DNV·GL

RE-ASSESSMENT REPORT

Public Certification Report for the Norway North East Arctic cod and haddock fishery

Norges Fiskarlag

Authors: John Nichols, Stephen Lockwood, Sten Sverdrup-Jensen, Guro Meldre Pedersen

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Task and objective:

The ojective of this report is the reasessment of the Norway North East Arctic cod and haddock fisheries.

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Reference to part of this report which may lead to misinterpretation is not permissible.

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Table of contents

ABBREVIATIONS & ACRONYMS 4

LIST OF SYMBOLS AND REFERENCE POINTS 5

1 EXECUTIVE SUMMARY 6
1.1 Assessment team 6
1.2 Assessment timeline 6
1.3 Principle level scores 7
1.4 Main strengths and weaknesses of the client's operation 7
1.5 Determination with supporting rationale 8
1.6 Conditions for certification and time-scale for compliance 9

2 AUTHORSHIP AND PEER REVIEWERS 12
2.1 Assessment team 12
2.2 Peer reviewers 13

3 DESCRIPTION OF THE FISHERY 15
3.1 Units of Certification and scope of certification sought 15
3.2 Overview of the fishery 16
3.3 Principle One: Target Species Background 23
3.4 Principle Two: Ecosystem Background 38
3.5 Principle Three: Management System Background 68

4 EVALUATION PROCEDURE 72
4.1 Harmonized Fishery Assessment 72
4.2 Previous assessments 76
4.3 Assessment Methodologies 86
4.4 Evaluation Processes and Techniques 89

5 TRACEABILITY 98
5.1 Eligibility Date 98
5.2 Traceability within the Fishery 98
5.3 Eligibility to Enter Further Chains of Custody 99
5.4 Eligibility of Inseparable or Practically Inseparable (IPI) stock(s) to Enter Further Chains of Custody 100

6 EVALUATION RESULTS 101
6.1 Principle Level Scores 101
6.2 Summary of Scores 101
6.3 Summary of Conditions 104
6.4 Determination, Formal Conclusion and Agreement 105
6.5 Changes in the fishery prior to and since Pre-Assessment 106

REFERENCES 107

APPENDIX 1 SCORING AND RATIONALES 113
Appendix 1.1 Performance Indicator Scores and Rationale 113
Appendix 1.3 Conditions and recommendations 284

APPENDIX 2. PEER REVIEW REPORTS 308
Peer reviewer A 308
Peer reviewer B 323

APPENDIX 3. STAKEHOLDER SUBMISSIONS 333
Appendix 3.1 Comments to Public Comment Draft Report 333

APPENDIX 4 SURVEILLANCE FREQUENCY 350

APPENDIX 5 CLIENT AGREEMENT 351

APPENDIX 6 OBJECTIONS PROCESS 352
Appendix 6.1 Changes to report following Technical Review 352

APPENDIX 7 SCORING OF OVERLAPPING FISHERIES 353

APPENDIX 8 VARIATION REQUEST AND RESPONSE – IPI STOCK(S) 358

APPENDIX 9 VARIATION REQUEST AND RESPONSE – IPI STATUS EXTENDED FOR RECERTIFICATION PERIOD 361

APPENDIX 10 VARIATION REQUEST AND RESPONSE – PARTIAL SITE VISIT 365

APPENDIX 11: CLIENT REVIEW OF PRELIMINARY DRAFT REPORT 368
Appendix 11.1: Assessment team response to client comments 373

ABBREVIATIONS & ACRONYMS

ACOM	(ICES) Advisory Committee
AFWG	(ICES) Arctic Fisheries Working Group
BSMP	Barents Sea Management Plan
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CPUE	Catch per unit effort
CRISP	Centre for Research-based Innovation in Sustainable fish capture and Pre-processing technology
DoF	Directorate of Fisheries
EEZ	Exclusive Economic Zone
ETP	Endangered, threatened and protected species
EU	European Union
FAM	Fisheries Assessment Methodology
FNI	Fridtjof Nansen Institute
GADGET	Globally applicable Area Disaggregated General Ecosystem Toolbox
GPS	Global Positioning System
HCR	Harvest Control Rule
HelCom	Baltic Marine Environment Protection (Helsinki) Commission
ICES	International Council for the Exploration of the Sea
IMR	Institute for Marine Research (Havforskninsinstituttet), Norway
IPI	Inseparable or practically inseparable catches
IUU	Illegal, unregulated and unreported fishing
IWC	International Whaling Commission
JNRCEP	Joint Norwegian–Russian Commission on Environmental Protection
JNRFC	Joint Norwegian-Russian Fisheries Commission
JRNFC	Joint Russian–Norwegian Fisheries Commission
MAREANO	Marine AREA database for NOrwegian waters / Marin AREAldatabase for NOrske kyst- og havområder
MFCA	Ministry of Fisheries and Coastal Affairs
MSC	Marine Stewardship Council
MTIF	Ministry of Trade, Industry and Fisheries
N	Norway
NAFO	Northwest Atlantic Fisheries Organization
NAMMCO	North Atlantic Marine Mammal Commission
NE	North East
NEA	North East Arctic
NEAFC	North East Atlantic Fisheries Commission
NFA	Norwegian Fishermen's Association (Norges Fiskarlag)
NGO	Non – Governmental Organization
NINA	Norsk institutt for naturforskning / The Norwegian nature conservation agency
NORWECOM	NORWegian ECOlogical Model system
NPI	Norwegian Polar Institute
OCEAN-CERTAIN	EU-funded program; OCEAN-CERTAIN – "Ocean Food-web Patrol – Climate Effects: Reducing Targeted Uncertainties with an Interactive Network"
OSPAR	Oslo and Paris Commission for the protection and conservation of the North-East Atlantic and its Resources
PI	Performance Indicator
PISG	Performance Indicator Scoring Guidepost
RECOVERY	Research on Effective Cod Stock Recovery Measures
SG	Scoring Guidepost
SMH	Sensitive marine habitat
TAC	Total Allowable Catch
UK	United Kingdom of Great Britain and Northern Ireland
UNEP	United Nations Environmental Programme
VME	Vulnerable marine ecosystem
VMH	Vulnerable marine habitat
VMS	Vessel monitoring system

VPA	Virtual population analysis
WGBYA	(ICES) Working Group on Bycatch of Protected Species
WGDEC	(ICES) Working Group on Deep-water Ecology
WGDEEP	(ICES) Working Group on the Biology and Assessment of Deep-sea Fisheries Resources
WGECO	Working Group on Ecosystem Effects of Fishing Activities
WGMME	(ICES) Working Group on Marine Mammal Ecology
WGSAM	Working Group on Multispecies assessment Methods
WGSE	(ICES) Working Group on Seabird Ecology
XSA	Extended survivors analysis

LIST OF SYMBOLS AND REFERENCE POINTS

B_{lim}	Minimum biomass below which recruitment is expected to be impaired or the stock dynamics are unknown.
B_{msy}	Biomass corresponding to the maximum sustainable yield (biological reference point); the peak value on a domed yield-per-recruit curve.
B_{pa}	Precautionary biomass below which SSB should not be allowed to fall to safeguard it against falling to Blim.
F	Instantaneous rate of fishing mortality
F_{lim}	Exploitation rate that is expected to be associated with stock 'collapse' if maintained over a longer time (precautionary reference point).
F_{max}	F where total yield or yield per recruit is highest (biological reference point)
F_{msy}	F giving maximum sustainable yield (biological reference point).
F_{pa}	Precautionary buffer to avoid that true fishing mortality is at Flim when the perceived fishing mortality is at Fpa.
MSY	Maximum Sustainable Yield
MSY $B_{trigger}$	Precautionary biomass level at which the management plan initiates specific harvest control rules to minimise the risk of further decline in biomass and concomitant risk to recruitment.

1 EXECUTIVE SUMMARY

This report provides information on the re-assessment of the Norway NEA cod and haddock fisheries against Marine Stewardship Council Fishery standard: Principles and Criteria for Sustainable Fishing.

The report is prepared by DNV GL for the client Norges Fiskarlag. The assessment was carried out using MSC Certification Requirements v1.3. The default assessment tree was used.

1.1 Assessment team

Principle 1 Expert and Team leader:	John Nichols
Principle 2 Expert:	Dr. Stephen Lockwood
Principle 3 Expert:	Sten Sverdrup-Jensen
DNV GL project manager and Chain of custody responsible:	Guro Meldre Pedersen

1.2 Assessment timeline

Announcement of re-assessment:	6 May 2014
Site visit and stakeholder consultations:	23 and 24 June 2014.
Target eligibility date:	25 April 2015 (expiry date of preceding certificates). In April 2015 a variation was requested by the assessment team and granted by the MSC to extend the preceding certificates for the Norway NEA cod and haddock certificates to 25 August 2015. In August 2015 a variation was requested by the assessment team and granted by the MSC to extend the preceding certificates for the Norway NEA cod and haddock certificates to **25 October 2015**.
Actual eligibility date:	**26 October 2015** (following the expiry date of the preceding certificates following extensions)

1.3 Principle level scores

Table 1 Principle scores for the Norway NEA cod fishery

	Trawl	Longline	Gill-net	Danish seine	Hook and line gears
Principle 1 – Target Species	95.6	95.6	95.6	95.6	95.6
Principle 2 – Ecosystem	85.3	86.7	85.7	85.7	87.0
Principle 3 – Management system	95.5	95.5	95.5	95.5	95.5

Table 2 Principle scores for the Norway NEA haddock fishery

	Trawl	Longline	Gill-net	Danish seine	Hook and line gears
Principle 1 – Target Species	95.6	95.6	95.6	95.6	95.6
Principle 2 – Ecosystem	85.3	86.7	85.7	85.7	87.0
Principle 3 – Management system	95.5	95.5	95.5	95.5	95.5

1.4 Main strengths and weaknesses of the client's operation

The attributes of the Norwegian North East Arctic cod and haddock fisheries that are helpful in achieving sustainability and thereby complying with MSC Principles and Criteria for Sustainable Fisheries are:

- The cod and haddock stocks in the North East Arctic are both well above Bpa. Fishing mortality for cod is currently below the Fpa, Fmsy and management plan levels and well below Flim. Fishing mortality for haddock has been below Fpa and well below Flim over recent years and has now fallen below the lower management plan and MSY level.
- There is a robust stock assessment for both cod and haddock supported by a raft of fishery independent surveys. The annual assessment firmly underpins the harvesting strategy which is designed to respond to the current status of the stocks and to maintain them at a level that supports a sustainable 'high long-term yield'
- The NEA cod and haddock have been subject to intense research, monitoring and stock assessments over the past 60 years. Thus, there is a significant body of reference data on life history, fecundity, spawning, distribution, growth, length at age, etc. all of which contribute to reliable stock assessments.
- Norway and Russia maintain a rigorous and effective control and surveillance regime through the joint arrangements (JNRFC), which ensures a high degree of compliance across all fishing fleets participating in this fishery. As a consequence the historical problem of IUU landings and discarding are no longer considered to be an issue
- Through the JNRFC, important research areas are identified and followed up resulting in a strong movement towards an ecosystem-based approach to the management of these fisheries.

- Research is on-going in plotting the distribution of sponges, corals and other vulnerable marine habitats in the Barents Sea (MAREANO project). Some sensitive habitat areas have been identified and these areas are closed to fishing.
- There is an effective national consultation process involving fishermen in the decision making process.
- Fishermen are represented and supported by Norges Fiskarlag (Norwegian Fishermen's Association / NFA) which was established in 1926 as an interest group for the hitherto unorganized Norwegian fishermen. The NFA's most important objective is to organize all professional Norwegian fishermen, and the activities embrace the political, economic, social and cultural fields of interest to its members, as well as other matters more or less directly connected to their fishing activities. The organisation encourages strict adherence of skippers to the laws, regulations and requirements of the fishery.

Weaknesses of the Norwegian North East Arctic cod and haddock fisheries in the context of fully meeting the MSC Principles and Criteria for Sustainable Fisheries are:

- The problem of illegal, unregulated and unreported (IUU) catches has been a major problem in the past in both fisheries, but since 2008 the practice appears to have ceased. Nevertheless the unreliability of past estimates of the catch could still be adversely affecting the current assessment.
- Incomplete survey coverage in recent years has generated some uncertainty in relation to the resultant tuning indices for both cod and haddock assessments. In 2012 the spatial coverage in the joint winter survey was incomplete because of technical problems with a Norwegian survey vessel.
- The occurrence of coastal cod in the fishery within 12 nml of the coast generates some uncertainty regarding the impact of the fishery on this potentially vulnerable component. It has been identified as an IPI stock in this assessment and for practical reasons the actual catch of coastal cod, is difficult to assess.
- It has been estimated from reference fleet data that as many as 7,000 porpoises might be killed annually by gillnetters. There is a lack of reliable data on the size of the NE Arctic porpoise population and therefore the impact of this mortality level cannot be quantified.

1.5 Determination with supporting rationale

The Norway NEA cod and haddock fisheries achieved a score of 80 or more for each of the three MSC Principles, and did not score under 60 for any of the set MSC criteria.

The fisheries achieved a score of less than 80 for three individual performance indicators (PIs), including a below 80 score for two individual scoring elements for one of the PIs, and therefore four appropriate conditions have been raised.

Based on the evaluation of the Norway NEA cod and haddock fisheries as presented in this report, the assessment team recommends the certification of the fisheries, with four conditions and two recommendations for the client Norges Fiskarlag (Norwegian Fishermen's Association).

Two conditions from the initial assessment are carried over into the new certification period, based on a process allowed by MSC in their response to the variation request to combine the inshore and offshore components of these fisheries (28.11.2011): *Where the inshore components have slightly*

different conditions, they will be evaluated according to the timescale established in the inshore fishery Public Certification Report. (If necessary, these timescales would be continued into the recertification period, assuming progress is on-target for completion.)

The Technical Reviewer at DNV GL adheres to the recommendation of the assessment team and approves the certification of the Norway NEA cod and haddock Fishery for the client Norges Fiskarlag.

1.6 Conditions for certification and time-scale for compliance

The Norway NEA cod and haddock fisheries achieved a score of below 80 against three scoring indicators. The assessment team has set four new conditions for continued certification that the client is required to address. The conditions are applicable to improve performance to at least the 80 level within the period set by the DNV GL assessment team. Two recommendations were set for the fisheries. Two conditions from the initial assessment are carried over into the recertification period (see Appendix 1.3.1 for details).

Table 3 Summary of conditions for Norway NEA cod and haddock fisheries carried over from the initial assessment (detailed in Appendix 1.3)

Condition number	Performance indicator	Condition	Gear
1	2.1.1 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.	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.	All gear types
2	2.3.1 The fishery meets national and international requirements for protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of 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.	Trawl, longline, gill net, Danish seine

Table 4 Summary of new conditions for Norway NEA cod and haddock fisheries (full text available in Appendix 1.3)

Condition number	Performance indicator	Condition	Gear
3	2.3.1 The fishery meets national and international requirements for the protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species	The quantity and quality of data available for estimating porpoise population size and fishery related mortalities must be improved to a level where effects of the fishery are known and can be shown to be highly likely within limits of national and international requirements for protection of ETP species; i.e. gillnet induced mortality rates must be within internationally agreed levels of sustainability.	Gill-net
4	2.3.2 The fishery has in place precautionary management strategies designed to: • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species.	A strategy for managing the fishery's impact on porpoise shall be developed that includes measures to minimise gillnet-related mortality and is highly likely to achieve national and international requirements for the protection of ETP species, i.e. harbour porpoise.	Gill-net
5	2.4.1 The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.	The fishery shall demonstrate that it is highly unlikely to reduce Pennatulacea (sea pens) habitat structure and function of to a point where there would be serious or irreversible harm.	Trawl, Danish seine
6	2.3.1 The fishery meets national and international requirements for the protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species	The effects of the fishery on the golden redfish (i.e. *Sebastes norvegicus*, previously *S. marinus)* should be highly likely to be within limits of national and international requirements for protection of this ETP species. The client must present evidence that the direct effects of the fishery are highly unlikely to create unacceptable impacts to this ETP species.	All gears

Table 5 Summary of recommendations

Recommendation number	Recommendation	Gear
1	Following a variation granted by the MSC 26. November 2014, the designation of the Norwegian coastal cod stock as an Inseparable or Practically Inseparable (IPI) stock will remain in effect for another certification period, pending the successful reassessment of the Norway NEA cod fishery. For any future re-assessment the MSC Certification Requirements, CR v1.3 CH 3.1, suggests that the CAB may make a recommendation to either - promote the future Principal 1 assessment of the IPI stock (CH 6.1.1.1) or - to develop techniques to effectively separate the catches of the currently IPI stock (CH 6.1.1.2) or - to develop measures to reduce the proportion of the IPI stock in the catches to 2% or less and ensure that the catch of the IPI stock does not create a significant impact on the state of the IPI stock as a whole (CH 6.1.1.3). For the Norwegian coastal cod we consider it unlikely that they can be practically separated in the mixed catches with NEA cod. The assessment team therefore recommends that the client make representations to the appropriate authority for action to ensure that, for any future re-assessment of the fishery the Norwegian coastal cod can either; • be dealt with under Principle 1 or • the catch of Coastal cod can be reduced to 2% or less of the total combined cod catch.	All gears
2	It is recommended that steps are taken to bring Norwegian SMH protection measures in line with internation standards recommended elsewhere. *i.e.* • the move-on rule should apply to all coaral catches (soft and hard) exceeding 30 kg; • the move-on rule should apply to sponge bycatch that exceeds 400 kg; • the move-on rule should be applied to all catches of sea pens, or similar burrowing megafauna, exceeding 7 kg; • the move-on rule should be increase from 2 to 5 nautical miles.	All gears

2 AUTHORSHIP AND PEER REVIEWERS

2.1 Assessment team

The assessment team consisted of John Nichols (Principle 1 expert and team leader), Dr. Stephen Lockwood (Principle 2 expert), Sten Sverdrup-Jensen (Principle 3 expert) and Guro Meldre Pedersen (DNV GL project manager and Chain of custody responsible).

John Nichols – Principles 1 and Team Leader: John Nichols is a retired UK government fisheries biologist with 42 years research experience in plankton ecosystems in the North Atlantic specializing in the taxonomy of North Atlantic & NW European plankton including phytoplankton, micro and meso-plankton, ichythoplankton and young fish. He has been a member of ICES working groups on herring, mackerel, horse mackerel, sardine and anchovy assessments; and mackerel and horse mackerel egg surveys. He was also a member of ICES study groups on herring larval surveys and plankton sampling. He was scientist in charge Certificate sharing mechanism of numerous research vessel surveys for fish stock assessment purposes and directly involved in the assessment of pelagic and western demersal fish stocks from 1994 to 2000. He has been involved in the publication of over fifty scientific papers and reports, more than half of which have been in peer reviewed journals, and the publication of two fish egg and larvae identification keys. Since retirement from his government post he has participated in a total of 25 different fisheries MSC assessments as the Principle 1 expert plus the re-assessments of many of those fisheries. Those assessments include the Thames estuary herring, PFA North Sea Herring, NEA mackerel and Atlanto-Scandian herring, Hastings Fleet Dover sole, the north –east coast of England bass fishery, the SW mackerel hand line fishery, Portuguese sardine, a Newfoundland herring fishery, Canadian Pacific sablefish, various Norwegian and Swedish pelagic fisheries, Faroese and Norwegian saithe fisheries, Faroese and Russian Arctic cod and haddock fisheries and a North Sea plaice and sole fishery. He has also been a peer reviewer for numerous MSC certification reports by various Conformity Assessment Bodies and has also carried out two MSC pre-assessments and numerous annual audits. In 2010 he delivered a lecture on 'The Importance of a Fisheries Interaction with the Ecosystem in the MSC Certification Process' at an international Safe Seas conference in Portugal

Dr. Stephen Lockwood - Principle 2: Stephen Lockwood is an independent marine environment consultant with over 40 years' experience of marine fishery and environmental research and management. From 1967 to 1999 he was a government fishery scientist at the Fishery Laboratory (now Cefas) Lowestoft and then Conwy, North Wales. His research covered fishery coastal ecology, stock assessment and management, and fishery interests in coastal zone management. As a consultant he has prepared environmental impact assessments for a variety of coastal and offshore developments and contributed as a peer reviewer, assessment team member and annual surveillance auditor for numerous UK, European and North American fisheries seeking MSC certification.

Professor Sten Sverdrup-Jensen – Principle 3: Professor Sten Sverdrup-Jensen has more than 30 years of experience with Danish and international fisheries. In 1978-81 he was the Director of the North Jutland County/Aalborg University Fisheries Research Group undertaking the first EU fisheries research project in Denmark. As founding director of Danish Institute of Fisheries Technology 1981- 87 Sten Sverdrup-Jensen was involved in various research and consultancy projects focusing on fisheries management and development in Denmark. After leading a global evaluation of EU fisheries development aid Sten Sverdrup-Jensen in 1991 took up a position as Planning Adviser to the Director General and Acting Director of Social Science Division at ICLARM

(now World Fish Centre). Upon his return to Denmark Sten Sverdrup-Jensen in 1993 was the founding director of IFM and involved in research and consultancy work related primarily to institutional aspects of fisheries management for a range of Danish and international clients. After having served as Chief Technical Adviser to Danida/Mekong River Commission on the establishment of fisheries R&D institutes in Cambodia and Laos in 1999-2002 Sten Sverdrup-Jensen re-joined IFM and took up positions as Senior Researcher and Acting Director/Head of Centre. His most recent research work relates to EU fisheries (e.g. Indicators for Fisheries Management in Europe, IMAGE). In 2008 Sten Sverdrup-Jensen was appointed Professor (adj.) at Aalborg University. Sten Sverdrup-Jensen has participated in a number of MSC Fishery assessments as P3 expert.

Guro Meldre Pedersen - Chain of Custody & DNV GL Project manager. Pedersen was involved in the initial accreditation process for DNV GL for the MSC programme, and since joining DNV GL - Business Assurance as Global Seafood Coordinator in 2010 she has been supporting the MSC Fishery and Chain of Custody programmes, including participation in accreditation audits. She has participated in site visits and contributed to MSC assessment processes for Norway North Sea saithe, Norway North East Arctic saithe, Norway spring spawning herring and Norway North Sea and Skagerrak herring fisheries. She has been project manager for several MSC Fishery surveillance activities and pre-assessments.

2.2 Peer reviewers

Based on their qualifications and experience with the MSC Fishery programme and components of the Unit of Certification, the following peer reviewers were selected:

Peer reviewer 1: Geir Hønneland is Research Director of the Fridtjof Nansen Institute in Oslo, Norway, and adjunct professor at the University of Tromsø, Norway. He holds a Ph.D in political science from the University of Oslo and has primarily studied international fisheries management (with a main emphasis on compliance issues), international environmental politics and international Arctic politics more widely. Among his recent books are Arctic Politics, the Law of the Sea and Russian Identity (Palgrave, 2014), Making Fishery Agreements Work (Edward Elgar, 2012), International Environmental Agreements (Routledge, 2011), Arctic Politics and International Cooperation (Routledge, 2007) and Law and Politics in Ocean Governance: The UN Fish Stocks Agreement and Regional Fisheries Management Regimes (Martinus Nijhoff, 2006). He worked in the Norwegian Coast Guard from 1988 to 1994, where he was certified as fisheries inspector. Geir also has a wide range of evaluation and consultancy experience, e.g. for the FAO and OECD, relating to responsible fisheries management. He has been involved in MSC assessments since 2009 (covering cod, haddock and herring fisheries in the Northeast Atlantic and krill in the Southern Ocean) and was certified as MSC Team Leader in 2014.

Peer reviewer 2: Hans Lassen is an independent consultant working with fisheries management, fisheries statistics and fish stock assessments. He started his career as researcher on computer simulations on chemical reactions, but has spent the last forty years focusing on the fishery sector. As a researcher and later principle senior scientist at Danish Institute for Fisheries Research / DTU he focused on fish stock assessment, computer simulations of ecosystems and fisheries statistics. Lassen has been head of ICES Advisory Programme (1998-2010) and Deputy and acting Director of Greenland Institute for Fisheries Research (now Greenland Nature Institute) (1988-1992). An important aspect of his work has been international cooperation. He has been member of numerous ICES assessment groups and chaired some of them, member of ACFM, responsible for interactions with industry and NGOs, and also been teaching fish stock assessment techniques

internationally. Lassen has been part of the assessment team for two full assessments of fisheries against the MSC Principle and Criteria for sustainable fisheries; the completed assessment of the West Greenland cold water prawn fishery and the ongoing assessment of the Greenland trawl fishery for cod, haddock and saithe in the Barents Sea.

3 DESCRIPTION OF THE FISHERY

3.1 Units of Certification and scope of certification sought

According to the MSC Certification Requirements v1.3, the proposed unit of certification shall include the target stock (s), the fishing method or gear and the practice (including vessels) pursuing that stock.

The MSC Certification Requirements Guidance V1.3 specifies 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 that stock". The units of certification for the Norway NEA cod and haddock fisheries are provided in Table 6 and Table 7.

Table 6 Norway NEA cod fishery – Units of Certification

Species:	Atlantic cod *(Gadus morhua)*
Geographical range of fishing operations:	North East Arctic Ocean, within FAO Area 27, ICES Sub-Areas I and II
Method of capture:	Trawl, Longline, Gill-net, Danish seine, Hook and line gears
Stock:	North East Arctic cod
Management:	Joint Norwegian-Russian Fisheries Commission & Norwegian Authorities
Client group:	Norges Fiskarlag on behalf of the entire Norwegian Fleet

Table 7 Norway NEA haddock fishery – Units of Certification

Species:	Atlantic haddock *(Melangrammus aeglefinus)*
Geographical range of fishing operations:	North East Arctic Ocean, within FAO Area 27, ICES Sub-Areas I and II
Method of capture:	Trawl, Longline, Gill-net, Danish seine, Hook and line gears
Stock:	North East Arctic haddock
Management:	Joint Norwegian-Russian Fisheries Commission & Norwegian Authorities
Client group:	Norges Fiskarlag on behalf of the entire Norwegian Fleet

3.1.1 Other eligible fishers

As the entire Norwegian fleet is included in the Unit of Certification, no other eligible fishers have been identified.

3.1.2 Unilateral exemption and destructive fishing practices

The fishery is not conducted under a controversial unilateral exemption to an international agreement. Fishing operations do not include destructive fishing practices such as fishing with poisons or explosives.

3.1.3 Scope of Assessment in Relation to Enhanced Fisheries

The Norway NEA cod and haddock fisheries are not enhanced fisheries.

3.1.4 Scope of Assessment in Relation to Introduced Species Based Fisheries (ISBF)

The Norway NEA cod and haddock fisheries are not based on any introduced species.

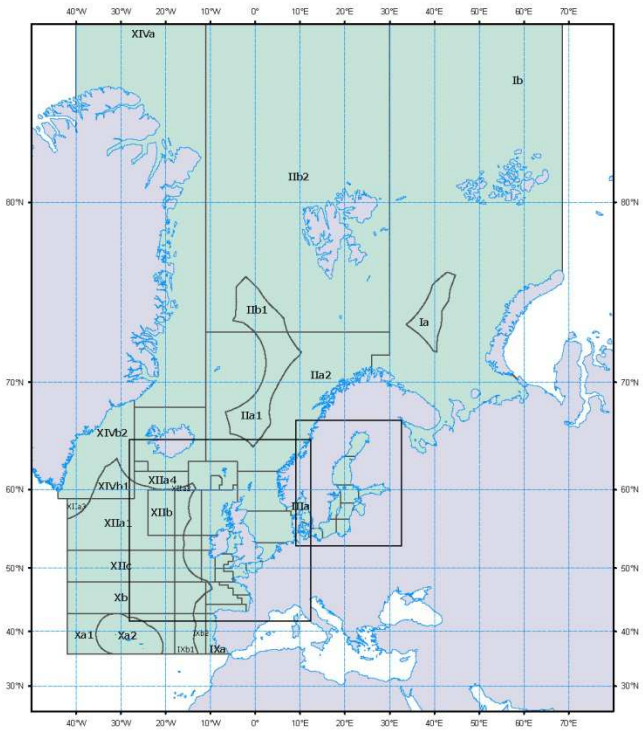

Figure 1 FAO Area 27, ICES Sub-Areas I and II

3.1.5 Scope of Assessment in Relation to Inseparable or Practically Inseparable (IPI) stocks

Norway coastal cod are practically inseparable from the target stock of Norway North East Arctic cod during normal fishing operations. Norwegian coastal cod is caught together with North East Arctic cod stock within the 12nm Norwegian coastal zone. The two stocks cannot be separated in the catches or during landings and are only separable retrospectively by apportioning catches taken in that area by scientific sampling of the landings. The separation method is based on the microscopic analysis of differences in the otolith type and structure. The proportion of Norwegian coastal cod in the total combined catch was 2.3 % and the proportion in the total Norwegian catch was 4.9% in 2013. Coastal cod is described in section 3.4.8 and assessed under PI 2.1 Retained species in this assessment.

For further details on eligibility of IPI stocks to enter further chains of custody, please see section 5.4. MSC CR v1.3 Annex CH for IPI fisheries applies to this assessment, except CH 4.1 where a variation has been granted. Details on variations related to IPI stocks are provided in Annex 8 and Annex 9.

3.2 Overview of the fishery

Norges Fiskarlag (Norwegian Fishermen's Association, NFA) is responsible client for the Norway NEA cod and haddock fisheries.

Client name:	**Norges Fiskarlag**
Contact person:	Tor Bjørklund Larsen
Address:	Postbox 1233 Sluppen Pirsenteret, 7462 Trondheim, Norway
Telephone:	+ 47 73 54 58 50 / +47 930 44 346
Email:	fiskarlaget@fiskarlaget.no / tor@fiskarlaget.no

Norges Fiskarlag (Norwegian Fishermen's Association / NFA) was established in 1926 as an interest group for the hitherto unorganized Norwegian fishermen. The main focus was better control of the fish brought to shore and improved working conditions in the high-risk profession. As a direct result of the organization's efforts, the Raw Fish Act was introduced in 1938, ensuring the fishermen a minimum price for fish delivered.

The NFA's most important objective is to organize all professional Norwegian fishermen, and the activities embrace the political, economic, social and cultural fields of interest to its members, as well as other matters more or less directly connected to their fishing activities. The organisation is a politically independent, national organisation based on voluntary membership of fishermen via their county associations and group organizations. The highest governing body of the NFA is its Congress, which consists of 69 delegates, elected by the seven county associations and two group organizations which together constitute NFA. The Congress meets biannually. Intermediate authority is exercised by the National Committee that comprises of 14 members chosen from the member organisations and elected by the Congress. The main office in Trondheim is staffed by approximately 20 people, including the General Secretary, Assistant General Secretary and sections for areas of specific interest including resource management.

The NFA organizes both owners of fishing vessels and fishermen working on a share or percentage basis. The organization today represents about 25% of the registered Norwegian fishermen. NFA coordinates MSC Fisheries certification processes for the following fisheries on behalf of the entire Norwegian fleet:

- **Norway North East Arctic Cod**
- **Norway North East Arctic Haddock**
- Norway North East Atlantic mackerel (through MINSA)
- Norway North Sea and Skagerrak Herring
- Norway spring spawning Herring
- Norway North East Arctic Saithe
- Norway North Sea Saithe
- Norway North East Arctic Cold Water Prawn

3.2.1 The North East Arctic cod fishery

The North East Arctic cod fishery is conducted both with an international trawler fleet and with coastal vessels using traditional fishing gears. Cod is a target species in a mixed fishery taking haddock and saithe as major by-catch species. Two species of redfish*, Sebastes norvegicus and S. mentella* are also taken as by-catch. A separate Norwegian coastal waters cod stock inhabits the Norwegian fjords and Norwegian coastal zone out to 12nml. Within the 12nml coastal zone these coastal cod are found together with the Northeast arctic cod offshore stock and are taken in combined catches in that area. The two components cannot be separated in the catches or during landings. They are only separable by apportioning catches taken in that area by scientific sampling of the landings. The separation method is based on the microscopic analysis of differences in the otolith type and structure (Berg et al, 2005). In terms of the fishery they are considered to be an inseparable or practicably inseparable component of the landings. For management and stock assessment purposes all cod caught between latitudes 62°N and 67°N for the whole of the year and between 67°N and 69°N for the second half of the year have been considered to be from the Norwegian coastal cod stock. In 2013 the assessment working group (ICES 2014a) explored and accepted a new method, the ECA program, the results of which are described in section 3.3.2.

Quotas were introduced in 1978 for the trawler fleets and in 1989 for the coastal fleets. In addition to quotas, the fishery is regulated by a minimum catch size, a minimum mesh size in trawls and

Danish seines, a maximum by-catch of undersized fish, a maximum by-catch of non-target species, closure of areas having high densities of juveniles and by seasonal and area restrictions (ICES, 2014b). Since 1997 sorting grids have been mandatory for all trawl fisheries in most of the Barents Sea and Svalbard area. From 2011 the minimum mesh size, for bottom trawl fisheries for cod and haddock for the whole of the Barents Sea, changed to 130mm. Prior to that it was 135mm in the Norwegian EEZ and 125mm in the Russian EEZ. Minimum landing size was also changed, from 1 January 2011, to 44cm in all areas. Previously the minimum size was 42cm in the Russian EEZ and 47cm in the Norwegian EEZ. These changes were part of a harmonisation of the regulations in each EEZ and included changes to the percentage of undersized fish permitted in the catch.

In the past there has been a major issue of unreported and unregulated catches in this fishery. The ICES Arctic Fisheries Working Group (AFWG) had only limited information on the extent of the problem before 2002 although from 1990 to 1992 ICES estimated unreported landings of between 25,000t and 130,000t annually (ICES, 2014a). From 2002 to 2008 the AFWG estimate of landings exceeded the Official landings figures by an average of 15% (87,000t) each year and was as high as 26% (166,000t) in 2005 (ICES, 2014b). More rigorous enforcement measures, including inspections at sea and designated catch control and landing points and VMS tracking of some vessels have seen the problem virtually eliminated since 2009 (ICES, 2014a).

Figure 2 shows the fluctuating pattern of annual landings of Northeast Arctic cod over the period 1946 to 2013 (ICES, 2014b). Over the post war period through to the early 1960s landings generally fluctuated between 600,000 and 800,000 tonnes with the exception of two years, 1955 and 1956 when landings went over one million tonnes to a post war high of 1.3 million tonnes in 1956. From a subsequent low of 438,000t in 1964 landings rapidly increased to over a million tonnes in 1968 and 1969. Landings then fluctuated but remained above half a million tonnes after which there was a steady decline to less than 300,000t in 1983. After a small and very short recovery landings fell rapidly to the lowest recorded level, in the historic time series, of 212,000t in 1990. Landings then increased again fluctuating between a high of 771,000t in 1994 to 415,000t in 2000. Since then landings have fluctuated between 500,000t and 700,000t but increased considerably in 2013 to 966,000t. This is the highest recorded since 1974 (ICES, 2014b).

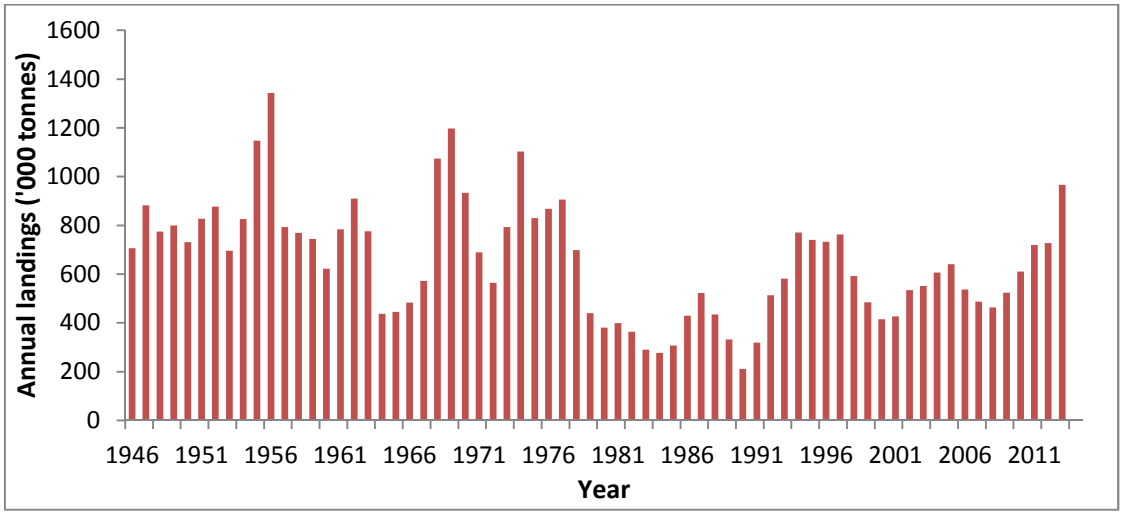

Figure 2 Annual (ICES) landings of Northeast Arctic cod, in thousands of tonnes, over the period 1946 to 2013. (Data source ICES 2014b).

Fishing mortality, calculated on ages 5- 10 years old, over the period 1946 to 2013 (Figure 3) has shown similar fluctuations but has been below the limit level of F0.74, established in 1998, since 2001. The ICES precautionary approach fishing mortality (Fpa/Fmsy) was reduced from F0.42 to F0.4 in 2003 and is the highest F estimate having a >90% probability of remaining above Blim. Fishing mortality has been maintained below that level since 2007 but did increase from F0.24 in 2012 to F 0.34 in 2013 (ICES, 2014b). The reduction in fishing mortality in recent years is largely attributable to the implementation of the management plan (2004) and harvest control rule and to the absence of unregulated and underreported catches,

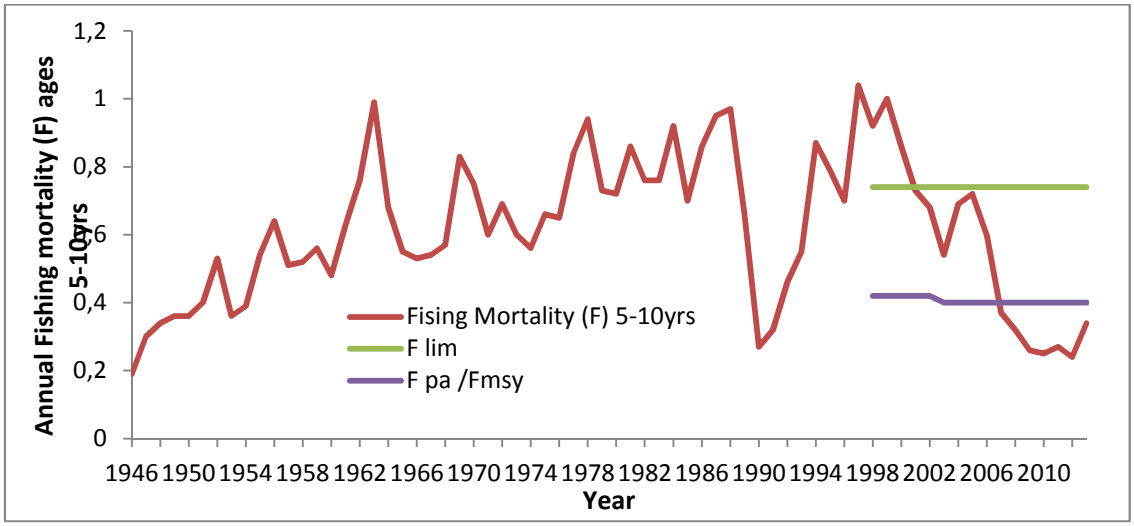

Figure 3 Fishing mortality (F, ages 5-10 years) of the Northeast Arctic cod over the period 1946 to 2013. The precautionary approach and limit levels of fishing mortality are also shown from when first established in 1998. Data source: (ICES, 2014b)

Historically the cod fishery in the north east Arctic was dominated by Norway, the United Kingdom and Russia through to the late 1970s. Following the establishment of 200 nautical mile exclusive economic zones in the early 1980s, the fishery became dominated by Norway and Russia through to the present time. Over the past fifteen years Norway has taken an average of 45% of the catch, Russia 42% and other countries 13%.

The total catches, by each country, of Northeast Arctic cod in ICES sub-Areas I and II from 2007 to 2013 are shown in Table 8. The total catches includes a small quantity of 'others' which includes unspecified EU catches (ICES, 2014b)

Table 8 Catches of Northeast Arctic cod (tonnes) by countries from ICES sub- Areas I and II from 2007to 2013. The 2013 figures are still provisional. Data source: (ICES, 2014b)

Year	2007	2008	2009	2010	2011	2012	2013
Faroes	14,788	15,812	16,905	15,977	13,429	17,523	13,833
France	3,190	3,149	3,908	4,499	1,173	2,841	7,858
Greenland	5,951	5,617	4,977	6,584	7,155	8,520	7,885
Germany	4,619	4,955	8,585	8,442	4,621	8,500	8,010
Norway	199,809	196,598	224,298	264,701	331,535	315,739	438,734
Spain	9,496	9,658	12,013	12,657	13,291	12,814	15,042
UK	9,298	8,287	8,632	9,091	8,210	11,166	12,536
Russia	188,229	190,225	229,291	267,547	310,326	329,943	432,314
Iceland	7,316	7,535	7,380	11,299	12,734	9,536	14,734
Others	5,101	7,336	7,442	9,185	17,354	11,081	15,263
Total	445,796	449,171	523,431	609,983	719,829	727,663	966,209

3.2.2 The North East Arctic haddock fishery

The North East Arctic haddock fishery is mainly a bottom trawl fishery and is generally a by-catch of the much larger cod fishery over the same areas. There are some directed trawl and longline fisheries specifically for haddock particularly in years of high fishable stock abundance.

A raft of enforcement measures exist to protect the stock and to ensure sustainability of the fishery. These include minimum landing size, minimum mesh size for trawls and Danish Seines, maximum by-catch of undersized fish, maximum by-catch of non-target species, flexible area closures when large numbers of juveniles occur and other seasonal and area closures. Since 1997 sorting grids have been mandatory for the trawl fisheries in most of the Barents Sea and Svalbard area.

Technical regulations for demersal fisheries were harmonized from January 2011 so that they are now the same in both the Norwegian and Russian EEZs (ICES, 2014a). Before 2011 the minimum landing size was 44cm from within the Norwegian EEZ and 39cm from within the Russian EEZ. Up to 2010 the minimum mesh size was 135mm in the Norwegian EEZ and 125mm in the Russian EEZ. From 2011, for the whole of the Barents Sea, the minimum landing size became 40cm and the minimum mesh size 130mm.

Annual quotas have been in place for trawl fisheries since 1978 and Norway sets separate quotas for the trawl fishery and for other gears. There is a total ban on discarding over the whole of the area together with a maximum by-catch of undersized fish. The maximum allowable percentage of undersized fish is 15% by number of cod, haddock and saithe combined in the Norwegian EEZ and 15% by number of cod and haddock combined in the Russian EEZ. Previously it was 15% by number of each species. It is known that there is still some, unrecorded, discarding in the longline and trawl fisheries.(ICES, 2014a)

Illegal and unreported landings have been a problem in this fishery in the past , linked strongly to practices within the cod fishery. The ICES Arctic Fisheries Working Group (AFWG) had no information on the extent of the problem before 2002 (ICES, 2009; ICES, 2010a). From 2002 to 2007 the AFWG estimate of landings exceeded the Official landings figures by an average of 16%

each year and was as high as 25% in 2005. This problem was addressed by more rigorous enforcement measures, including inspections at sea and designated landing points. As a result the problem was gradually reduced and in 2008 the ICES estimated catch exceeded the official landings by just 4%. Since 2008 the ICES assessment working group no longer consider that illegal and unreported landings to be a significant issue and the official and ICES estimates of the catch have been the same since 2009 (ICES, 2014a).

Figure 4 shows the pattern of landings over the period 1950 to 2013 (ICES, 2014c). The historic high landings, of 322,226 t, in 1973 divides the time-series into two periods. In the first period, highs were close to 200,000 t around 1956, 1961 and 1968, and lows were between 75,000 and 100,000 t in 1959, 1964 and 1971. The second period showed a steady decline from the peak in 1973 down to the historically low level of 20,945 t in 1984. Since then landings have fluctuated with short periods of increase followed by further decline. Following a low of 68,944t in 2000 the fishery has enjoyed a period of reasonable productivity peaking at over 300,000t in 2011 and 2012. In 2013 landings fell by 39% to 193,744t as the influence of strong year classes from 2004 to 2006 decreased

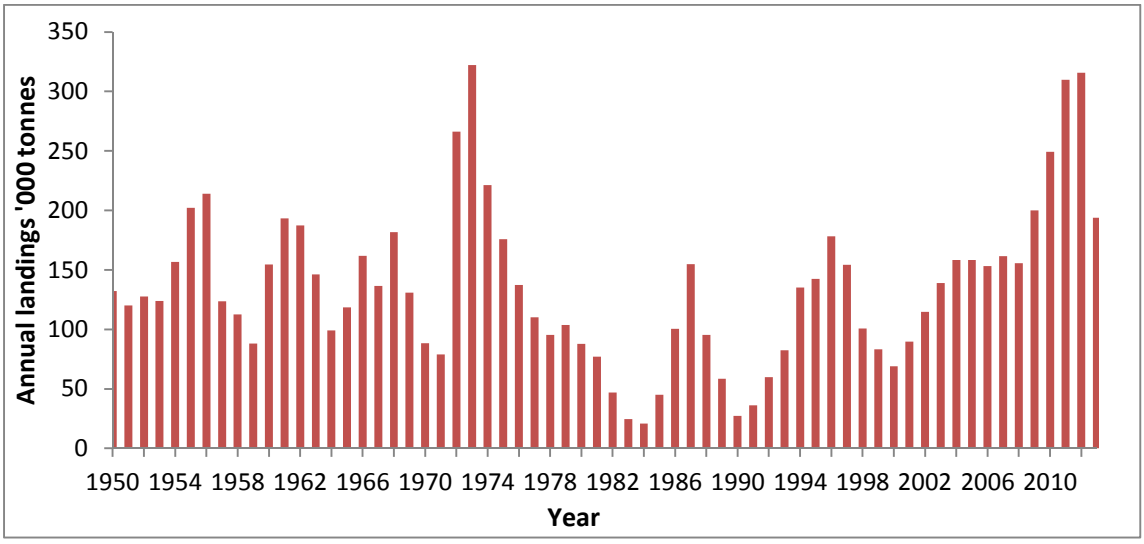

Figure 4 Annual landings of North East Arctic haddock, in thousands of tonnes, over the period 1950 to 2013. Data source: (ICES 2014c)

Annual fishing mortality over the period 1950 to 2013, based on ages 4 to 7 years in the fishery, is shown in Figure 5. This shows a fluctuating pattern with the level consistently below what is now considered to be a precautionary limit level of F_{lim}0.77 since 1978. With the exception of 1997 fishing mortality has been consistently below the precautionary approach level of F 0.47 since 1989. It has fluctuated around the the maximum sustainable yield and management plan target level of F0.35 over recent years. (ICES, 2014c). The estimation of annual fishing mortality is obviously strongly influenced by the choice of reference age range. The effect of large year classes, such as those between 2004 to 2006, can be difficult to predict in particular if effort is targeted on them when they move out of that age range. As a consequence fishing mortality on ages 4-7 years may not be a good indicator of current exploitation levels.

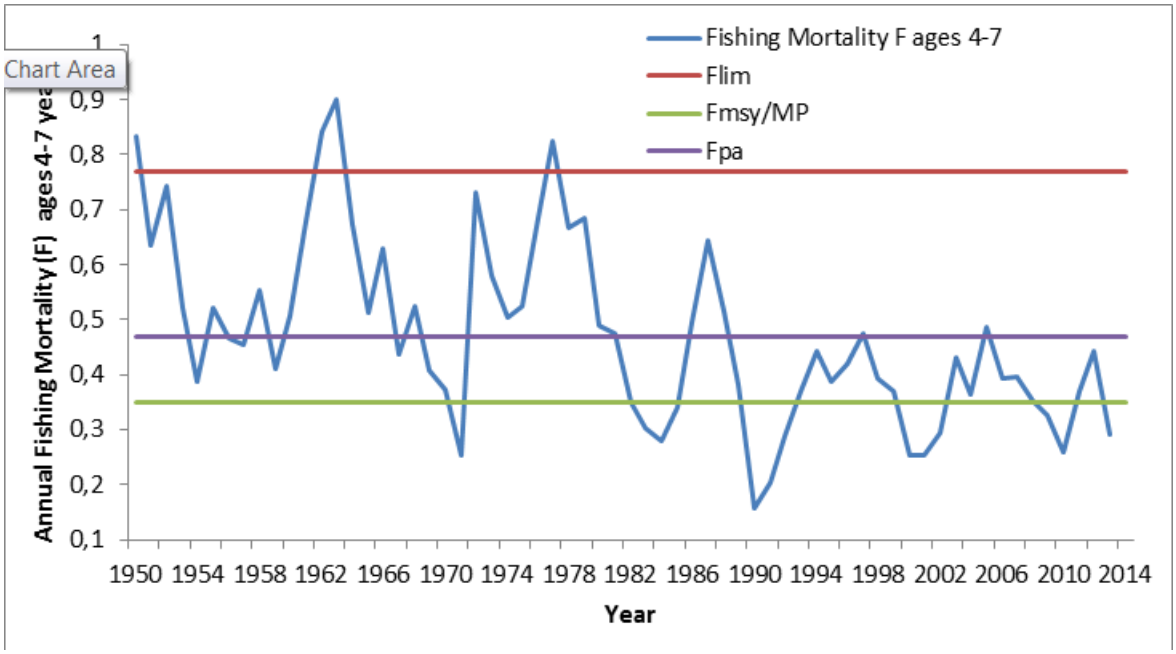

Figure 5 Annual fishing mortality on the North East Arctic haddock stock, based on ages 4-7 years, over the period 1950 to 2013. The current agreed limit level (Flim), Maximum sustainable yield and Management plan (Fmsy/MP) and Precautionary approach (Fpa) reference points are also shown. Data source: ICES, 2014a .

Before the establishment of national exclusive economic zones (EEZs) for fisheries in 1977 the haddock catches were shared mainly between Norway Russia and the UK. Since 1977 Norway and Russia have dominated the catches with on average 96% of the annual catches (Norway 56%: Russia 40%). Figure 6 shows the actual catches and the proportions of the catches by Norway, Russia and all other countries, in the 2013 fishery.

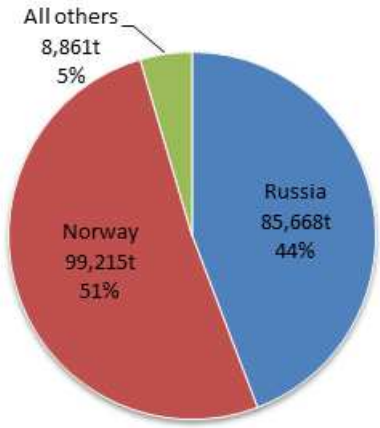

Figure 6 The share of the catches of North East Arctic haddock by Norway, Russia and other countries in 2013. Data source: (ICES 2014c)

The total catches, by each country, of North East Arctic haddock in ICES sub-Areas I and Divisions IIa and IIb from 2007 to 2013 are shown in Table 9 below which includes some catches allocated to other unspecified countries.

Table 9 Catches of North East Arctic haddock (tonnes) by countries from ICES Subarea I and Divisions IIa and IIb combined over the period 2007 to 2013. Data source: (ICES 2014c)

Year	2007	2008	2009	2010	2011	2012	2013
Faroes	2,307	2,687	22,820	3,173	1,759	2,055	1,886
France	277	311	529	764	268	322	342
Greenland	1,464	1,659	1,410	1,970	2,110	3,984	1,795
Germany	1,123	535	1,957	3,539	1,724	1,111	500
Norway	71,244	72,779	104,354	123,384	158,202	159,602	99,215
Spain	125	283	317	379	502	441	439
UK	1,351	971	1,315	1,758	1,379	833	639
Russia	66,569	68,792	85,514	111,372	139,912	143,886	85,668
Others	2,511	1,759	1,845	2,862	4,763	3,393	3,260
Total	161,525	155,604	200,061	249,200	309,785	315,627	193,744

3.3 Principle One: Target Species Background

3.3.1 NEA cod – Life History

The North Atlantic cod is a demersal living roundfish of the order Gadidae. It is widespread across the shelf areas of the temperate North Atlantic from Newfoundland north to Greenland, Iceland and the Barents Sea, and south through the North Sea to the English Channel and also to the west of the British Isles and in the Irish Sea (Wheeler, 1969). It also occurs in the Skagerrak, Kattegat and in the Baltic Sea. It is found in depths ranging from the shoreline out to 600m. It is a highly migratory fish and there are individual tagging records showing fish that have travelled across the Atlantic Ocean. Population studies have shown that stocks within certain areas do remain discreet and have separate and clearly identifiable spawning areas. The population in the Barents Sea and Norwegian Sea, in ICES sub-areas I and II, is sufficiently discreet to be managed as a separate stock, the North East Arctic cod stock. A separate coastal cod stock inhabits the Norwegian fjords and the Norwegian coastal zone out to 12nml where it does mix with the North East Arctic cod at various stages in its life history. These coastal cod generally only occur within 12nml of the coast and can be identified on morphometric characters in particular in the otolith (Berg et al 2005). Cod spawn over much of the continental shelf areas of northern Europe generally in depths of less than 200m. Northeast Arctic cod become mature at between five and ten years old which is two to three years later than populations further south in the North Sea. There is a suggestion that the mean age at maturity may be reducing which could be a response to environmental change and/or to fishing pressure. However examination of the survey data over the past twenty five years provides no strong evidence of this (ICES, 2014a). An average female produces around five hundred ripe oocytes per gram of body weight which equates to around 5 million eggs for a 100cm long female. The spawning areas of the Northeast Arctic cod extend all the way down the northern part of the Norwegian coast from Finmark to Stad but the most important spawning grounds are off the Lofoten archipelago. Spawning occurs from February through to April. The egg and larval stages are planktonic and subject to the North Atlantic drift which distributes them, via the Spitzbergen and North Cape currents, northwards over the whole of the north-east Arctic basin. The juveniles become demersal at around 7cm in length when they are about 6 months old. From an early demersal stage cod are generally opportunistic feeders and will take crustaceans, molluscs, other invertebrates and fish of any kind. In the north-east Arctic capelin and herring are very important sources of food for cod and year to year fluctuations in their abundance can have a

significant effect on the growth rates and maturity of cod. In some years the mean weight of fish at the same age may vary by a factor of 2 or 3 times. (ICES 2014a, Annexe 03).

3.3.2 NEA cod – Stock status and stock assessment

Total landings of cod from sub-Areas I and II in 2013 were 991,909t which includes an estimate of 25,700t of Norwegian coastal cod (ICES 2014d). In 2014 the assessment working group (ICES 2014a) explored and accepted a new method, the ECA program, for determining the catch of coastal cod. This has led to changes in the perception of the catch of coastal cod from 18,500t to 35,200t in 2012 and from 17,800t to 25,700t in 2013. Before the next benchmark assessment the working group accepts that this needs to be re-evaluated, using the ECA program, for the whole time series back to the 1980s.

Total landings of Northeast Arctic cod in the 2013 fishery, as used in the assessment, were 966,209t which was a big increase of 238,500t over the 2012 landings. The final ICES landings figure for the 2012 fishery was revised downwards by 26,500t to 727,663t. (ICES, 2014b). The total landings in 2013 were 34,000t below the agreed TAC (1,000,000t) but were 26,000t above the catch corresponding to the ICES advice. The allocated catch of coastal cod exceeded the coastal cod TAC of 21,000t by 4,700t. The status of the coastal cod population is assessed under separate stock assessment procedure and described in ICES (2014 a, d)

Figure 7 shows the performance of the fishery against the agreed TAC and the catch corresponding to the ICES advice, over the period 1987 to 2013. Since 2007 the landings, TAC and advice have been very close. Prior to that there have been periods, where for various reasons, the landings were in excess of both the TAC and the ICES advised level. Over that period between 1990 and 1994 and between 2002 and 2007 there was a serious problem of unreported and unregulated (IUU) catches in the fishery. More rigorous enforcement has seen the magnitude of the IUU catches decrease from a high of 166,000t, 26% of the official landings in 2005, to negligible amounts since 2008. The uncertainty surrounding the actual catches over the period 2002 to 2007 could still have some influence on the assessment of the current stock. (ICES, 2014a)

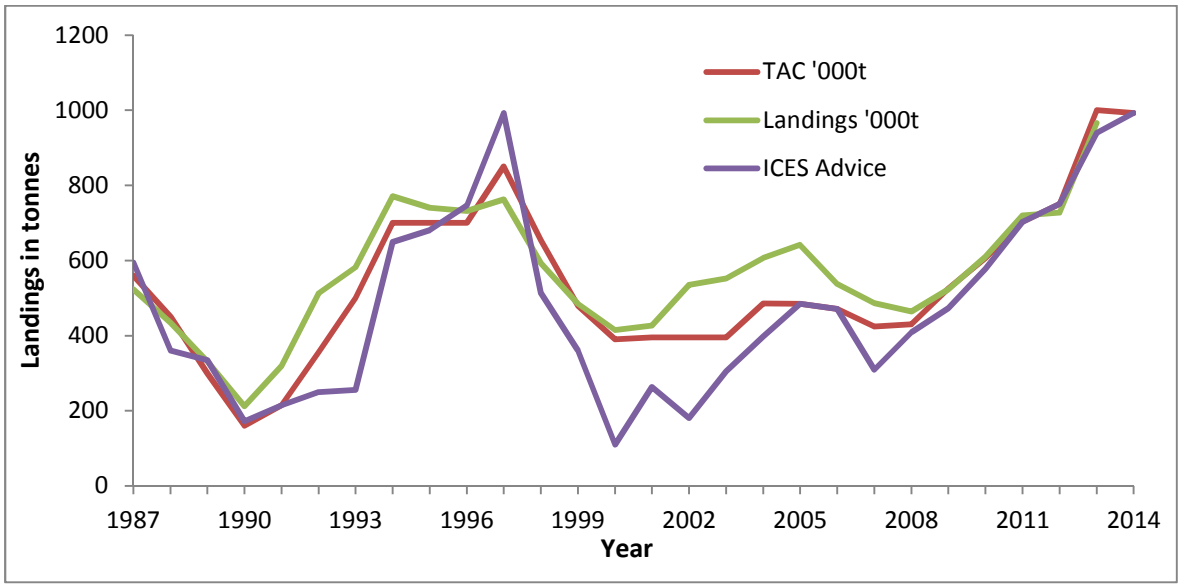

Figure 7 Total landings of North East Arctic cod from ICES sub-Areas I and II, the agreed TAC and the catch corresponding to the ICES advice, for the period 1987 to 2013 including the TAC for 2014. Data source: (ICES 2014b).

The assessment is carried out annually by the ICES Arctic Fisheries Working Group with members attending from most of the countries participating in the fishery. The assessment in 2014 of the status of the stock at spawning time in 2013 was an update assessment. The last benchmark assessment, with full data exploration, was in 2010 (ICES, 2010a) following an ICES Benchmark Workshop, WKROUND (ICES, 2010b). The main assessment model in use is the extended survivor's analysis (XSA). This is an analytical assessment model based on catch at age data from the whole fishery. Catch at age data are provided by Germany, Norway, Spain and Russia who also provide catch weight at age data. The assessment uses one commercial catch per unit of effort data series and three fishery independent surveys as tuning indices in the assessment (Table 10). After evaluation by the assessment working group only the cpue data for ages 9-11 years from the Russian trawl survey are used in the assessment (ICES 2014a Annexe 03).

Table 10 Fishery independent surveys used as tuning indices.

Survey name	Place	Season	Ages	Years
Russian trawl cpue	Total area	Whole year	9-11	1985-2013
Joint Bottom trawl	Barents Sea	Feb-Mar	3-8	1981-2014
Joint Acoustic	Barents Sea + Lofoten	Feb-Mar	3-9	!985-2014
Russian Bottom trawl	Total area	Oct-Dec	3-9	1994-2013

There are differences in the percentage mature at age calculated from the Russian and Norwegian surveys (Figure 8). These differences are consistent with generally higher growth rates observed in cod sampled on the Norwegian surveys. As a consequence the maturity ogive used in the assessment is an arithmetic average of the time series of Norwegian and Russian survey data with the exception of two years when only Norwegian data were available and one year when only Russian data were available (ICES, 2014a). The maturity ogive used in the 2014 assessment is shown in Table 11 below.

Table 11 maturity ogive used in the 2014 assessment.

Age in years	3	4	5	6	7	8	9	10	11	12	+group
% Mature	0	0.2	0.8	15.4	48.6	75.3	90.8	98.1	98.9	100	100

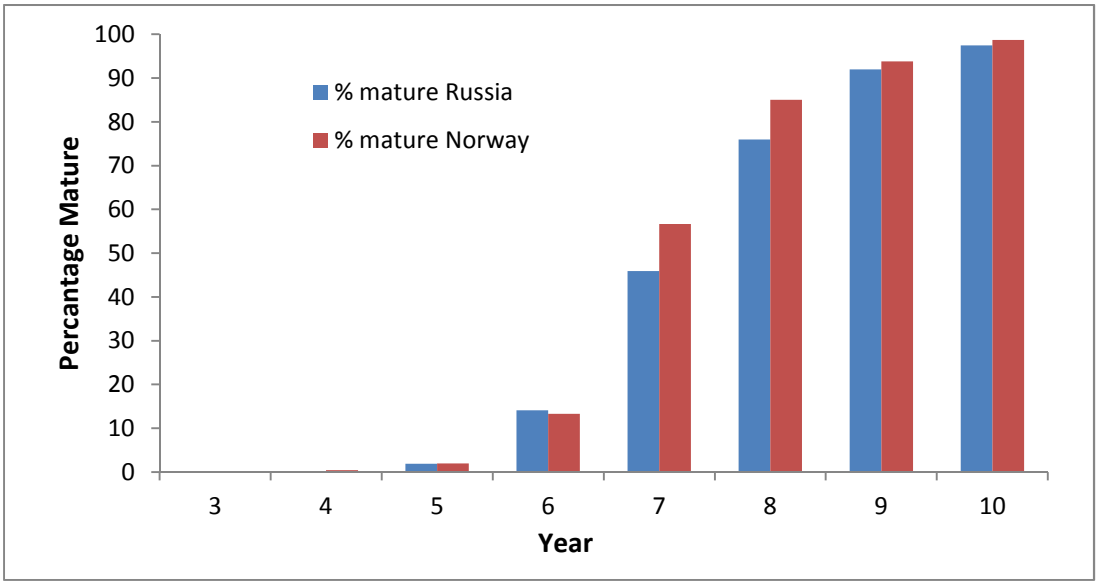

Figure 8 The maturity state of the Northeast Arctic cod in the surveys by Norway and Russia in 2012 as the percentage mature in each year class. Data source: (ICES 2014a)

Figure 9 shows the estimate of annual spawning stock biomass, at spawning time, over the period 1946 to 2014. The management plan values for the biomass limit level and precautionary approach / MSY biomass trigger levels are also shown. The final assessment in 2014 resulted in an estimated SSB at spawning time in 2014 of 1,797,496t, a decrease of 355,413t on the estimate of SSB at spawning time in 2013. SSB has now remained above 1 million tonnes since 2009 and prior to that had only been above one million tonnes between 1946 and 1948 (ICES,2014b). SSB has been maintained above the precautionary level, Bpa, since 2002 (Figure 9). This level, of 460,000t, is also the current Management plan level, the Maximum Sustainable yield (MSY) level and the Biomass trigger point in the Harvest Control Rule.

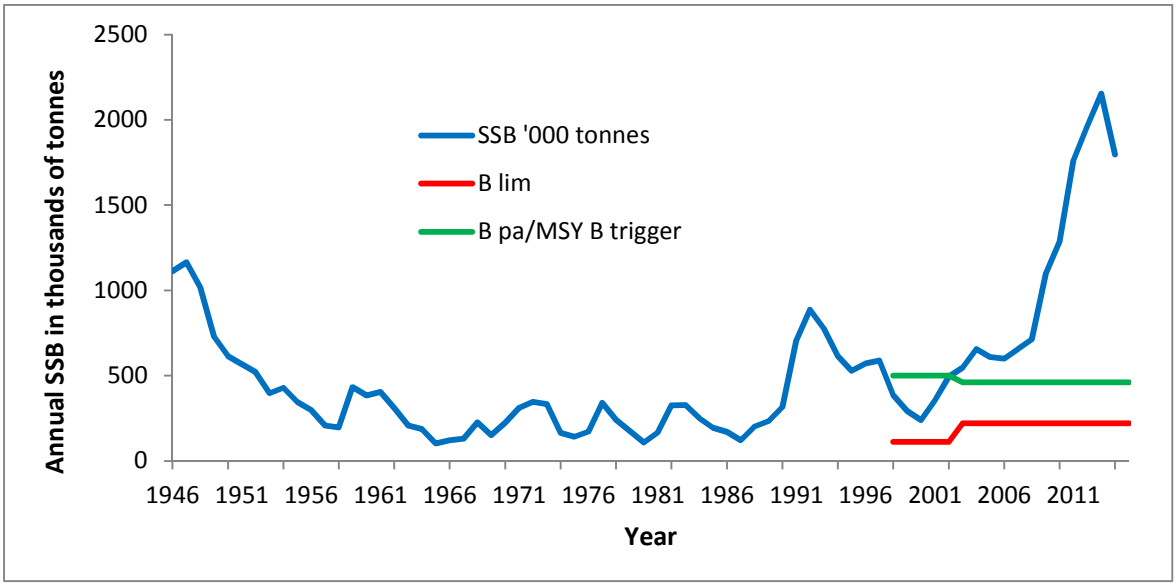

Figure 9 The spawning stock biomass ('000t) of Northeast Arctic cod in ICES sub-Areas I and II over the period 1946 to 2014. The most recent biomass reference points first agreed in 1998 and modified in 2003 are also shown. Data source: (ICES 2014b)

Fishing mortality (Figure 3), calculated on ages 5-10 years old in the stock, has been steadily declining in recent years from a time series high of F1.03 in 1997. It fell to below current limit level of F0.74 in 2001 and fell below the current precautionary approach, Management plan and MSY level of F0.4 in 2007. After further reducing to F 0.24 in 2012 fishing mortality increased in 2013 to F 0.3 (ICES, 2014b)

Natural mortality used in the assessment is 0.2. In addition cannibalism is taken into account. The method used to calculate the consumption of cod by cod is the method used to calculate prey consumption generally by cod described by Bogstad and Mehl (1997).

Recruitment is not estimated within the XSA modelling procedure because the youngest ages in the survey data are not used. Instead annual recruitment at age 3yrs is calculated from a hybrid model which comprises an arithmetic mean of the different recruitment models used (ICES, 2014a). Annual recruitment as thousands of 3 years old fish over the period 1946 to 2012 is shown in Figure 10. This shows the large fluctuations in recruitment over the whole time series. Recruitment over recent years has been less volatile although the 2001 and 2007 year classes were poor whilst the 2004 and 2005 year classes were very good.

The relationship between spawning stock size and recruitment is poor and cannot be used as a reliable predictor of future recruitment Figure 11. However the change point in the regression of SSB versus recruitment is used to determine the biomass limit point at 220,000t (ICES, 2014a).

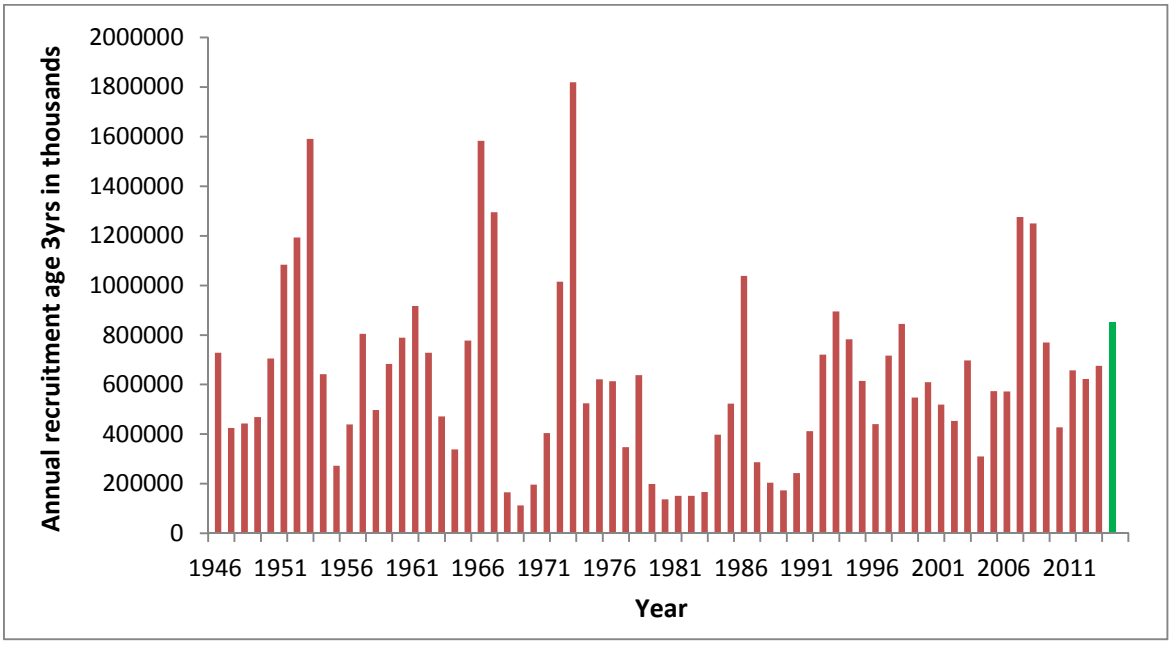

Figure 10 Annual recruitment of Northeast Arctic cod as thousands of 3 year old fish over the period 1946 to 2013. The 2014 predicted level is included in green. Data source: (ICES 2014b).

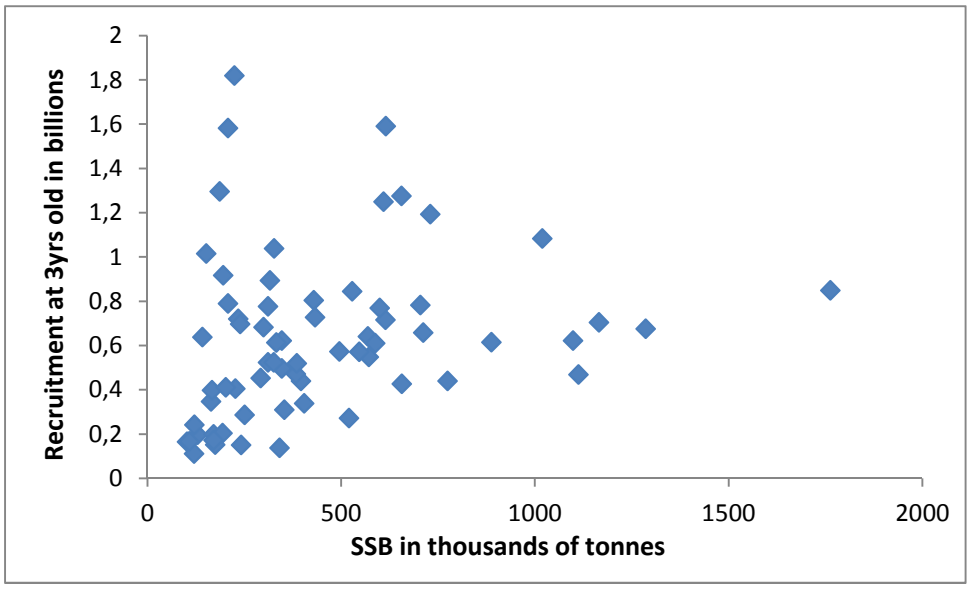

Figure 11 Annual recruitment as 3 years old fish plotted against the SSB in the year that they were spawned.

Uncertainty in the assessment is related to elements of both the catch and the fishery independent survey data (ICES, 2014 a, b).

- The problem of illegal, unregulated and unreported (IUU) catches has been a major problem in the past but since 2009 the practice appears to have ceased. Nevertheless the unreliability of past estimates of the catch could still be affecting the current assessment.
- The increase in the cod population in recent years has led to an expansion of the cod distribution. As a result it is likely that the coverage in the February survey has been incomplete in recent years in particular for the younger ages. This assumption was verified by the expansion of the survey in 2014.

- Scientific sampling of some Norwegian commercial landings has been affected by the termination of a port sampling programme during 2009. Poor sampling caused problems in estimating Norwegian catches for the oldest age groups in 2010 1nd 2012. Sampling levels have improved slightly in 2012 and 2013 but there are still problem areas and ICES continues to recommend an increase in port sampling effort. Sampling from Norwegian trawl catches was also very poor in the second half of 2013..
- Commercial catch sampling levels have also been reducing in Russia and the sampling levels in 2013 were the same as 2012. ICES has recommended an increase in Russian sampling levels.
- The abundance of the very strong 2004 and 2005 year classes (at ages 7 – 10) is far above any previous observations for this age group. This has generated a number of problems in the assessment. These are related to the choice of age ranges for the stock-dependent catchability at age parameter and also the difficulty in predicting the dynamics of the stock at the present high stock sizes.
- The methods used in the past for apportioning the proportions of Norwegian coastal cod in the landings are subject to considerable uncertainty. The method has now changed and the impact of that method change has not yet been evaluated against the historic time series of data.
- The proportions mature at age are different from the Norwegian and Russian sampling. Whilst there is an explanation for this the differences inevitably generate some uncertainty. This uncertainty together with any uncertainty in the mean weight at age, has a very direct effect on the estimation of SSB.

3.3.3 NEA cod - Fisheries management plan and annual advice

A management plan linked to a harvest control rule has been implemented since 2004 with the objectives of maintaining a high long term yield, year to year stability in landings and full utilization of all available information on stock dynamics (ICES, 2005). A review, and discussion of the harvest control rule, was made by the ICES Study Group on Management Strategies in 2007 (ICES, 2007). They discovered that the HCR could give unexpected and possibly unwanted results if the assessment changes much from year to year in a situation when SSB is close to Bpa. This problem has, however, so far not been encountered in the application of the HCR.

However in response to this potential problem the Joint Russian–Norwegian Fisheries Commission (JNRFC), at its 38th meeting in November 2009, amended the previous management plan. The amendment is shown in bold in the current management plan below.

The amended plan was evaluated by ICES in 2010 (ICES, 2010b) and considered to be in accordance with the precautionary approach. ICES noted that if conditions change to outside the range assumed in the management plan evaluation (with respect to biological conditions, assessment quality, and implementation error), then the management plan may have to be revised.

The Plan now states: "The Parties agreed that the management strategies for cod and haddock should take into account the following:

- *conditions for high long-term yield from the stocks*
- *achievement of year-to-year stability in TACs*

- *full utilization of all available information on stock development*

On this basis, the Parties determined the following decision rules for setting the annual fishing quota (TAC) for Northeast Arctic cod (NEA cod):

- estimate the average TAC level for the coming 3 years based on Fpa. TAC for the next year will be set to this level as a starting value for the 3-year period.
- the year after, the TAC calculation for the next 3 years is repeated based on the updated information about the stock development, however the TAC should not be changed by more than +/- 10% compared with the previous year's TAC**. If the TAC, by following such a rule, corresponds to a fishing mortality (F) lower than 0.30 the TAC should be increased to a level corresponding to a fishing mortality of 0.30.**
- if the spawning stock falls below Bpa, the procedure for establishing TAC should be based on a fishing mortality that is linearly reduced from Fpa at Bpa, to F= 0 at SSB equal to zero. At SSB-levels below Bpa in any of the operational years (current year, a year before and 3 years of prediction) there should be no limitations on the year-to-year variations in TAC[1].

At the 39th Session of the Joint Russian–Norwegian Fisheries Commission in October 2010 it was agreed that the current management plan should be used 'for five more years' before it is evaluated.

3.3.4 NEA Cod – Annual management advice

The advice for the 2013 fishery provided by ACOM in 2012 (ICES, 2012a) was based on a fishing mortality in 2012 equal to the fishing mortality in 2011 (F0.26) which would generate predicted landings of 857Kt in 2012. This would be in excess of the agreed TAC of 751Kt (ICES, 2012a). This would lead to an SSB at spawning time in 2013 of 2.225 million tonnes. The eventual landings in 2012 were 727,663t at a fishing mortality of F 0.24.

The outlook for the 2014 fishery provided by ICES in 2013 (ICES, 2013a) was based on predicted landings in 2013 generated by F (2013) of 735,000t. The eventual advice was based on the management plan, 940,000t, and the agreed TAC for 2013 was 1,000,000t. The landings were 966,209t.

The outlook for the fishery in 2015 (ICES, 2014b) has to estimate the likely landings in 2014. This is based on an F 2014 = to F 2013 (0.34) which would result in an SSB in 2015 0f 1,570,000t and landings of 864,000t in 2014. This is well below the predicted catch according to the ICES advice, based on the management plan, 993,000t which was the eventual agreed TAC for 2014.

Following the Management plan the catch in 2015 would be based on F0.41 which would generate landings of 894,000t and an SSB in 2016 of 1,301,000t.

Following the MSY Approach with a fishing mortality of F0.40 would generate landings of 878,000t in 2015 leading to an SSB of 1,315,000t at spawning time in 2016.

At their meeting in Oslo during the week ending 10 October 2014 the JNRFC set quotas for the Barents Sea fisheries under their jurisdiction. The resultant quota for the 2015 fishery for cod is:

[1] *This quotation is taken from Annex 14 in the Protocol of the 38th Session of the Joint Russian–Norwegian Fisheries Commission and translated from Norwegian to English. For an accurate interpretation the text in the official languages of the Commission (Norwegian and Russian) should be consulted.*

TAC 894,000t. This is a reduction of 99,000t compared with 2014. The agreed quota is in line with the ICES advice. The Norwegian share in 2015 is 401,240t.

3.3.5 NEA cod - Reference points

The current reference points for Northeast Arctic cod were estimated by an ICES Study Group on biological reference points for North East Arctic cod (ICES, 2003) and adopted by ACFM at the May 2003 meeting.

At the 38th session of JNRFC the new version of the management rule (above) was adopted. As part of their evaluation of the new rule the working group investigated, by long term simulations, the precautionary approach fishing mortality reference point. They concluded that the Fpa of 0.4 in the harvest control rule provides a long term yield corresponding to the maximum (Fmsy). Similarly the precautionary approach biomass reference point, 460Kt, which was the trigger point and management plan target in the harvest control rule could also serve as the MSY biomass trigger point. MSY reference points were also endorsed in 2010 following the ICES Workshop, WKFRAME, on the implementation of Fmsy (ICES, 2010c).

Table 12 NEA cod - reference points

	Type	Value	Technical basis
Management Plan	SSB mp	460Kt	Bpa. TAC linearly reduced from Fpa at SSB=Bpa to 0 at SSB = Zero
	Fmp	0.40	Fpa. average TAC for next 3yrs based on Fpa
MSY Approach	MSY B trigger	460Kt	Bpa and the trigger point in the HCR
	Fmsy	0.40	Long term simulations
Precautionary Approach	Blim	220Kt	Change point regression
	Bpa	460Kt	Lowest SSB estimate having > 90% probability of remaining above Blim
	Flim	0.74	F corresponding to an equilibrium stock = Blim
	Fpa	0.40	The highest F estimate with >90% probability of remaining below Flim.

3.3.6 NEA haddock – Life history

In the North East Atlantic, haddock are widely distributed from the Celtic Sea, Irish Sea, central and northern North Sea northwards through the Norwegian Sea, Faroe Islands , Iceland and the Barents Sea. They only rarely occur as far south as the English Channel and northern Biscay (Wheeler, 1969).

It is a demersal, bottom living fish, inhabiting depths between 40m and 150m and rarely found in temperatures < 2°C. The species is not continuously distributed throughout its geographic range but forms local populations which are sufficiently isolated at spawning times to be considered and managed as separate stocks.

In that context the North East Arctic haddock population can be considered as a separate stock. They are found in the Norwegian Sea, Barents Sea and adjacent waters mainly at temperatures above 2°C. The main spawning grounds of this stock are along the continental slope off the Norwegian coast from latitude 70° 30'N to 73°N in depths between 50m and 150m. They spawn in this area between March and June in areas of high salinity and at temperatures between 5°C and 7°C. Fecundity is high ranging from one hundred thousand to one million eggs per female depending on the size and age of the female. The eggs are planktonic and, because they are of similar size, are difficult to distinguish from cod eggs until late embryonic development (Russell, 1976). The larvae and early juvenile stages are also planktonic and off Norway they are subjected

to the residual drift which takes them to their nursery areas in the southern Barents Sea. Maturing and mature fish tend to migrate back from these nursery areas to the Norwegian Sea.

The spawning success of haddock is characterised throughout its distribution by large fluctuations in subsequent recruitment and the strength of the year class. Year class strength, measured at age three, may vary by up to two orders of magnitude between good and poor year classes. No other teleost species, in the Northeast Atlantic, epitomises the enigma of recruitment variability as well as haddock. The mechanisms which generate such volatility in juvenile haddock survival rates and subsequent year class strength are difficult to understand or explain. For the Northeast Arctic haddock there is no obvious relationship between spawning stock size and subsequent recruitment. However research has shown that water temperature during the first and second years of the Northeast Arctic haddock life cycle is a fairly reliable indicator of year-class strength. If mean annual water temperature in the bottom layer during the first two years of haddock life does not exceed 3.75° C (Kola - section), then the probability that strong year-classes will appear is very low even if other factors, such as food availability, are favourable. Steep rises or falls in water temperature also have a marked effect on the abundance of year classes (ICES 2014a, Annexe 4). Variation in the recruitment of haddock has also been associated with the changes in the influx of Atlantic waters to the large areas of the Barents Sea shelf (ICES, 2014a, annexe 4).

Once they become demersal, during the first year of their life, haddock are predominantly benthic feeders taking echinoderms, polychatetes, ophiuroids and gastropods although they can at times feed opportunistically on capelin, capelin eggs, herring and even euphausids.

Haddock growth rates are variable over their distribution range and generally dictated by population abundance, the availability of the main prey species and water temperature. They will generally grow to <20 cm during their first year, up to 30cm (1.5kg) in their second year and attain their maximum length of around 80cm (3kg) at ten years old. (ICES 2014a Annexe 4). Figure 12 shows the total fishable stock biomass and spawning stock biomass of North East Arctic haddock, in 2013, over the age range 3-11+ years. This shows that haddock over ten years old are present in the stock but although they are not common they may live up to a maximum of around fourteen years.

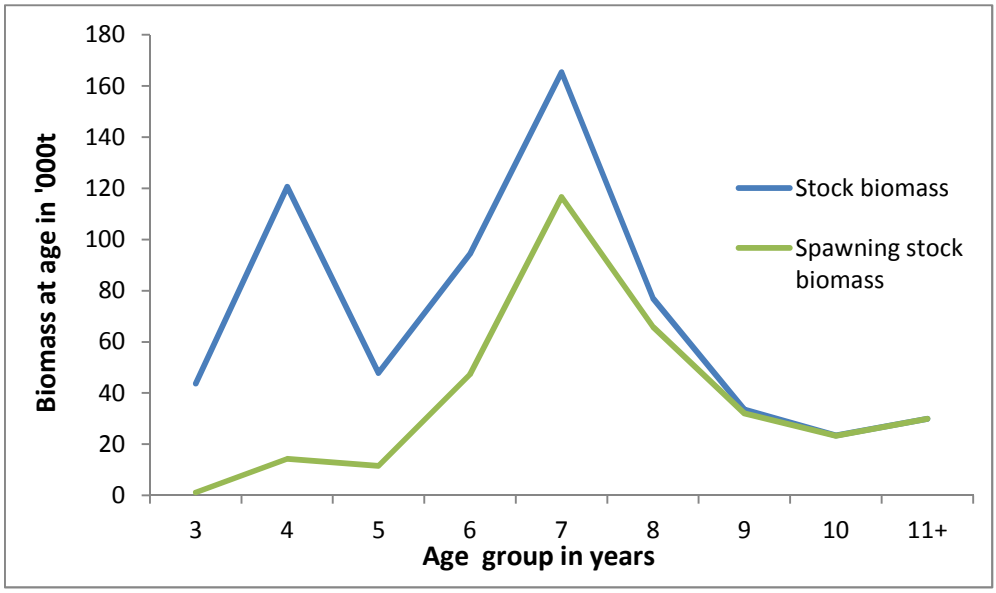

Figure 12 The fishable stock biomass and the spawning stock biomass of Northeast Arctic haddock, in thousands of tonnes, at ages 3 to 11+ years in 2013. Data source: (ICES 2014a)

Figure 13 shows the proportion of Northeast Arctic haddock mature over the age range 3 to 11+ years old. Some begin to mature as early as during their third year and around 50% are mature at six years old.

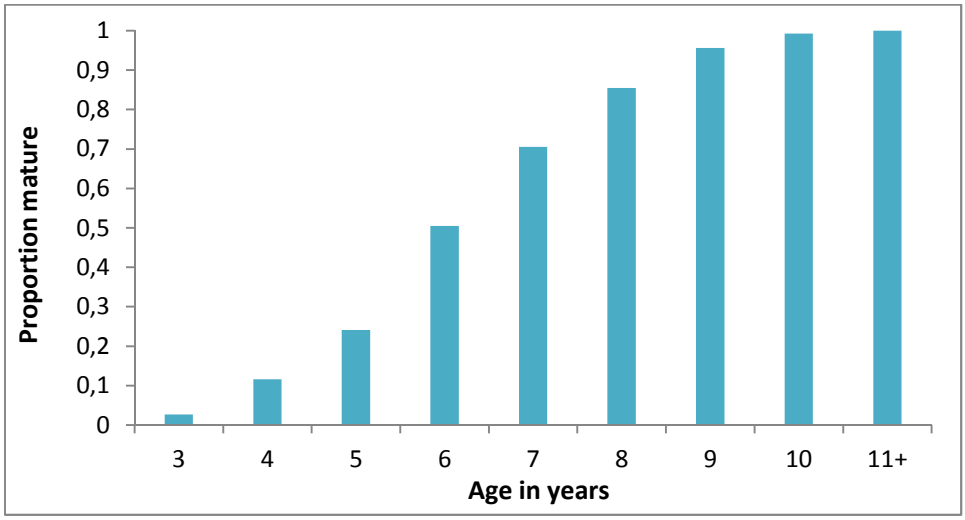

Figure 13 The proportion of Northeast Arctic haddock mature, over the age range 3 – 11+ years, in 2013. Data source: (ICES 2014a).

3.3.7 NEA haddock - stock status and stock assessment

The total official landings of haddock from sub-Areas I and II in 2013 were 193,744 t which was a reduction of 39% compared to 2012. This was 6,000t lower than the agreed TAC and 44,000t lower than the maximum predicted catch advised by ICES

Figure 14 shows the annual official landings, the ICES estimated landings, the ICES advice and the agreed TAC over the period 1987 to 2013. Until 2002 the total annual landings were either below or close to the agreed TAC and the official and ICES estimate of landings were the same.. In 2002 the ICES AFWG included an estimate of unreported and unregulated landings for the first time (ICES, 2002). Although the official landings figures remained close to the agreed TAC actual

landings, as estimated by ICES, exceeded it by as much as 40,000t (in 2005). The extent of this problem gradually reduced after 2005 as a result of increased monitoring and surveillance and by 2008 the problem had effectively been eliminated. The unregulated and under reported landings are now considered to be zero (ICES, 2014a).

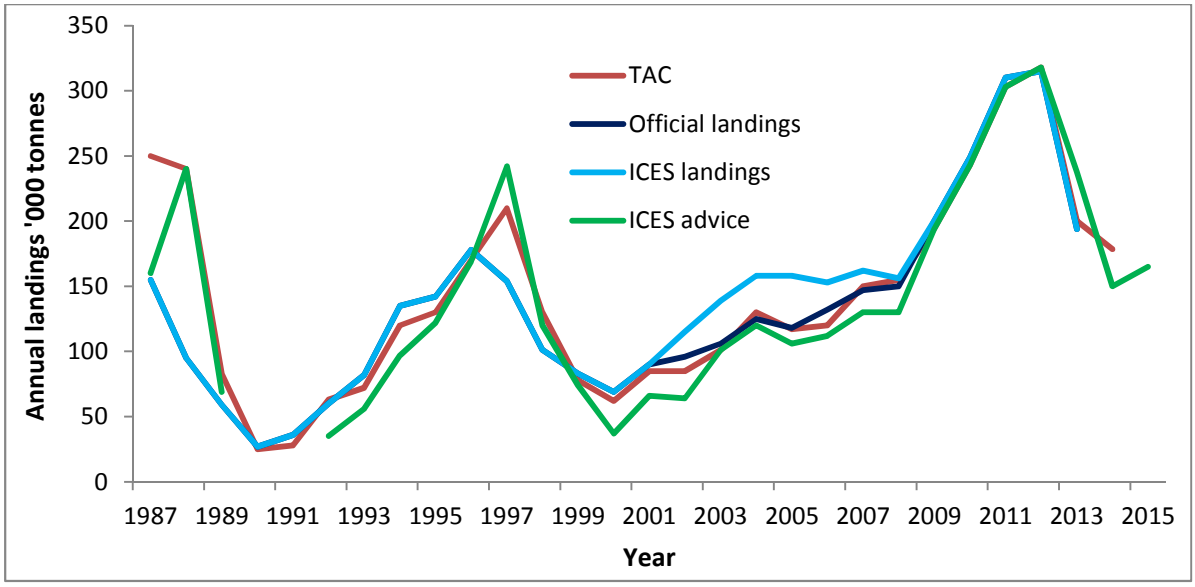

Figure 14 Official annual landings and the ICES working group's estimate of annual landings of North East Arctic haddock, in thousands of tonnes, over the period 1987 to 2011. The ICES advised catch and the agreed TAC (up to 2014) are also shown. Data source: (ICES 2014c)

In 2006 the ICES Arctic fisheries working goup decided to include landings of haddock by Norway from the area between 62°N and the Lofoten Islands, for the first time in their assessment and continue to do so (ICES, 2006a).

The assessment in 2014 of the status of the stock in 2013 was an update assessment using updated catch and tuning series data from the most recent surveys. The last 'benchmark' assessment, with full data exploration, was in January 2011 on the status of the stock in 2010 (ICES, 2011a. The same Virtual Population Analysis (VPA) model was used with Extended Survivors analysis (XSA) used to tune the model to the various tuning indices. The tuning indices used in the assessment all cover the Barents Sea area and are all accorded the same weighting in the assessment. There are three surveys which produce four tuning indices.

- Russian bottom trawl survey in the autumn: time series from 1983 to 2009 for ages 3-7yrs. 1991 – 2013 data now used in the assessment.
- Joint Norwegian / Russian bottom trawl survey in the winter: time series from 1982 to 2010 for ages 3-8yrs. 1990 – 2013 data now used in the assessment.
- Joint Norwegian / Russian acoustic survey in the winter: time series from 1980 to 2010 for ages 3-7yrs. 1990 – 2013 data now used in the assessment.
- Joint Norwegian / Russian '0' group / ecosystem and bottom trawl survey in the autumn: time series 2004 to 2013

Since their meeting in 2004 the assessment working group have not used any of the survey series data prior to 1990. The decision was based mainly on uncertainties related to changes in survey methodology since 1990. The joint '0' group / ecosystem and bottom trawl survey in August / September was first used in the 2011 assessment after selection by the ICES benchmark

assessment workshop (ICES, 2011b). This index shows reasonably good internal consistency and correlation for ages 1-8yrs with the catch at age data in the other surveys.

Figure 15 shows the spawning stock biomass over the period 1950 to 2014 together with the limit, precautionary approach, MSY and management plan reference points. The assessment in 2014 of the state of the stock in 2013 estimated the SSB at the start of 2014 at 254,451t. This was a decrease of 87,800t over the previous year and continued the downward trend over the last three years. This downward trend results from the decreasing influence of the big year classes of 2004 to 2006. The SSB remains well above the management plan, precautionary approach and MSY trigger level of 80,000t and has been consistently above that level since 1989.

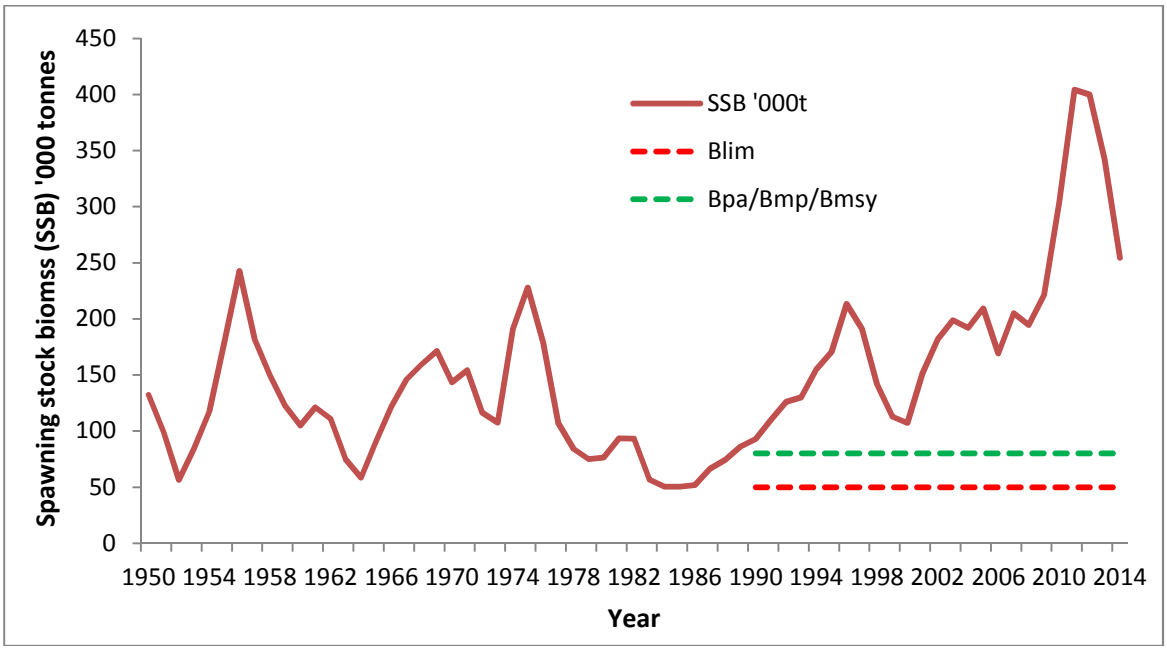

Figure 15 The annual estimate of spawning stock biomass of Northeast Arctic haddock, in thousands of tonnes, over the period 1950 to 2014. The reference points for the biomass limit level (Blim) and the precautionary approach (Bpa), management plan (Bmp) and MSY trigger (Bmsy) levels are also shown. Data source: ICES, 2014c.

Fishing mortality (Figure 5) in 2013 was estimated at F0.29 in the current assessment. This is now below the management plan and MSY target level of F0.35. The retrospective estimate of fishing mortality in 2012 has reduced from F0.56 to F0.44 and for 2011 from F0.44 to F 0.37. Fishing mortality over recent years has fluctuated around the management plan and MSY target level of F0.35 and has been consistently below the precautionary approach level of F0.47.

Natural mortality in the assessment takes into account predation on haddock by cod. Natural mortality rates used in the assessment are shown in Table 13. The natural mortality rate is 0.2 plus the cod predation mortality which affects haddock from 3 to 6 years old in the assessment.

Table 13 Natural mortality rates

Age (years)	3	4	5	6	7	8	9	10	11+
Natural mortality	0.379	0.306	0.274	0.246	0.2	0.2	0.2	0.2	0.2

Annual recruitment at age 3 (Figure 16) shows the large fluctuations in year class strength which is typical of haddock stocks throughout their range. In recent years there have been three consecutive strong year classes, in 2004, 2005 and 2006 with the 2005 year class the largest in the time series dating back to the 1947 year class (3yrs old in 1950). The 2007 and 2009 year classes are above average but the 2008 and 2010 year classes appear to be poor. With such

volatility in annual recruitment it is not surprising to find that there is not a strong relationship between spawning stock size and subsequent recruitment (Figure 17). It can however be seen that above average recruitment can occur at around the lowest observed levels of SSB in the time series. This then provides a sound basis for setting the biomass limit level at Bloss, 50,000t, the lowest observed SSB in the time series, in 1984.

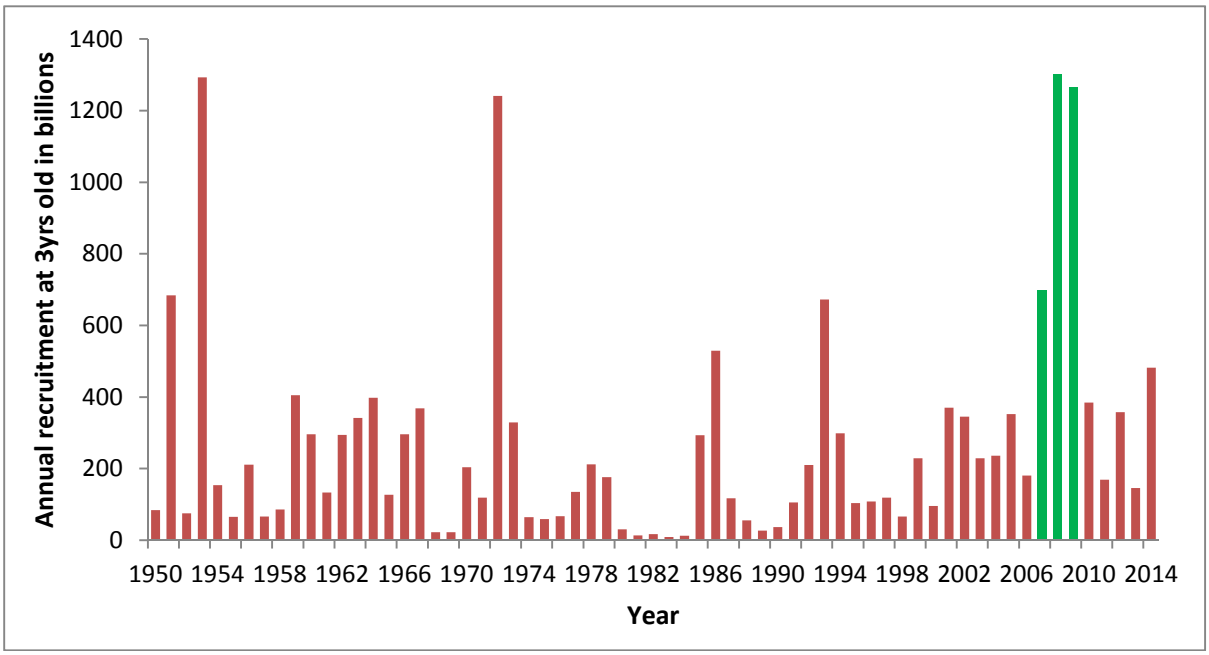

Figure 16 Annual recruitment to the Northeast Arctic haddock stock as billions of three years old fish over the time series 1950 to 2014 (year classes 1947 to 2011). The three recent strong year classes are highlighted in green. Data source: (ICES 2014c).

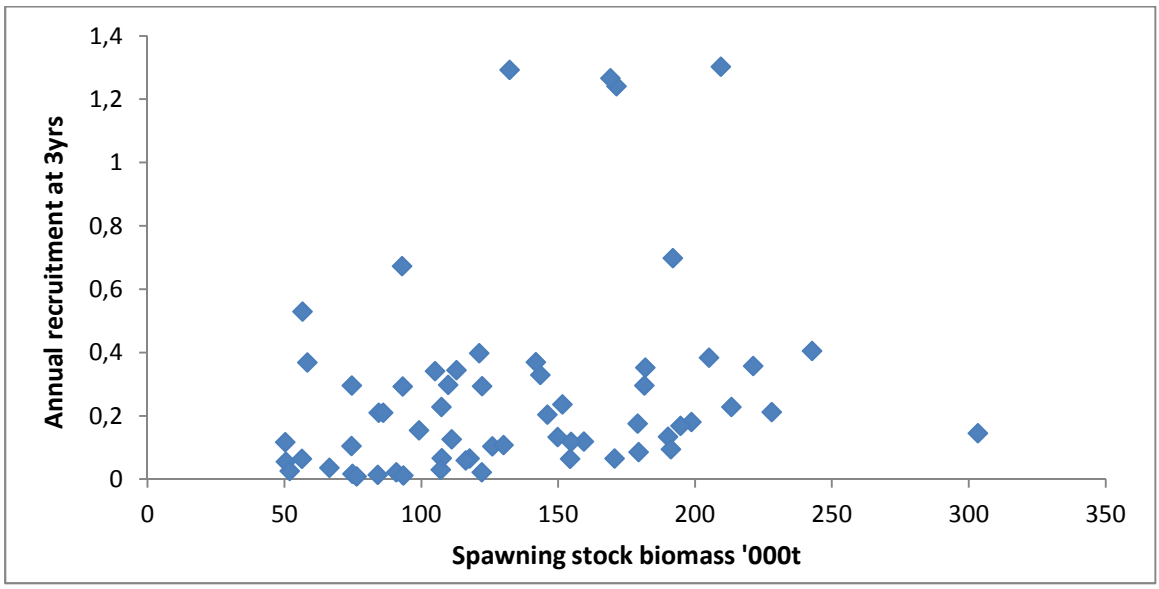

Figure 17 The relationship between the numbers of three years old Northeast Arctic haddock and the spawning stock biomass from which they were produced over the time series 1950 to 2011. (Data source: ICES 2014c)

Uncertainty in the assessment is generated by the following factors:

- Non compliance in the past with TAC regulations have resulted in a significant amount of illegal and unreported catches, in particular between 2002 and 2007. The problem has decreased in recent years and is now considered to be almost negligible and does not affect the data collected in 2009 to 2011. However the unreliability of past records does continue to affect the assessment.
- In spite of the ban on discarding, some discarding is known to occur in trawl and longline fisheries. The quantities involved are unknown but are not considered to be significant in terms of the overall catch.
- The estimates of the very strong 2004 to 2006 year classes are very uncertain with conflicting evidence between the survey and commercial data.
- The strong year classes of 2004 to 2006 are now moving out of the reference age range for the calculation of fishing mortality and current values of F in the assessment may not reflect the present exploitation rate
- Although biological sampling of the catch is generally considered to be good, there is some uncertainty folowing the termination of a Norwegian port sampling programme in 2009. This continued to be an issue in 2013 and will affect the precision of the catch – weight and maturity at age data.

Exploration of alternative models:

Norway has started to test a 'state space' model (SAM) and presented the results of running the model at the 2014 working group meeting. The model estimates of SSB and F for the haddock stock are different to the estimates from the XSA model especially for the most recent years. The 'state space' model is a statistical catch-at-age model now used by ICES for the assessment of a number of other stocks. This modelling approach has a number of highly desirable characteristics which include stochastic (random processes with probability) treatment of all observations and a full statistical framework for evaluating the model results. The 'state space' approach was first pioneered by Gudmundsson, (1994) and Fryer (2002) and further explored by Neilsen, (2012). Until recently the computationally intensive nature of the method has meant that the use of 'state space' models has not become widespread. This and other alternative assessment models will be investigated in the next benchmark meeting (2015).

3.3.8 NEA haddock - Fisheries Management plan

A management plan was agreed by the Joint Norwegian Russian Fishery Commission and has been in force since 2004. (ICES, 2010a). The Commission reviews the advice from ICES, based on the management plan and as a result sets an annual TAC. The plan was modified in 2007 from a three-year rule to a one-year rule on the basis of the HCR evaluation conducted by ICES. The harvest control rule (HCR) and resultant modified management plan was evaluated by the ICES Study Group on Management Strategies in 2007 (ICES, 2007) and found to be in agreement with the precautionary approach. As a consequence ICES provides advice annually based on the revised management plan.

The agreed HCR for haddock with the latest modifications is as follows (Protocol of the 40th Session of The Joint Norwegian Russian Fishery Commission, 14 October 2011):

- TAC for the next year will be set at level corresponding to Fmsy.

- The TAC should not be changed by more than +/- 25% compared with the previous year TAC.
- If the spawning stock falls below Bpa, the procedure for establishing TAC should be based on a fishing mortality that is linearly reduced from Fmsy at Bpa to F= 0 at SSB equal to zero. At SSB-levels below Bpa in any of the operational years (current year and a year ahead) there should be no limitations on the year to-year variations in TAC.

ICES has evaluated the modified management plan and concluded that it is in accordance with the precautionary approach and not in contradiction to the maximum sustainable yield (MSY) approach (ICES, 2011c)

At the 39th Session of the Joint, Russian-Norwegian Fisheries Commission in 2010 it was agreed that this management plan should be used for 'five more years' before it is re-evaluated.

3.3.9 NEA haddock – Annual management advice

For the 2013 fishery the ICES advice, based on the management plan was for catches < 238,000t and the agreed TAC was 200,000t. The official landings figure for 2013 was 193,744t with a fishing mortality F 0.29 (ICES, 2012b).

The ICES advice for the fishery in 2014 (ICES 2013b) was based on F (2013) = F (2012) which would have generated landings in 2013 of 213,000t and resulted in a SSB at the start of 2014 of 178,000t. The SSB at the start of 2014 from the current assessment was 254,451t. The resultant advice for the 2014 fishery was for catches no greater than 150,000t and was firmly based on the management plan and harvest control rule. The eventual agreed TAC was for 178,500t because the Joint Norwegian-Russian Fisheries Commission agreed on applying the -25 % clause in the agreed harvest control rule as if it had been used for setting TAC for 2013.

The ICES advice for the fishery in 2015 (ICES 2014c) is provided on the basis of a fishing mortality in 2014 equal to the fishing mortality in 2013 (F0.29). This would result in landings in 2014 of 147,000t, which is below the agreed TAC, and would generate an SSB at the start of 2015 of 241,000t. Following the management plan / MSY framework for the 2015 fishery would result in landings in 2015 of 165,000t, which is the ICES advised TAC. This scenario would generate an SSB at the start of 2016 of 217,000t. Following the precautionary approach in 2015, where fishing mortality should be no greater than Fpa 0.47, would generate landings of 210,000t and an SSB in 2016 of 188,000t (ICES 2014ac).

At their meeting in Oslo during the week ending 10 October 2014 the JNRFC set quotas for the Barents Sea fisheries under their jurisdiction. The resultant quota for the 2015 fishery for haddock is: TAC 178,500t. This is an increase over the 2014 TAC and 13,500t above the ICES advised level.

3.3.10 NEA haddock - Reference Points

Reference points were reviewed in 2006 by a special ICES workshop on biological reference points for North East Arctic haddock (ICES, 2006b).The biomass and fishing mortality reference points were reviewed again in 2011by the ICES Benchmark Workshop on Roundfish and Pelagic stocks (ICES 2011b). They concluded that long-term stochastic simulations for Northeast Arctic haddock show that the F = 0.35 currently used in the management plan corresponds to FMSY and provides high long-term yield. MSY B trigger is chosen as Bpa, which is a biomass that is encountered with low probability if FMSY is implemented (ICES, 2011c).

Based on an analysis of the stock and recruitment plot the assessment working group in 2011 (ICES, 2011a) proposed that Blim and Bpa remained unchanged at 50Kt and 80Kt respectively.

The Bpa of 80Kt ensures a 95% probability of maintaining SSB above Blim taking into account uncertainty in the assessment and the stock dynamics.

It is accepted that there is no standard method recognised for the estimation of either Fpa or Flim. The working group did review and revise these reference points and proposed an F MSY reference point of F0.35 based on stochastic long term simulations. The ICES advisory committee, ACOM endorsed the rationale of the working group in revisiting F reference points and accepted the revised and new values as listed in Table 14.

Table 14 NEA haddock - reference points

	Type	Value	Technical basis
Management Plan	SSB mp	80Kt	Bpa. TAC linearly reduced from Fpa at SSB=Bpa to 0 at SSB = Zero
	Fmp	0.35	Fpa estimated prior to revision of the historical time series for the stock
MSY Approach	MSY B trigger	80Kt	Bpa
	Fmsy	0.35	Stochastic long term simulations
Precautionary Approach	Blim	50Kt	B loss
	Bpa	80Kt	Blim *exp(1.645*0.3)
	Flim	0.77	Corresponds to SPR value of the slope of the line from the origin at SSB =0 to geometric mean recruitment at SSB = Blim
	Fpa	0.47	Flim*exp(-1.6450.3)

3.4 Principle Two: Ecosystem Background

3.4.1 Marine Environment Research

The principal Norwegian marine environment research institute with specific responsibilities for the monitoring, assessment and provision of advice on living marine resources is the Institute of Marine Research (IMR), Bergen (Havforskningsinstituttet).[2] Although IMR has primary responsibility with respect to fisheries and all associated marine environmental research, it works in close partnership with numerous other Norwegian research and advisory bodies; *e.g.* the Norwegian Institute for Nature Research (NINA),[3] the Norwegian Polar Institute (NPI; http://www.npolar.no/en/), the Fridtjof Nansen Institute (FNI; http://www.fni.no/) as well as Norwegian universities. Within the Barents Sea the IMR research work is undertaken in partnership and collaboration with the Knipovich Polar Research Institute for Marine Fisheries and Oceanography (PINRO).[4] Much of this work is under the auspices of the Joint Russian- Norwegian Fisheries Commission (JRNFC)[5] and reports[6] are published jointly.

IMR and PINRO also an active participant in or scientific advisor to the many international bodies that undertake or coordinate research and management in the marine environment and its resources; *e.g.* (Norway) the Oslo and Paris Commission for the protection and conservation of the North-East Atlantic and its Resources (OSPAR),[7] the International Council for the Exploration of the Sea (ICES),[8] the International Whaling Commission (IWC),[9] the North East Atlantic Fisheries

[2] http://www.imr.no/en
[3] http://www.nina.no/ninaenglish/Start.aspx
[4] http://www.pinro.ru/index_e.htm?top=pinro_e
[5] http://www.jointfish.com/eng
[6] http://www.imr.no/publikasjoner/andre_publikasjoner/imr-pinro_samarbeidsrapporter/en
[7] www.ospar.com
[8] www.ices.dk
[9] www.iwc.org

Commission (NEAFC),[10] the North Atlantic Marine Mammal Commission (NAMMCO),[11] the Baltic Marine Environment Protection (Helsinki) Commission (HelCom[12]). Additionally, although Norway is not a member of the European Union (EU), IMR is an active participant in many of the marine environment and resource research and development projects facilitated and coordinated by the European Commission (EC); *e.g.* RECOVERY[13]; OCEAN-CERTAIN[14].

Much of the monitoring and research undertaken by IMR is aimed at meeting the short-term need for year-on-year advice on the management of fish stocks. In this context it is among the leading world research institutes and has established a substantial body of data relating to its principal living marine resources dating back seventy years or more. This substantial body of information provides a bedrock upon which to base its long-term objectives for the development of ecosystem models (*e.g.* ATLANTIS[15], NORWECOM[16], as well as OCEAN–CERTAIN) that will underpin more holistic, ecosystem-based management plans such as the Barents Sea Management Plan (BSMP, 2006;[17] Olsen *et al*., 2007)[18] and the Norwegian Sea Management Plan (NSMP, 2009)[19] (Figure 18). These plans seek to balance the needs of all the component parts of the ecosystem, *e.g.* sensitive marine species (SMS) and habitats (SMH), predator–prey interactions, and the long-term sustainability of the commercial fisheries.[20] The Norwegian ecosystem modelling programmes also contribute to the wider research efforts in this field (Bjørge, 2008;[21] Hjøllo, 2007[22]*). Indeed, considerable research effort has been invested in modelling the interaction of fish species within the overall fish community and wider ecosystem (Sparre, 1984;[23] WGSAM, 2013; [24] WGECO, 2013).[25] As elsewhere, all these scientific studies are aimed at describing a dynamic ecosystem – the NE Arctic – that ultimately is controlled by the first law of thermodynamics, i.e. matter can neither be made nor destroyed. Biologically, this means that within an ecosystem, such as the Barents Sea ecoregion, the gross biomass of all species is ~constant. In a period when both cod (Figure 9) and haddock (Figure 15) are concurrently at levels ~twice their highest previously recorded levels, other species (most probably trophic competitors and prey, including benthic species) will decrease in abundance, independent of fishery bycatch or physical interaction effects.

[10] www..neafc.org
[11] www.nammco.no
[12] www.helcom.fi
[13] Research on Effective Cod Stock Recovery Measures. http://cordis.europa.eu/projects/rcn/91400_en.html
[14] Ocean Food-Web Patrol – Climate Effects: reducing targeted uncertainties with an interactive network. http://cordis.europa.eu/projects/rcn/110540_en.html
[15] ATLANTIS; http://www.imr.no/temasider/modeller/atlantis/atlantis/en
[16] NORWECOM.E2E; http://www.imr.no/temasider/modeller/norwecom.e2e/norwecom.e2e/en
[17] BSMP, 2006. Report No. 8 to the Storting (2005-2006) Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. http://www.regjeringen.no/Upload/MD/Vedlegg/Svalbard%20og%20polaromraadene/Forvaltningsplan%20Barentshavet/PDF0080506_engelsk-TS.pdf
[18] Olsen, E., Gjøsæter, H., Røttingen, I., Dommasnes, A., Fossum, P. & Sandberg, P. 2007. The Norwegian ecosystem-based management plan for the Barents Sea. ICES Journal of Marine Science 64: 599–602.
[19] NSMP, 2009. Report No. 37 to the Storting (2008-2009) Integrated Management of the Marine Environment of the Norwegian Sea Report No. 37 (2008 – 2009) to the Storting. http://www.regjeringen.no/pages/2243615/PDFS/STM200820090037000EN_PDFS.pdf
[20] http://www.environment.no/Topics/Marine-areas/
[21] Bjørge, Q. 2008. New research programme focusing on coastal and fjord ecosystems. Marine News 3–2008. http://www.imr.no/epigraph/filarkiv/hi_news_3_eng_web.pdf/nb-no
[22] Hjøllo, S.S., 2007. EcoFish WP2 workandWind, NAO and ecosystem-selected articles. IMR, Bergen. http://ecofish.imr.no/__data/page/6432/work_and_Wind,_NAO_and_ecosystem-selected_articles080307.pdf
[23] Sparre, P. 1984. A computer program for estimation of food suitability coefficients from stomach content data and multipsecies VPA. ICES CM 1984/25.
[24] WGSAM, 2013. Interim Report of the Working Group on Multispecies assessment Methods. ICES CM 2009/SSGSUE:10. http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGSUE/2013/WGSAM2013.pdf
[25] WGECO, 2013. Report of the Working Group on Ecosystem Effects of Fishing Activities (WGECO) ICES CM 2013/ACOM:25 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WGECO/wgeco_2013_final.pdf

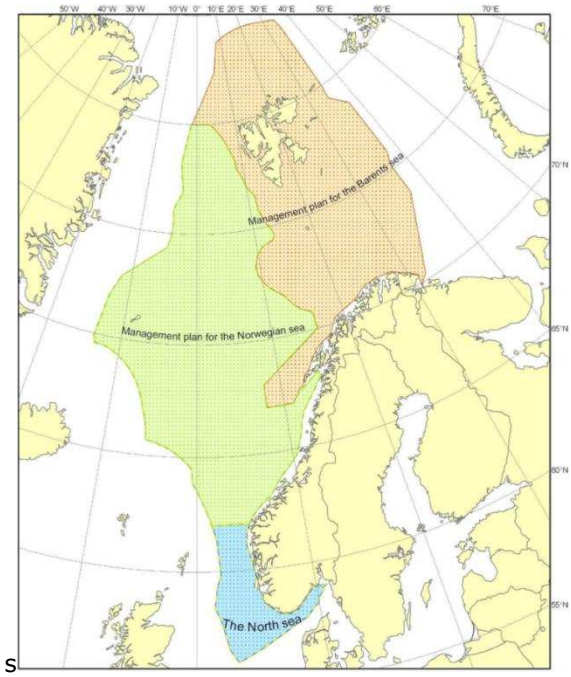

Figure 18 Areas covered by Norwegian seas management plans.

A core activity for IMR (and within the Russian zone PINRO) is the gathering, collation and analysis of the data that underpin the assessment of individual fish stocks and their fisheries. Throughout the NE Arctic, every fishing vessel must retain, record and land all commercial species, irrespective of quota allocations. These catch data are reported to and validated by the Directorate of Fisheries (DoF) before being passed to IMR as the basic building block for stock assessment. In the past, these data have been complemented by a port-based biological sampling programme that gathered information on lengths, weights, sex, maturity stage and otoliths for ageing the fish. This port-based programme has been cut back in recent years and such data are now gathered primarily during research-vessel trawl surveys and through IMR-trained crew self-sampling on the Norwegian reference fleet vessels (Bowering *et al*., 2011)[26]. These vessels are from all sectors of the fleet and are separated into inshore and offshore sectors (Table 15).

Table 15 Fleet numbers 2010 (Bowering et al., 2011)

Sector	Norwegian fleet	Reference fleet	%
Coastal demersal	5884	20	0.3
Offshore demersal	148	11	7.4
Coastal pelagic	174	2	1.1
Offshore pelagic	103	5	4.9
Total	6309	38	0.6

In addition to the biological sampling, the observers keep records of all species (macro-invertebrates, fish, birds and mammals) taken in the course of fishing. This is discussed in greater detail under bycatch, below.

Not only has IMR built up a substantial body of scientific data over the decades, its staff have also been at the forefront of publishing its findings through the local news media, national and international trade press, scientific meetings and internationally peer-reviewed journals and, most

[26] Bowering, R., Storr-Paulsen, M., Tingley, G., Bjørkan, M., Vølstad, J., Gullestad, P. & Lorentsen, E., 2011. Evaluation of the Norwegian Reference Fleet. Institute of Marine Research, Bergen. http://www.imr.no/filarkiv/2011/10/evaluation_of_the_norwegian_reference_fleet_final_report_august_2011_final_rev_logo.pdf/en

recently, through its own comprehensive web site. Much of the information that follows on the Norwegian seas ecosystem and its resources are a précis of what IMR has published.

3.4.2 The Barents Sea and Norwegian Sea

The Barents Sea covers the Arctic Ocean continental shelf north of Norway and north-west Russia. It connects with the Norwegian Sea to the west, the Arctic Ocean to the north and the Kara Sea to the east (Figure 19). It covers an area of approximately 1.4 million km^2, has an average depth of 230 m, and a maximum depth of about 500 m at the western end of the Bear Island Trough. Its topography is characterised by troughs and basins (300–500 m deep), separated by shallow bank areas, with depths ranging from 100–200 m. Several troughs over 300 m deep run from the central Barents Sea to the northern and western continental shelf break. These troughs allow the influx of Atlantic waters to the central Barents Sea (Arneberg et al., 2009)[27].

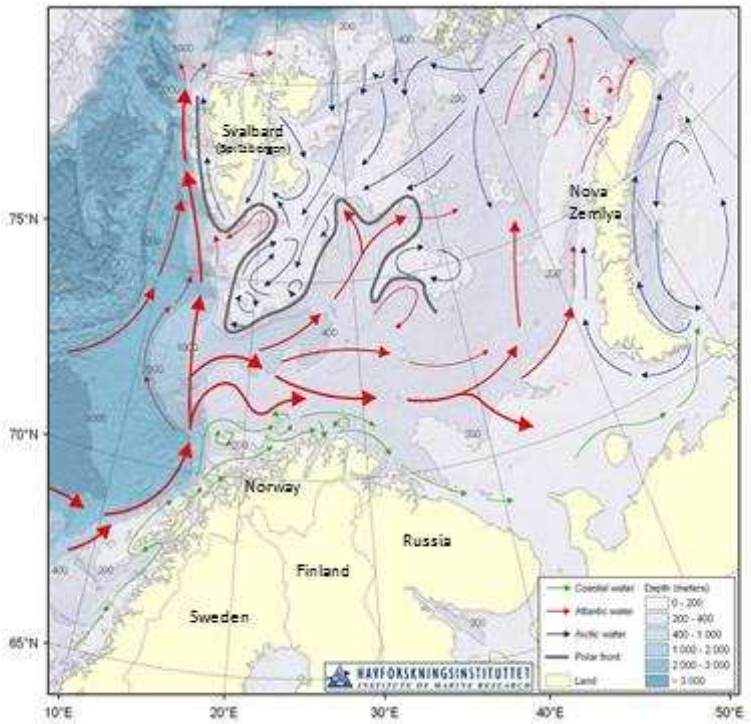

Figure 19 The Barents Sea: ocean current circulation patterns.

The general pattern of circulation (Figure 19) is strongly influenced by the topography, and is characterised by inflow of relatively warm Atlantic water, and coastal water from the west. This Atlantic water current divides into two branches: a southern branch that flows parallel to the coast and eastwards towards Novaya Zemlya; and a northern branch that flows along the shelf edge towards west Svalbard. In the northern region of the Barents Sea, fresh and cold Arctic waters flow from northeast to southwest. Atlantic and Arctic water masses are separated by the Polar Front, which is characterised by strong gradients in both temperature and salinity. There is large inter-annual variability in ocean climate related to variable strength of the Atlantic water inflow, and exchange of cold Arctic water and the annual extent of ice cover.

The Norwegian Sea is bounded by a line drawn from the Norwegian Coast at about 62° N to Shetland–Faroes–east Iceland–Jan Mayen–southern Spitsbergen–Vesterålen (on the Norwegian coast). The Norwegian Sea has an area of *c.*1 million km^2 and an average depth of *c.* 2000 m

[27] Arneberg, P, Korneev, O., Stiansen, J.E. & Titov, O. 2009. http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/introduction/introduction

divided into two separate basins (the Lofoten Basin to the south and the Norwegian Basin in the north) of 3000 m to 4000 m depth. Along the Norwegian coast there is a relatively narrow continental shelf, between 40 and 200 km wide with a relatively level seabed.

The circulation in the Norwegian Sea (Figure 20) is strongly affected by the topography. A low salinity Norwegian Coastal Current enters the area from the North Sea and flows north to the Barents Sea. North Atlantic inflow takes place mainly through the Faroe–Shetland Channel with some flow over the Iceland–Faroe Ridge. The major part of the warm, high salinity Atlantic Water continues northward as the offshore Norwegian Atlantic Current, parts of which branch into the North Sea and also to the more central parts of the Norwegian Sea. At the western boundary of the Barents Sea, the Norwegian Atlantic Current further bifurcates into the North Cape Current, which carries herring eggs and larvae from the Norwegian Sea spawning areas into the Barents Sea nursery areas, flowing eastwards into the Barents Sea and the West Spitsbergen Current flowing northwards into the Fram Strait between Spitzbergen and Greenland.

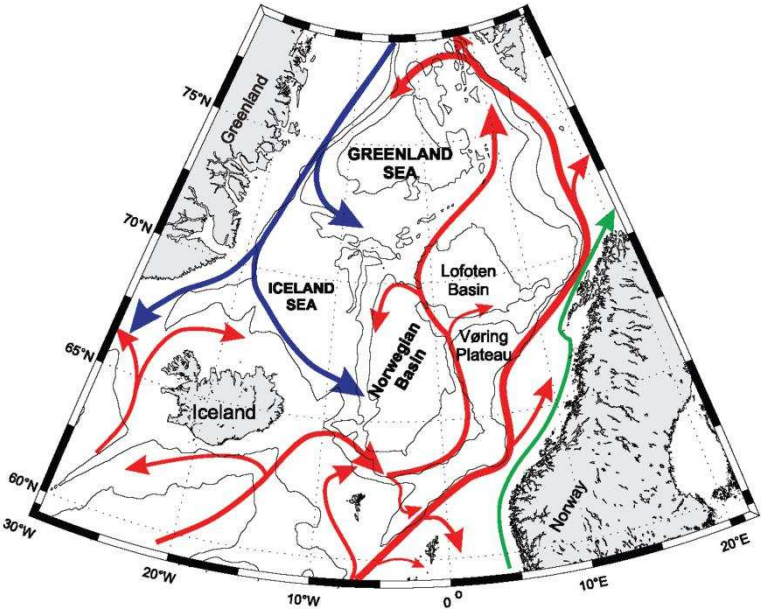

Figure 20 The main circulation pattern in the Norwegian Sea. Red lines indicate warm currents, blue lines indicate cold currents and green lines show low salinity coastal water.

The ecosystem in the Norwegian Sea has a relatively low biodiversity, but the food chain is productive and some species occur in very high numbers.[28] The great basins are dominated by deep-sea fauna while there are deep-sea coral reefs which act as keystone habitats for a diverse associated community of invertebrate and fish species. There is intense primary production during the spring bloom, which supports a high zooplankton biomass but recent biomass is the lowest since the measurements started in 1997.[29] Plankton organisms uncommon to the Norwegian Sea are entering the area at an increasing rate. The warm–temperate copepod *Calanus helgolandicus* appears to be displacing the normal Norwegian Sea copepod *c. finmarchicus*, and at times is the dominant species along the south-western coast of Norway. This change might have a detrimental effect on spring-spawning fish stocks if the fish larvae experience a reduction in their favoured food supply, *i.e.* larvae of *c. finmarchicus.*

[28] http://www.imr.no/filarkiv/havets_ressurser_og_miljo_2009/2.1_introduksjon-okosystem_Norskehavet.pdf/nb-no
[29] http://www.imr.no/filarkiv/havets_ressurser_og_miljo_2009/2.3_primaer_sekundaerproduksjon.pdf/nb-no

3.4.3 Primary and Secondary Production

The spring phytoplankton bloom starts in the Norwegian Sea, where it is dominated by the diatom *Chaetoceros socialis* followed by flagellates, particularly *Phaeocyctis pouchetii*, and then spreads north and east into the Barents Sea with the retreating ice. In early spring, the water is mixed from top to bottom but the main bloom does not occur until the water becomes stratified by density (temperature–salinity) differences. Diatoms are the dominant phytoplankton group in the Barents Sea, particularly early in the spring bloom when the concentration of diatoms can reach several million cells per litre.

The zooplankton communities of the Norwegian–Barents Seas are dominated by copepods and euphausids. The calanoid copepod *Calanus finmarchicus* is the main copepod in the Atlantic water while *C. hyperboreus* and *C. glacialis* are the dominant species in Arctic water masses. Krill (euphausids) also play a significant role, particularly *Meganychthiphanes norvegica*, *Thysanoessa inermis* and *Thysanoessa longicaudata*. Other important zooplankton include the hyperids *Themisto libellula* and *Themisto abyssorum*. Krill species are believed to be omnivorous, filter-feeding on phytoplankton during the spring bloom but feeding on small zooplankton (possibly including cod and haddock eggs and larvae) at other times of the year. Ctenophore and scyphozoan jellyfishes are also abundant, widespread predators of planktonic-stage and post-larval fish. The plankton community shows interannual variability in productivity, with concomitant implications for fish productivity.

3.4.4 The Seabed Environment

3.4.4.1 Potential effects of fishing gear on benthic habitats and species

The interaction of fishing gears with seabed habitats and species varies considerably with specific details of the gear and location (*e.g*. not all trawls will have the same effect on a given habitat, not least because the rig of the ground gear – doors, sweeps and footrope – may not be suitable for a particular substratum; Løkkeborg, 2005)[30]. In recent years there have been a plethora of specific studies and examples have been reviewed by Hall (1999)[31] and Kaiser & de Groot (2000).[32] There are, however, some broad generalities that can be noted and kept in mind; these are summarised here.

Static gear (lines and nets)

Generally speaking, static gear has a very light environmental footprint and is more likely to have an effect on the fish community through ghost fishing (*i.e.* continuing to fish after the gear has been lost or abandoned) than on benthic communities. Nevertheless, there is the potential to scrape turf communities or to break coral heads during hauling (Buhl-Mortensen et al., 2013[33]). In response to the ghost fishing problem, if vessels fail to retrieve all or lose their gear, for whatever reason, they are expected to report its last known position to the Norwegian Coastguard, which undertakes an annual lost-gear retrieval programme (Misund et al., 2005;[34] Buhl-Mortensen et al., 2013).

Danish seine

[30] Løkkeborg, S. 2005. Impacts of trawling and scallop dredging on benthic habitats and communities. FAO Fisheries Technical Paper. No. 472. Rome, FAO.
[31] Hall, S. J. (1999). *The Effects of Fishing on Marine Ecosystems and Communities*. Oxford: Blackwell Science – Fish Biology & Aquatic Resources Series 1
[32] Kaiser, M. J. & de Groot, S. J. (Eds) (2000). *Effects of Fishing on Non-target Species and Habitats*. Oxford: Blackwell Science
[33] Buhl-Mortensen, L., Aglen, A., Breen, M., Buhl-Mortensen, P., Ervik, A., Vivian Husa, V., Løkkeborg, S., Røttingen, I. & and Hagen Stockhausen, H. (2013). Impacts of fisheries and aquaculture on sediments and benthic fauna: suggestions for new management approaches. Fisken og Havet 2-2013. Bergen: IMR.
[34] Misund, R., Kolle, J., Haugen, S. & Hareide, N.-R. 2005. The Norwegian Retrieval Survey For Lost Gillnets. Bergen: Report from the Norwegian Directorate for Fisheries.

A Danish seine consists of a conical net with wings, rather like a trawl; it is laid out in a triangle on the seabed using very long ropes that are hauled in by an anchored vessel or vessel holding station by its own engine power (Scottish fly-seining). Since this kind of fishing is dependent on the ropes not getting caught on obstacles during the herding phase, there are clear limitations on the sediment types where it can be used; i.e. the vessel must avoid all areas with known seabed obstructions (Buhl-Mortensen et al., 2013), including benthic megafauna such as corals and sponges. As no significant problem has been identified there have been no studies to document the physical impact of Danish and Scottish seining on seabed habitats. The potential effects are probably much smaller than for bottom trawling, since there are no trawl doors, the ground gear is lighter and the seine is not dragged long distances (Buhl-Mortensen et al., 2013). However, the ropes may have a physical impact on upright soft megafauna such as seapens (Pennatulacea), cutting or possibly uprooting them.

Demersal (bottom) trawls

The range of ground gear used by trawl vessels has been summarise by Løkkeborg (2005) and Buhl-Mortensen et al. (2013). In essence, smaller, less powerful (inshore) vessels use lighter ground gear than is adopted by the large, powerful offshore fleet.

When the Barents Sea trawl grounds were first being opened up in the 1920s and '30s, position fixing was rudimentary, sun and star sights, line of sight to land – all weather permitting – and, on some vessels, basic radio direction finders. Little was known about seabed topography or habitats; *i.e.* vessels were fishing blind. For these reasons if no other, the ground gear was heavily armoured to protect the net and catch. Heavy (3–5 t) rectangular, steel-shod wooden (aptly named,) 'Dreadnought' doors were built to withstand anything with which they made contact. The footrope comprised a continuous row of 21–24 inch (50–60 cm) spherical steel bobbins. These were intended to either climb over or smash through any seabed obstruction, both animate and inanimate. The net itself was made of natural fibre that became waterlogged and dragged along the seabed; its underside was protected from chaffing and tearing by a mat of raw cowhides. This gear was in almost universal use through to the late 1960s–mid 1970s. Thus, it was during the middle decades of the 20th century that fishing had the greatest and most lasting adverse effects on SMHs and SMS, such as corals and sponges. With their slow growth and decadal recovery rates, many areas of the NE Arctic are still showing the scars of this historic fishing activity, but there are also signs of colonistaion, growth and recovery (BMT COrdah, 2011[35]; Buhl-Mortensern, 2013; Hankinson & Ulvestad, 2013[36]).

Following the first of the great fuel-oil crises in the early 1970s there was an urgent need to develop a lighter, more fuel efficient design for trawl gear (research and development that continued to this day through the government–industry funded CRISP partnership, including work to develop an even more environmentally friendly gadoid trawl; www.imr.no/crisp)[37]; this resulted in development of the rock-hopper rig. While the lighter rock-hopper gear has made very little difference in choice of offshore trawl grounds fished, it has enabled more of the smaller, less powerful inshore vessels to fish on rougher grounds than was previously possible. While rock-hopper gear still has the capacity to damage some SMHs, its lighter environmental footprint (rubber discs rather than steel bobbins) is complemented by the more efficient oval slotted

[35] BMT COrdah, 2011. The management of marine growth during decommissioning. Report for Gas & Oil Uk: Aberdeen, UK. http://www.oilandgasuk.co.uk/cmsfiles/modules/publications/pdfs/OP086.pdf

[36] Hankinson, L. & Ulvestad, L. 2013. Environmental Monitoring in Region 9 and Baseline Surveys in the Norwegian Sea and the Barents Sea: Visual Mapping in the Barents Sea 2013. Report No.: 16AKYSL-15 / 2013-1476. Høvik: DNV

[37] CRISP. 2013. Crisp Annual Report 2012. Bergen: IMR.

polyvalent doors and buoyant net fibres that enable the net to float clear of the seabed without the need for protective cowhides dragging across the seabed.

Navigational aids and seabed monitoring

In addition to the improvements to the fishing gear, there have been significant improvements in navigation and seabed monitoring that have had a positive environmental effect. Following the second world war (1939–45) radio direction finders were replaced by Loran C[38] and Decca navigators[39], systems that enabled vessels to plot their position to within a few miles offshore or hundreds of metres inshore, where position could be fixed more precisely by radar. Early echo sounders could provide depth, distinguish between hard and soft bottom and indicate the presence of fish. Over the past 20–30 years, advances in satellite navigation enable a skipper to plot his position better than ±5 m (with the option to offset the display to show the position of a trawl on the seabed) and modern ground-discrimination echo sounders can distinguish not just between hard and soft bottoms but between mud and sand or hard rock, coral and sponge. Clearly, such advances make a positive contribution to safeguarding SMHs. Even before the inauguration of the MAREANO programme, skippers knew a great deal of seabed detail [see, for example, *Close's Fishermen's Chart of the Murman Coast and the White Sea* or *Kingfisher Charts* (www.seafish.org.uk), which incorporate considerable information garnered from practising fishing skippers] but the detail and locations are known more precisely now and vessels have the electronic tools to avoid them. This information on the distribution of SMH in the Barents Sea is increasing all the time. Since 1999 there has been a requirement for vessels to avoid known coral grounds and is now subject to statutory regulations. These require vessels not only to stay outside of designated marine protected areas for coral reefs (J-151-2014) but also to report and avoid all instances where live coral or live sponges are encountered (J-128-2011).[40]

3.4.4.2 Benthos and Biogenic Habitats

The abundance and distribution of the megabenthc species and habitats of the Barents Sea ecosystem are monitored and mapped annually in the course of the IMR–PINRO trawl and ecosystem survey (Prokhorova, 2013).[41] In addition to looking at the distribution of particular (sensitive) species, the distribution of main habitats and many sensitive habitat types can be inferred from the abundance and distributions of major taxa (Figure 21). It would appear that the main, i.e. most widespread, habitat is characterised by species associated with sedimentary deposits while hard-bottom taxa tend to be more peripheral along the shalf break in the west and ice edge in the north.

[38] http://en.wikipedia.org/wiki/Loran-C

[39] http://en.wikipedia.org/wiki/Decca_Navigator_System

[40] J128-2011. Regulations on regulation of fishing with bottom gear in the Norwegian economic zone, fishery zone around Jan Mayen and the fisheries protection zone around Svalbard. http://www.fiskeridir.no/fiske-og-fangst/j-meldinger/gjeldende-j-meldinger/j-128-2011 also http://www.fisheries.no/ecosystems-and-stocks/Environmental-measures/Vulnerable-marine-ecosystems-protected-in-Norwegian-waters/#.VMPF2V5yZ9A

[41] Prokhorova, T. (Ed.) 2013. Monitoring of biodiversity. In: *Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October.* IMR/PINRO Joint Report Series, No.4/2013. Bergen: IMR

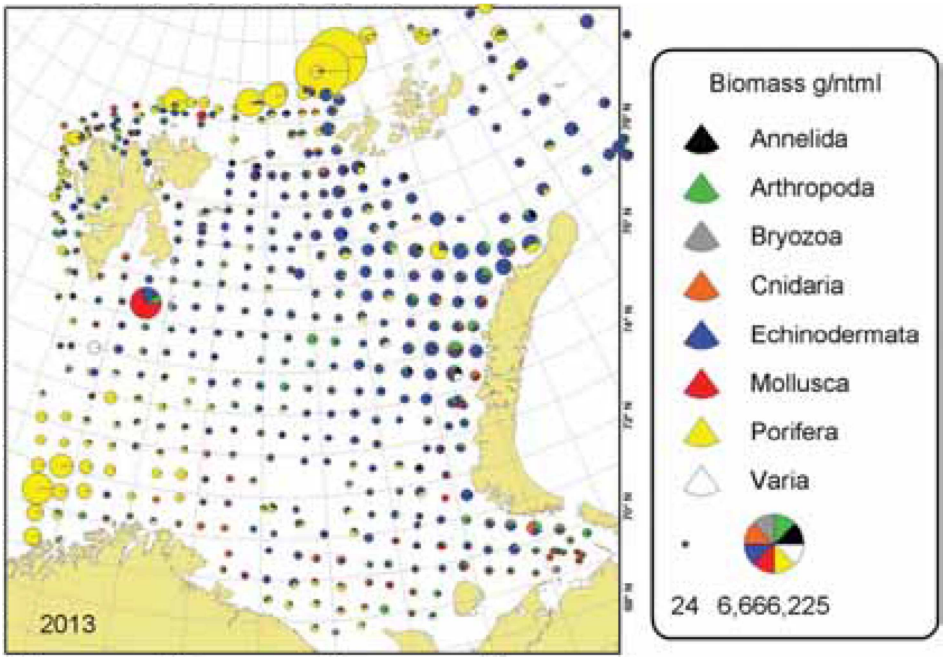

Figure 21 Distribution of main taxa throughout the Barents Sea basin (Lubin et al. 2013).

More than 3050 species of benthic invertebrates inhabit the Barents Sea (Sirenko, 2001)[42] including commercial species such as shrimp, king crab, snow crab and scallops. There was a decline in the total biomass of benthos from 1924–35 to 1968–70 (Antipova, 1975)[43] but the mechanism behind this biomass reduction is not clear.

The northern shrimp (*Pandalus borealis*) is distributed in most deep areas of the Barents Sea and Svalbard waters at depths between 200 and 350 meters. Although it is an important food item for many fish species it tends to be deeper than the greater part of the cod population. Red king crab (*Paralithodes camtschatica*) was introduced to the Barents Sea in the 1960s (Tysganova et al., 2009)[44]; it is an opportunistic omnivores and has become an important commercial species. The snow crab (*Chionoecetes opilio*) is a non-native (and invasive) species in the Barents Sea that since its arrival in 1996 has contributed to the diet of cod, haddock, catfishes (*Anarhichas* spp.) and thorny skate (*Amblyraja radiata*) (Tysganova et al., 2009). The Iceland scallop (*Chlamys islandica*) is a slow growing species common in all shallow areas (< *c.* 150 m).

Norway continues to maintain a long-term marine environment mapping programme, MAREANO[45] that, *inter alia*, identifies sensitive marine habitats including coldwater coral reefs and gardens, significant sponge communities and burrowing mega fauna such as sea pens (Pennatulacea) (Figure 22). Many sites have been identified already along the edge of the continental shelf in the Norwegian sector (MAREANO;[46] WGDEC, 2011),[47] and some coral-reef sites[48] have been designated protected areas in which fishing is prohibited (BSMP, 2006; J-151-2014)[49]. There is a blanket ban on fishing below 1000 m within the Norwegian EEZ to protect deep-water sensitive

42 Sirenko, B.I. 2001. List of species of free-living invertebrates of Eurasian Arctic Seas and adjacent deep waters. Russian Academy of Sciences, St. Petersburg.
43 Antipova, T.V. 1975b. Distribution of the Barents Sea benthos biomass. Trudy PINRO, 35: 121-124 (in Russian).
44 Tysganova, M., Berenboim, B., Salvesen, I., Gjøsæter, J., Jelmert, A. & Kålås, J. 2009. Introduced species - Red king crab (Paralithodes camtschaticus) http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/background/biotic-components
45 http://www.mareano.no/en
46 http://www.mareano.no/kart/viewer.php?language=en;
47 WGDEC, 2014. Report of the ICES/NAFO Joint Working Group on Deep-water Ecology ICES CM 2014/ACOM:29.
48 http://www.mareano.no/kart/viewer.php?language=en
49 J-151-2014. Forskrift om endring i forskrift om utøvelse av fisket i sjøen. http://www.fiskeridir.no/content/download/34340/301378/version/1/file/J-151-2014.pdf

habitats and species, and more recently Norway has introduced a ban on fishing in the vicinity of known coral reefs or gardens (J128-2011). The distribution (presence, or absence), of coldwater corals in the Russian sector has yet to be established in detail. Such data as have been presented to date suggest that the occurrence of coral reef and garden (and also sponge) communities in the Russian zone of the Barents Sea are few and sparsely distributed (OSPAR, 2008, 2009;[50,51] Lubin et al., 2013).[52]

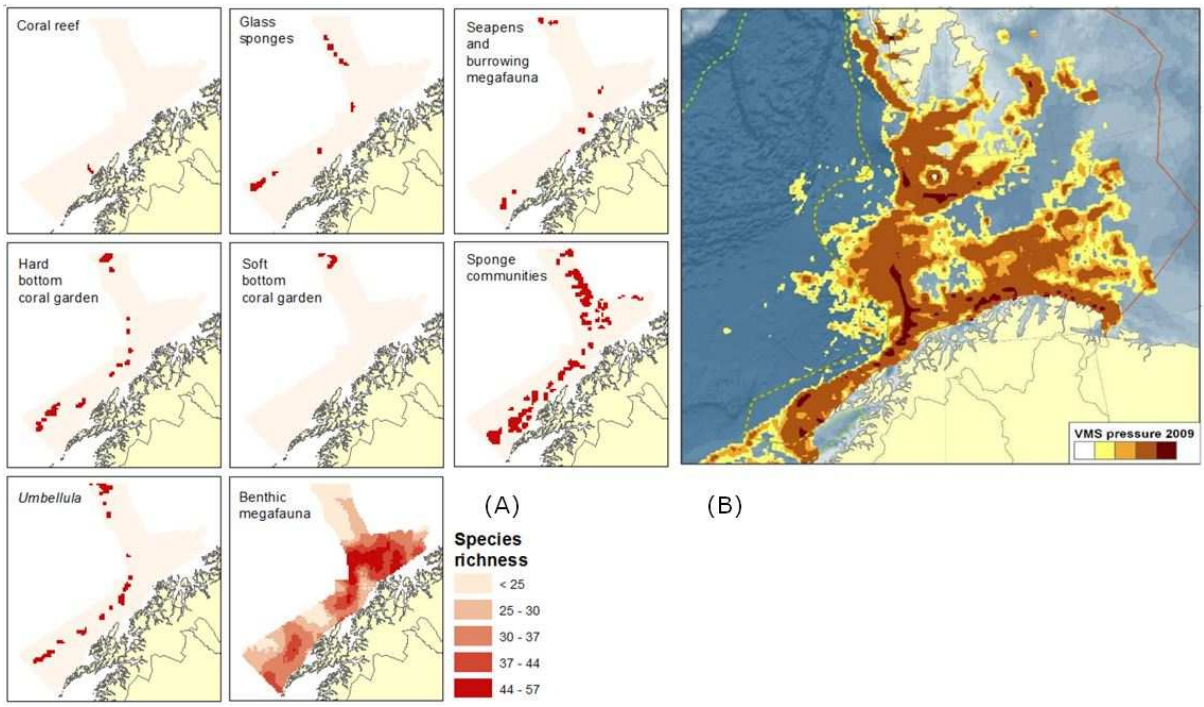

Figure 22 Distribution of (A) sensitive marine habitats and species within the MAREANO mapping area and (B) corresponding aggregated fishery VMS data (Buhl-Mortensen et al., 2012[53]; MAREANO Seabed Mapping programme[54])

Fosså *et al.* (2002)[55] estimated that *L. pertusa* covered 1500–2000 km^2 of seabed in the Norwegian EEZ and that 30–50% of the total reef area had been damaged by demersal fishing. Whether this damage is recent and ongoing or is primarily historical is a moot point at present as such damage will remain virtually undisturbed in these deep stable environments, as indicated by the presenece of settled 'marine snow' in some tracks (Hankinson & Ulvestad, 2013). Inevitably, fishing remains a threat to *L. pertusa* reefs throughout the OSPAR area (Hall-Spencer & Stehfest, 2008),[56] but the Norwegian fishing industry is increasingly aware that coral-areas are to be avoided, not least because it is now an offence to fish in known coral areas, irrespective of whether t is designated a marine protected area (MPA) or not. In the event that a vessel does

50 OSPAR, 2008. Case Reports for the OSPAR List of threatened and/or declining species and habitats. Biodiversity Series. London: OSPAR. http://qsr2010.ospar.org/media/assessments/p00358_case_reports_species_and_habitats_2008.pdf

51 OSPAR, 2009. Assessment of the environmental impact of fishing. Monitoring & Assessment Series. London: OSPAR. http://qsr2010.ospar.org/media/assessments/p00465_JAMP_QSR_fisheries_assessment.pdf

52 Lubin, P., Lindal Jørgensen, L. & Mashnin, A. 2013. Monitoring of biodiversity. In: *Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October* (Prokhorova, T. ed.) IMR/PINRO Joint Report Series, No.4/2013. Bergen: IMR

53 53 Buhl-Mortensen, L., Olsen, E., Røttingen, I., Buhl-Mortensen, P., Hoel, A.H., Lid Ringheim, S., Grøsvik, B.E., Nygaard Holen, S., Gonzalez-Mirelis, G. & Skulstad, E.M. 2012. Application of the MESMA Framework: Case Study – The Barents Sea. MESMA report: IMARES, IJmuiden, the Netherlands. http://www.mesma.org/FILE_DIR/04-10-2013_13-13-36_56_MESMA-FW-Case-Study-Barents-Sea-Lofoten.pdf

54 http://www.mareano.no/kart/viewer.php?language=en&bbox=-333038.4,6469756.0,1265979.6,7773886.0&KARTBILDE_ID=122

55 Fosså, J.H., Mortensen, P.B. & Furevik, D.M., 2002. The deep-water coral Lophelia pertusa in Norwegian waters: distribution and fishery impacts. Hydrobiologia 471, 1–12.

56 Jason M. Hall-Spencer, J.M. & Stehfest, K.M. 2008. Assessment of Lophelia pertusa reefs in the OSPAR area. Joint Nature Conservation Committee: Peterborough, UK.

have >60 kg of live coral in the catch, it must report the find to the Coastguard (as a contribution to the MAREANO mapping programme; Buhl-Mortensen, 2010)[57] and move a minimum of 2 miles before resumption of fishing (J-128-2011). At a practical level, towed-gear vessels avoid coral because of the damage it can do to the gear. Thus, although the aggregated VMS data in Figure 22(B) appears to show blanket coverage of all areas in which SMH and sensitive species are known to occur, the vessels engaged in the current fishery have the technology (high precision GPS navigation and ground-discrimination echo sounders) that enables them to skirt around and avoid such known sites. In areas that are avoided and remain undisturbed there is ample evidence that recolonisation and initial growth can be relatively rapid, even if actual reef formation is a protracted process (Anon., 1999; Bell & Smith, 1999; Gass & Roberts; 2006).[58,59,60]

Deepwater sponge communities (known to fishermen as *ostur*) are also widespread, but not always densely populated throughout the Barents Sea (Fig 1.4a; Christiansen, 2010;[61] WGDEC, 2014). The ostur communities act as keystone habitat for a wide range of associated species. Klitgaard (1995)[62] found 242 species of epi and in-fauna, of which 115 species were obligate sponge associates. Spicule mats associated with the sponge communities also support increased biomass of macrofauna (Bett and Rice, 1992).[63] The western Barents Sea is well known for mass occurrences of sponges from numerous scientific and fishermen's sources (Klitgaard & Tendal, 2004);[64] between 150 and 350 m depth, sponges of up to 1 m diameter and contributing up to 95–98 % of the local benthic total biomass samples and up to 5–6 kg m^{-2} were found to occur on sandy and sandy–silty seabed with good water movement. The distribution (presence, or absence), of sponges in the Russian sector has yet to be established in detail comparable with that in the MAREANO area. Such data as have been presented to date suggest that the occurrence sponge communities in the Russian zone of the Barents Sea are few and sparsely distributed (OSPAR, 2008, 2009; Lubin et al., 2013). The greatest abundance of sponge species in the Barents Sea are to be found along the western (Figure 22) and northern (Figure 21) margins, adjacent to the icefield (Lubin et al., 2013).

During MAREANO mapping (and comparable ROV-camera surveys; Hankinson & Ulvestad, 2013) closely spaced trawl-door ruts and traces of trawling have been seen in about 90% of video recordings. In some places with a large number of trawl tracks, large quantities of sediments were observed on the surface of sponges, and unattached sponges had collected in the trawl ruts. Self-evidently, direct trawl-gear impact will damage and break sponge colonies but aquarium experiments show that damage can be healed relatively fast (Hoffmann *et al.* 2003)[65] and sponges have been found to regrow quite rapidly within the Barents Sea (Hankinson & Ulvestad, 2013).Nevertheless, the size structure within sponge populations indicates slow reproduction and recruitment, and high age of the large specimens. No exact aging has so far been done but comparable size structure investigations in Antarctica point to decades if not centuries (Dayton

57 Buhl-Mortensen, 2010. Corals of the Arctic & MAREANO mapping. www.norut.no/content/download/4213166/.../Lene+Buhl-Mortensen.pdf

58 Anon. 1999. Brent Spar Outcry Leaves Shell With A £60M Bill. *Professional Engineering* **12:** 16

59 Bell, N. & Smith, J. 1999. Coral growing on North Sea oil rigs. *Nature* **402** (6762): 601–2

60 Gass, S. & Roberts, J.M. 2006. "The occurrence of the cold-water coral *Lophelia pertusa* (Scleractinia) on oil and gas platforms in the North Sea: colony growth, recruitment and environmental controls on distribution. *Marine pollution bulletin* **52** (5): 549–559.

61 Christiansen, S. 2010. *Background Document for Deep-sea sponge aggregations*. OSPAR Biodiversity Series: London.

62 Klitgaard, A.B. 1995. The fauna associated with outer shelf and upper slope sponges (Porifera, Demospongiae) at the Faroe Islands, northeastern Atlantic. *Sarsia* 80: 1–22.

63 Bett, B.J. & Rice, A.L. 1992. The influence of hexactinellid sponge (*Pheronema carpenteri*) spicules on the patchy distribution of macrobenthos in the Porcupine Seabight (Bathyal NE Atlantic). *Ophelia* 36: 217–226.

64 Klitgaard, A.B., Tendal, O.S. (2001) "Ostur" – "Cheese bottoms" – sponge dominated areas in Faroese shelf and slope areas. In Marine biological investigations and assemblages of benthic invertebrates from the Faroe Islands (Bruntse, G. & Tendal, O. S. eds). Kaldbak Marine Biological Laboratory;The Faroe Islands.

65 Hoffmann, F., Rapp, H.T., Zöller, T. & Reitner, J. (2003). Growth and regeneration in cultivated fragments of the boreal deep water sponge *Geodia barrette* Bowerbank, 1858 (Geodiidae, Tetractinellida, Demospongiae). *Journal of Biotechnology* 100: 109–118

1979;[66] Gatti 2002).[67] Consequently, it is assumed that it will take a long time for a sponge-dominated area to recover even after partial destruction.

As with coldwater coral reefs, skippers endeavour to avoid known ostur areas. In this instance however, it is because the deadweight of sponges in a trawl on hauling crushes the fish and makes the catch commercially worthless. There is also the risk of trawls bursting with concomitant loss of fishing time for repairs or (high-cost) replacement. Also, as with corals, this operational standard practice is underwritten and enforced through national legislation: if >800 kg of live sponge is taken in a haul, it must be reported to the Coastguard (as a contribution to the MAREANO mapping programme; Buhl-Mortensen, 2010) and the vessel must move a minimum of 2 miles before resumption of fishing (J-128-2011).

Of the mega burrowing benthic fauna (in sedimentary substrata – the most widespread habitat; Figure 21), it is primarily sea pens (Pennatulacea) that are most vulnerable to fishing gears covered by this assessment. In addition to the sparse distribution within the MAREANO mapping area (Figure 22) they are found in small numbers in many other areas of the Barents Sea (Lubin et al., 2013). For all practical purposes, static fishing gears (nets and lines) do not have any detectable effect and it is principally gears designed to dig in, such as dredges and tickler chains, that generally affect infauna. All sea pens have the ability to bend under pressure and some can retract into their burrow in response to hydrodynamic pressure clues. Those that cannot bend may be cut down by bottom-contact ground gear, including Danish seine footropes as the net closes but probably not by a rock-hopper foot rope that is 25–30 cm clear of the seabed (i.e. the axis of 21–24 inch wheels). Even if they are not cut down, they can still be damaged by passage of the gear. Studies of sea pen populations along the west coast of Scotland (http://www.ukmarinesac.org.uk/communities/seapens/sp5_1_1.htm) concluded that trawling was not a significant cause for concern with respect to sea pen populations (Atkinson, 1989;[68] Howson & Davies, 1991)[69].

In conclusion, it must be recognised that if fishing skippers did not actively seek to avoid SMHs, not only but particularly areas of corals and sponges, with the intensity of international trawl effort there has been over the past 70–90 years, there would be no SMHs left in the NE Arctic. The reality is that SMHs are still widespread in the Barents Sea ecoregion(Figure 22; Buhl-Mortensen et al., 2013) and in areas where fishing has ceased, there are signs of (*e.g.* coral-reef) recovery (Buhl-Mortensen et al., 2013). Notably, where the seabed is characterised by coral rubble, the biodiversity of benthic organisms has been found to be greater than in areas of living coral (Buhl-Mortensen et al., 2013). Nevertheless, it is right that concerns are expressed, and that vessel operators, management and enforcement agencies do all that they can to protect, and optimise recovery of SMHs. The current fishing industry is aware of this an supports the conservation objectives; attitudes and practices of earlier generations of the fishing industry should not be used to judge current practice.

As noted above, the information on the distribution and abundance of benthic marine species and habitats within Russian waters is less detailed than inNorwegian waters as it is limited to that gathered during the annual IMR–PINRO trawl and ecosystem surveys (Prokhorova, 2013). Responsibility for environmental proection and sustainability falls to the Russian Ministry for

[66] Dayton PK (1979) Observations on growth, dispersal, and population dynamics of some sponges in McMurdo Sound, Antarctica. In *Biologie des Spongiaires* (c. Lévi and N. Boury- Esnault, eds.), pp 272–282. Centre Nationale de Recherche Scientifique; Paris

[67] Gatti S (2002) The role of sponges in the High-Antarctic carbon and silicon cycling – a modelling approach. *Berichte zur Polar- und Meeresforschung* 434.

[68] Atkinson, R.J.A., 1989. Baseline survey of the burrowing megafauna of Loch Sween PMNR and an investigation of the effects of trawling on the benthic megafauna. Report to the Nature Conservancy Council from the University Marine Biological Station, Millport

[69] Howson, C.M. & Davies, L.M., 1991. Marine Nature Conservation Review, Surveys of Scottish sealochs. A towed video survey of Loch Fyne. Volume 1 - Report. Report to the Nature Conservancy Council from the University Marine Biological Station, Millport

Natural Resources (http://www.mnr.gov.ru/english/), which does have a programme for developing marine protected areas. To date, withinthe marine environment, these have focussed on seabirds and marine mammals, consequently, they are all coastal (*e.g.* Ramsar; special protection area, SPA) sites (http://www.zapoved.ru/) not designed explicitly for safeguarding benthic marine species or habitats. Nevertheless, the exclusion of large and non-Russian-registered fishing vessels from operating within the 12 mile coastal zone does offer a measure of protection. In addition to national measures, the Russian Federation declares its commitment to environmental protection through being a signatory to (e.g) the UN Convention on Biodiversity, UNEP (e.g. see UNEP, 2011)[70] and, in addition to the JRNFC, the Joint Norwegian–Russian Commission on Environmental Protection (http://www.miljodirektoratet.no/) and similar intergovernmental agreements.[71,72]

3.4.5 Fish Communities

There are 8 species of squid inhabiting the Barents Sea (Golikov *et al.*, 2008).[73] The flying squid (*Todarodes sagittatus*) was a significant fishing resource in Norwegian waters during several periods up about 1988 (Borges, 1990).[74] However, since then this squid has almost been absent and only sporadic catches have been recorded. In contrast, the boreo-Atlantic armhook squid (*Gonatus fabrici*) is abundant in offshore waters. Although this species has not been a subject of stock assessment, the total biomass is probably several million tonnes (Bjørke, 1995).

More than 250 fish species are registered in trawl catches during IMR–PINRO surveys of the Barents Sea (AFWG, 2014, Wienerroither et al., 2013),[75],[76] and IMR surveys of the Norwegian Sea,[77] of which nearly 100 occur regularly. In addition to North-east Arctic cod, commercially important fish species include, Northeast Arctic haddock, redfish (mainly deep-sea redfish, *S. mentella*), Greenland halibut, long rough dab (*Hippoglossoides platessoides*), wolffish (*Anarhichas* spp.), European plaice (*Pleuronectes platessa*), capelin (*Mallotus villosus*), polar cod (*Boreogadus saida*) and immature Norwegian spring-spawning herring (*Clupea harengus*). In recent warmer years, increased numbers of young blue whiting (*Micromesistius poutassou*) have migrated into the Barents Sea but are currently restricted to its western fringes. Variations in abundance of these species have been attributed to a combination of fishing pressure, environmental variability, spawning biomass, climate conditions, food availability and predator abundance and distribution. Variation in the recruitment of some species, like cod, haddock and herring, has been associated with changes in the influx of Atlantic waters into the Barents Sea.

Cod prefer capelin as a prey (typically, they contribute *c.* 30% the annual diet – up to 3 Mt year^{-1}; Dolgov, 2002),[78] and fluctuations in 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

[70] UNEP, 2011. Protecting Arctic Biodiversity: limitations and strengths of environmental agreements. Nairobi: United Nations Environment Programme. http://content.yudu.com/A1pish/MEAreport/resources/87.htm

[71] JNREC, 1992a. Agreement between the Goverment of the Kingdom of Norway and the Russian Federationon Cooperation in Environmental Matters. Oslo, 1999

[72] Joint declaration from the meeting of the Ministers of Environment of the Nordic Countries and the Russian Federation. Kirkenes, 1992.

[73] Golikov, A.V., Sabirov, R.M., and Lubin, P.A. 2008. Distribution and ecology of cephalopods in Barents Sea. Abst. In *Biodiversity and Functioning of Aquatic Ecosystems in the Baltic Sea Region*: pp. 36–37. Klaipeda: Lithuania.

[74] Borges, T. *c.* 1990. A contribution to the biology of the ommastrephid squid, *Todarodes sagittatus*, with emphasis on the possible application of morphometric data to population studies. Doctoral Thesis. Norwegian College of Fisheries Science at the University of Tromsø. Tromsø, University of Tromsø, Norway.

[75] Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.

[76] http://www.fishbase.org/trophiceco/FishEcoList.php?ve_code=133

[77] http://www.fishbase.org/trophiceco/FishEcoList.php?ve_code=138

[78] Dolgov, A. V. 2002. The role of capelin (*Mallotus villosus*) in the foodweb of the Barents Sea. – ICES Journal of Marine Science, 59: 1034–1045.

euphausiids for cod feeding increases in the years when capelin stock is at a low level (Ponomarenko & Yaragina 1990)[79] with euphausid abundance affecting the survival rate of cod during the first year of life (Ponomarenko, 1973,[80] 1984).[81]

The Barents Sea capelin stock has experienced three stock collapses in recent decades: 1985–1989, 1993–1997, and 2003–2006. The collapses had effects both downwards and upwards in the food web (Gjøsæter *et al.*, 2009).[82] The release in predation pressure from the capelin stock led to increased amounts of zooplankton during the two first collapse periods. When capelin biomass was drastically reduced, its predators were affected in various ways. Cod experienced increased cannibalism, growth was reduced and maturation delayed. Seabirds and harp seals also experienced increase mortality rates and recruitment failure (AFWG, 2014).

Juvenile Norwegian spring-spawning herring are distributed in the southern parts of the Barents Sea. They stay in this area for about three years before they migrate west and southwards along the Norwegian coast and mix with the adult part of the stock. The presence of young herring in the area has a profound effect on the recruitment of capelin, and it has been shown that when strong year classes of herring enter the Barents Sea, the recruitment to the capelin stock is poor, and in the following years the capelin stock collapses (Gjøsæter and Bogstad, 1998).[83]

Haddock is also a common species, and migrates partly out of the Barents Sea to spawn. The stock has large natural variations in stock size. Water temperature at the first years of the life cycle may be used as an indicator of year-class strength. Food composition of haddock consists mainly of benthic organisms, some, if not all of which might be expected to decrease in abundance (rather than icrease, as has been the case since *c*. 2005) during periods of ultra-high haddock abundance such as has been recored in recent years (Figure 15). Saithe is found mainly along the Norwegian coast, but also occurs in the southern Barents Sea. Smaller individuals feed on crustaceans, while larger saithe depends more on fish prey; caplin contribute up to 60% the annual diet (Dolgov, 2002). Polar cod is a coldwater species found particularly in the eastern Barents Sea and in the north. It has no commercial value but seems to be an important forage fish for several marine mammals (JNRFC, 2010) and, to some extent, also for cod.

Deep-sea or beaked redfish (*S. mentella*) and golden redfish (*S. norvegicus*) used to be important elements of Barents Sea fish fauna. Due to heavy overfishing these stocks declined during the 1980s but there are some hopeful signs of recovery in the beaked redfish stock.

Greenland halibut (*Reinhardtius hippoglossoides*) taken primarily along the continental slope between the Barents Sea and the Norwegian Sea but it is also found in the deeper parts of the Barents Sea. Its diet comprises squid, capelin and herring with a decreasing proportion of small prey (shrimps and small capelin) and increasing proportion of larger fish with increasing predator length. The largest Greenland halibut (> 65–70 cm) take a greater proportion of cod and haddock in their diet.

[79] Ponomarenko, I..Ya. and N.A.Yaragina. 1990. Long-term dynamics of the Barents Sea cod feeding on capelin, euphausiids, shrimp and the annual consumption of these objects. Feeding resources and interrelations of fishes in the North Atlantic: Selected papers of PINRO. Murmansk 1990.

[80] Ponomarenko, I.Ya. 1973. The influence of feeding and temperature conditions on survival of the Barents Sea "bottom" juvenile cod. Voprosy okeanografii severnogo promyslovogo basseina: Selected papers of PINRO. Murmansk, 1973.

[81] Ponomarenko, I.Ya. 1984. Survival of "bottom juvenile" cod in the Barents Sea and determining factors. Cod reproduction and recruitment: Proceedings of the first Soviet–Norwegian symposium. VNIRO. – M., 1984: 301–315.

[82] Gjøsæter, H., Bogstad, B., and Tjelmeland, S. 2009. Ecosystem effects of three capelin stock col-lapses in the Barents Sea. In *Fifty Years of Norwegian–Russian Collaboration in Marine Research* (Haug, T., Røttingen, I., Gjøsæter, H. & Misund, O. A. eds) Thematic issue No. 2, *Marine Biology Research* 5:40–53.

[83] Gjøsæter, H. and Bogstad, B. 1998. Effects of the presence of herring (*Clupea harengus*) on the stock-recruitment relationship of Barents Sea capelin (*Mallotus villosus*). *Fisheries Research* 38: 57–71.

Long rough dab (*Hippoglossoides platessoides*) eats mainly benthos but the proportion of fish in the diet increases with size (polar cod and cod, capelin, juvenile redfish and haddock, and their own juveniles). Thorny skate (*Amblyraja radiata*) prey primarily on large crustaceans, shrimps and crabs but may also feed on fish – young cod and capelin. Round skate (*Rajella fyllae*) fed mainly on benthos, especially polychaetes and gammarids. Arctic skate (*Amblyraja hyperborea*) feed mainly on fish and shrimp (herring, capelin, redfish and northern shrimp). Blue skate (*Dipturus batis*) diet consists largely of fish (young cod and haddock, redfish, and long rough dab). Spinytail skate (*Bathyraja spinicauda*) also prey mostly on fish (haddock, redfish and long rough dab). Total yearly food consumption by thorny skate is estimated to be around 160 thousand tonnes, of which around 75 thousand tonnes comprised commercial fishes and invertebrates. Total yearly food consumption by all other skate species was estimated to be around 30 thousand tonnes, of which around 20 thousand tonnes was commercial species (Dolgov, 2005).[84]

3.4.6 Seabirds

The abundance and distribution of offshore seabirds are monitored as part of the annual IMR–Pinro ecosystem survey (Mauritzen & Klepikovsky, 2013).[85]

The Barents Sea has one of the largest concentrations of seabirds in the world (Norderhaug *et al.*, 1977; Anker-Nilssen *et al.*, 2000); its 20 million seabirds harvest annually approximately 1.2 million tonnes of biomass from the area (Barrett *et al.*, 2002). Nearly 40 species are thought to breed regularly in northern regions of the Norwegian Sea and the Barents Sea but just two species – puffin (*Fratercula arctica*) and kittiwake (*Rissa tridactyla*) – account for more than 90% of all breeding seabirds in the region (Christiansen, 2010). The high density of seabirds is a consequence of high primary production and large stocks of pelagic fish species such as capelin, herring and polar cod. In the north and east, the marginal ice-zone is an important feeding habitat where seabirds forage on migrating capelin, polar cod and zooplankton (Mehlum & Gabrielsen, 1993,[86] Mehlum *et al.*, 1996).[87] The seabird communities in south and west depend on juvenile gadoids, juvenile herring, sandeels (*Ammodytes sp.*) and capelin (*e.g.* Anker-Nilssen, 1992,[88] Barrett & Krasnov, 1996,[89] Barrett *et al.*, 1997,[90] Fauchald & Erikstad, 2002).[91]

3.4.7 Marine Mammals

The abundance and distribution of marine mammals are monitored as part of the annual IMR–Pinro ecosystem survey (Mauritzen & Klepikovsky, 2013).

Information on the distribution and abundance of marine mammals in the Barents Sea is gathered under the auspices of the North Atlantic Marine Mammal Commission (NAMMCO). Norway is a

[84] Dolgov, A.V. 2005. Feeding and Food Consumption by the Barents Sea Skates. *J. Northwest Atlantic Fisheries Science* **35**: 495–503.

[85] Mauritzen, M. & Klepikovsky., R. 2013. Marine mammals and seabird monitoring. In: *Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October* (Prokhorova, T. ed.) IMR/PINRO Joint Report Series, No.4/2013. Bergen: IMR

[86] Mehlum, F. & Gabrielsen, G.W. 1993. The diet of high-arctic seabirds in coastal and ice-covered, pelagic areas near the Svalbard archipelago. Polar Research 12:1–20.

[87] Mehlum, F., Hunt, G.L., Klusek, Z., Decker, M.B., and Nordlund N. 1996. The importance of prey aggregations to the distribution of Brunnich's guillemots in Storfjorden, Svalbard. Polar Biology, 16:537–547.

[88] Anker-Nilssen, T. 1992. Food supply as a determinant of reproduction and population devel-opment in Norwegian Puffins *Fratercula arctica*. Dr. scient. thesis, University of Trondheim, Norway.

[89] Barrett R.T., and Krasnov Y.V. 1996.Recent responses to changes in stocks of prey species by seabirds breeding in the southern Barents Sea. ICES Journal of Marine Science: Journal du Conseil, 53(4):713–722.

[90] Barrett, R.T., Bakken, V. , and Krasnov, J. 1997. The diets of common and Brünnich's guille-mots *Uria aalge* and *U. lomvia* in the Barents Sea region. Polar Research 16(2): 73–84.

[91] Fauchald, P., and Erikstad, K.E. 2002.Scale dependent predator-prey interaction in the marine ecosystem: the aggregative response of guillemots to capelin under variable capelin abun-dance and patchiness. Marine Ecology Progress Series 231:279–291.

signatory to the NAMMCO convention but although Russia currently only has observer status, Russia participates fully in many of the data gathering and ecosystem modelling programmes.[92]

Twelve species of large cetaceans, five species of dolphins and seven pinniped species have been recorded in the Barents Sea region, plus polar bears (*Ursus maritimus*). Most of the whales are long-distance migrants but only three species are permanent high Arctic residents – white (beluga) whale (*Delphinapterus leucas*), narwhal (*Monodon monceros*) and bowhead whale (*Balaena mysticetus*). Historically, all of the large whales were hunted but even after 80 years of protection, only scattered individuals of bowhead whale survive near the ice edge. Today, the minke whale (*Balaenoptera acutorostrata*) is the only whale species being hunted in the region, and only in limited numbers (Stiansen et al., 2009).[93] Demersal fish species, particularly cod (Stiansen et al., 2009) contribute a significant percentage of the minke whale annual diet but, clearly, it is not an obligate predator of gadoids (Table 16).

Table 16 Estimated annual fish consumption (thousand tonnes) by minke whale (1992–1995) and harp seal (1990–1996) (Stiansen et al., 2009).

Prey	Minke whale consumption	Harp seal consumption	
		Low capelin stock	High capelin stock
Capelin	142	23	812
Herring	633	394	213
Cod	256	298	101
Haddock	128	47	[1]
Krill	602	550	605
Hyperiid amphipods	0	304	313[2]
Shrimp	0	[1]	[1]
Polar cod	[1]	880	608
Other fish	55	622	406
Other crustaceans	0	356	312
Total	1817	3491	3371

[1] the prey species is included in the 'other fish' group
[2] only *Themisto*

The frequency of direct, physical interaction between demersal fishing vessels and large whales is likely to be trivial [dolphins and certainly porpoises (*Phocoena phocoena*), tend to be more abundant inshore] but there can be direct trophic competition (Table 5.6). Trophic competition for pelagic prey species (*e.g.* herring *Clupea harengus*, capelin) probably occurs on a greater scale between target gadoid species and whales. The demersal fisheries, however, tend to reduce gadoid stock size and hence predation pressure on the pelagic species thereby favouring the cetacean predators rather than increasing trophic pressure. These species interactions are all part of the mosaic of multi-species ecosystem research and modelling undertaken by numerous institutions in the NE Atlantic (*e.g.* Marine Research Institute, Iceland: Stefánsson *et al.*, 1997;[94] CEFAS, UK: Blanchard et al., 2002) and as part of the Barents Sea Management Plan (BSMP, 2006;[95] Stiansen et al., 2009; Arneberg, 2013).[96]

[92] (http://iwcoffice.org/_documents/commission/IWC63docs/63-OS%20NAMMCO.pdf).
[93] Stiansen, J.E., Korneev, O., Titov, O., Arneberg, P. (Eds.), Filin, A., Hansen, J.R., Høines, Å., Marasaev, S. (Eds) 2009. Joint Norwegian-Russian environmental status 2008. Report on the Barents Sea Ecosystem. Part II – Complete report. IMR/PINRO Joint Report Series, 2009(3).
[94] Stefánsson, G., Sigurjónsson, J., & Víkingsson, G. A. (1997). On dynamic interactions between some fish resources and cetaceans off Iceland based on a simulation model. *Journal Northwest Atlantic Fisheries Science* **22**, 357–370
[95] RNME, 2006. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report No. 8 to the Storting (2005–2006). Royal Norwegian Ministry of the Environment: Oslo.
[96] Arneberg, P., Titov, O., Filin, A., and Stiansen, J. E. (Eds.) 2013. Joint Norwegian-Russian environmental status report on the Barents Sea Ecosystem – update for current situation for climate, phytoplankton, zooplankton, fish and fisheries in 2011. IMR/PINRO Joint Report Series, 2013(3).

Harp seal (*Pagophilus groenlandicus*) is the marine mammal that exists in the highest numbers in the region, with an estimated population in 20129 of *c.* 160 000 (NAMMCO, 2014).[97] It feeds in the open ocean and in spring huge numbers gather on the sea ice at the entrance to the White Sea to give birth. It is the only marine mammal that appears to come into direct contact with demersal trawlers with *c.* one per year being brought aboard. Demersal fish species, particularly gadoids (Stiansen et al., 2009) contribute a significant percentage of the harp seal annual diet but, as with minke whales, they are not obligate predators of gadoids (Table 16).

3.4.8 Inseparable or Practically Inseparable Stocks

3.4.8.1 Norwegian coastal cod

The distribution of coastal cod is limited to waters less than 12 miles from the coast but they are mostly found in the fjords. The closer inshore they are, and during the spawning season, there is an increased likelihood of offshore NEA cod mixing with coastal cod. The two groups of fish cannot be differentiated other than by post hoc comparison of otoliths taken during the biological sampling programme. Cod catches within 12 miles are apportioned to NEA and coastal cod according to the proportions in the biological samples. There is a trends-based assessment without any defined biological reference points. The survey indicates that the SSB is close to its lowest value.

Recruitment has remained low in recent years and F appears variable without a clear trend since 2000. A stock rebuilding plan defined by the Norwegian authorities was provisionally endorsed by ICES in 2010 as being consistent with the precautionary approach ($ACOM_{coast}$, 2014).[98]. The three-year mean estimate (2011–13) of commercial catch of coastal cod *c.* 28 000 (AFWG, 2014; *i.e. c.* 4% of total demersal fish catch), but the AFWG makes the explicit point that this is probably an over estimate owing to inherent sampling bias. By definition, it is probable that the per cent coastal cod in the catches of inshore (static gear and jigger) vessels is greater than 4% (i.e. >5%, hence, a main retained species) but there are no data to confirm that this is the case.

In addition to the general fishery conservation measures for Norwegian waters, there is a complex suite of inshore gear-related technical conservation measures aimed at minimising catches of coastal cod, not the least of which are restrictions on trawling and Danish seining in inshore waters. To some extent, however, these measures are confounded by socio-economic considerations to assist isolated fishery-dependent communities. A quantity of the annual Norwegian cod quota is top-sliced and held in reserve for reallocation to these communities in the autumn, specifically for the landing of fresh cod. These measures mean that the fish are taken by day-boats that are more likely to catch coastal cod than offshore NEA cod.

3.4.9 Retained species

All commercial species caught in Norwegian and Russian waters must be retained, recorded and landed (with the exception of juvenile Atlantic halibut)[99]; *i.e.* all commercial species meet the MSC criterion for 'retained species'. The total annual catch of retained species for each of the past three years (*i.e.* 2011–13), by species, by gear, as covered by this UoC, are shown in Table 17. They are ranked in the order of average weight landed (all gears combined) over the three year period 2011–13, as shown in Table 18.

[97] NAMMCO, 2014. Report of the Twentieth Meeting of the Scientific Committee of NAMMCO. Tromso. http://www.nammco.no/webcronize/images/Nammco/1001.pdfpdf

[98] $ACOM_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3.

[99] Atlantic halibut *Hippoglossus hippoglossus* less than 80- cm total length must be returned to sea alive; a measure intended to assist in stock recovery.

The MSC criterion for 'main retained species' is that the species catch must exceed 5% of the total weight of fish landed or 5% the total value. The per cent distribution of catch by gear is shown in Table 18. With all gears combined, only haddock (*c.* 20%) and saithe (*c.* 19%) meet the main retained species threshold but tusk also qualifies, notionally, as a main retained species in the longline fishery. The status of these, and other retained species is reviewed below.

Table 17 The annual catch (t) by year 2011–2013, by species for each of the fishing gears in the NE Arctic cod fishery, as covered by the Unit of Certification

Type of gear	Gillnet			Jigger			Longline			Danish seine			Trawl			All gears total			3-year mean	Nor/Int*
Year	2011	2012	2013	2011	2012	2013	2011	2012	2013	2011	2012	2013	2011	2012	2013	2011	2012	2013	total	%
Species																				
Atlantic cod	93,031	98,017	115,221	23,093	25,365	23,822	51,746	53,133	76,152	54,719	58,962	86,499	110,124	115,142	161,813	332,712	350,619	463,508	382280	55.0
Haddock	2,906	3,136	2,904	205	144	116	50,393	55,627	34,513	27,347	32,256	23,297	77,289	68,453	38,279	158,140	159,615	99,109	138955	47.6
Saithe	31,855	28,226	23,906	4,935	5,225	4,267	1,690	1,966	1,919	5,621	7,296	6,521	53,631	56,169	41,835	99,732	98,883	78448	92354	54.1
Tusk	1,061	1,141	822	44	52	43	10,268	8,863	7,551	7	8	9	60	80	64	11,440	10,142	8,489	10024	37.0
Ling	4,573	3,964	4,444	38	35	34	5,048	4,253	3,936	30	36	67	365	459	393	10,053	8,747	8,874	9225	96.4
Greenland halibut	1,583	1,929	2,397	12	5	0	4,238	4,453	4,647	239	413	176	2,273	2,532	2,929	8,345	9,331	10,149	9275	54.0
Wolffishes (3 spp.)	45	48	49	6	14	5	5,428	6,940	9,348	50	58	53	571	1,119	1,039	6,100	8,179	10,494	8258	
Redfish (2 spp.)	2,253	1,888	1,798	131	126	97	1,143	1,064	1,093	22	13	24	3,629	3,269	2,592	7,178	6,361	5,604	6381	35.5
Angler (Monkfish)	4,895	3,635	2,916	14	21	8	62	68	32	30	17	20	21	12	8	5,024	3,753	2,985	3921	81.7
Atlantic halibut	971	1,084	907	49	49	38	666	696	770	36	30	30	119	175	118	1,840	2,034	1,863	1912	
Lumpfish	1,193	1,019	982	12	8			8					-	-	-	1,206	1,034	982	1074	
Pollack	674	591	642	29	28	21	33	34	27	7	5	4	253	185	171	996	842	865	901	
European hake	315	525	491	1	2	4	3	3	4	14	16	55	296	319	291	629	865	846	780	0.9
European plaice	52	41	51	1	2	1	10	12	7	301	357	341	0	1	2	365	413	401	393	
Blue ling	142	136	99				11	3	4	0	0	0	14	2	4	167	141	107	138	
Skates and rays	51	42	44	1	1	2	172	178	265	3	2	3	1	5	3	228	229	317	258	
Ground fishes							117	59	93				32	48	18	150	107	111	123	
Picked dogfish	70	76	42	3	1	1	20	53	30				-	0	-	92	130	74	99	
Whiting	9	5	3			1	31	42	18	1	1	3	9	23	18	50	71	42	54	
Sharks									0				22	43	17	22	43	17	27	
Lemon sole	0	1	1							24	26	20	-	-	-	25	27	21	24	
Flatfishes	5	6	7				1	1	4	3	2	1	7	7	23	15	15	35	22	
Basking shark	2	22		2									-	-	-	4	22	-	9	
Porbeagle	6	12	7										1	-	-	7	12	7	9	
Turbot	3	4	3							1	1	1	-	-	-	5	6	5	5	
Common dab								1					0	2	2		3	2	2	
Unindentified	35	35	13	0	1		115	123	113				12	11	26	1622	170	153	648	
Total	**145,731**	**145,583**	**157,751**	**28,577**	**31,079**	**28,460**	**131,194**	**137,581**	**140,527**	**88,456**	**99,498**	**117,124**	248,730	248,057	249,644	642,688	661,797	693,506	665997	

*Nor/Int, the three-year means of total Norwegian catch as a percentage of the total international catch, where ICES publishes total international catches in ACOM advice books. Blank rows indicate the absence of corresponding ICES advice for sub-areas I & II.

Table 18 The three-year mean (2011–13) catch, by species for each of the fishing gears in the NE Arctic cod fishery, as covered by the Unit of Certification. Main retained species are highlighted by the shaded cells (further details on tusk in section 3.4.9.4).

Type of gear	Gillnet		Jigger		Longline		Danish Seine		Trawl		All gears	
Year	t	%	t	%	t	%	t	%	t	%	t	%
Species												
Atlantic cod	102,090	68.2	24,093	82.0	60,344	44.2	66,726	65.6	128,934	52.5	382,280	57.4
Haddock	2,982	2.0	155	0.5	46,844	34.3	27,634	27.2	61,042	24.8	138,955	20.9
Saithe	27,996	18.7	4,809	16.4	1,858	1.4	6,480	6.4	48,119	19.6	91,687	13.8
Tusk	1,008	0.7	46	0.2	8,894	6.5	8	0.0	66	0.0	10,024	1.5
Ling	4,327	2.9	36	0.1	4,412	3.2	44	0.0	401	0.2	9,225	1.4
Greenland Halibut	1,970	1.3	6	0.0	4,446	3.3	276	0.3	2,552	1.0	9,275	1.4
Wolffishes (3 spp.)	47	0.0	8	0.0	7,239	5.3*	54	0.1	910	0.4	8,258	1.2
Redfish (2 spp.)	1,980	1.3	118	0.4	1,100	0.8	20	0.0	2,879	1.2	6,381	1.0
Angler (Monkfish)	3,816	2.5	15	0.0	54	0.0	23	0.0	14	0.0	3,921	0.6
Atlantic halibut	987	0.7	45	0.2	711	0.5	32	0.0	137	0.1	1,913	0.3
Lumpfish	1,065	0.7	7	0.0	3	0.0	0	0.0	0	0.0	1,074	0.2
Pollack	636	0.4	26	0.1	31	0.0	5	0.0	195	0.1	901	0.1
European hake	444	0.3	2	0.0	4	0.0	28	0.0	298	0.1	780	0.1
European plaice	48	0.0	1	0.0	9	0.0	333	0.3	1	0.0	393	0.1
Blue ling	126	0.1	0	0.0	6	0.0	0	0.0	6	0.0	138	0.0
Skates and rays	46	0.0	1	0.0	205	0.2	3	0.0	3	0.0	258	0.0
Ground fishes	-	-	-	-	90	0.1	0	0.0	29	0.0	123	0.0
Picked dogfish	63	0.0	2	0.0	35	0.0	0	0.0	0	0.0	99	0.0
Whiting	6	0.0	1	0.0	30	0.0	2	0.0	15	0.0	54	0.0
Sharks	-	-	-	-	0	0.0	-	-	25	0.0	27	0.0
Lemon sole	1	0.0	0	0.0	0	0.0	23	0.0	0	0.0	24	0.0
Flatfishes	6	0.0	0	0.0	2	0.0	2	0.0	12	0.0	22	0.0
Basking shark	8	0.0	1	0.0	-	-	-	-	0	0.0	9	0.0
Porbeagle	8	0.0	0	0.0	0	0.0	-	-	0	0.0	9	0.0
Turbot	4	0.0	0	0.0	0	0.0	1	0.0	0	0.0	5	0.0
Common dab	0	0.0	-	-	0	0.0	-	-	1	0.0	2	0.0
Unindentified	28	0.0	0	0.0	117	0.1	0	0.0	15	0.0	161	0.0
Total	149,689	100.0	29,372	100.0	136,434	100.0	101,693	100.0	245,658	100.0	665,994	100.0

* Comprising 3 species of ~equal quantities ≤ 2% each

Table 19 The three-year mean (2011–13) catch, by species for each of the fishing gears in the NE Arctic haddock fishery, as covered by the Unit of Certification. Main retained species are highlighted by the shaded cells (further details on tusk in section 3.4.9.4).

Type of gear	Gillnet		Jigger		Longline		Danish Seine		Trawl		All gears	
Year	t	%	t	%	t	%	t	%	t	%	t	%
Species												
Haddock	2,982	2.0	155	0.5	46,844	34.3	27,634	27.2	61,042	24.8	138,955	20.9
Atlantic cod	102,090	68.2	24,093	82.0	60,344	44.2	66,726	65.6	128,934	52.5	382,280	57.4
Saithe	27,996	18.7	4,809	16.4	1,858	1.4	6,480	6.4	48,119	19.6	91,687	13.8
Tusk	1,008	0.7	46	0.2	8,894	6.5	8	0.0	66	0.0	10,024	1.5
Ling	4,327	2.9	36	0.1	4,412	3.2	44	0.0	401	0.2	9,225	1.4
Greenland Halibut	1,970	1.3	6	0.0	4,446	3.3	276	0.3	2,552	1.0	9,275	1.4
Wolffishes (3 spp.)	47	0.0	8	0.0	7,239	5.3*	54	0.1	910	0.4	8,258	1.2
Redfish (2 spp.)	1,980	1.3	118	0.4	1,100	0.8	20	0.0	2,879	1.2	6,381	1.0
Angler (Monkfish)	3,816	2.5	15	0.0	54	0.0	23	0.0	14	0.0	3,921	0.6
Atlantic halibut	987	0.7	45	0.2	711	0.5	32	0.0	137	0.1	1,913	0.3
Lumpfish	1,065	0.7	7	0.0	3	0.0	0	0.0	0	0.0	1,074	0.2
Pollack	636	0.4	26	0.1	31	0.0	5	0.0	195	0.1	901	0.1
European hake	444	0.3	2	0.0	4	0.0	28	0.0	298	0.1	780	0.1
European plaice	48	0.0	1	0.0	9	0.0	333	0.3	1	0.0	393	0.1
Blue ling	126	0.1	0	0.0	6	0.0	0	0.0	6	0.0	138	0.0
Skates and rays	46	0.0	1	0.0	205	0.2	3	0.0	3	0.0	258	0.0
Ground fishes	-	-	-	-	90	0.1	0	0.0	29	0.0	123	0.0
Picked dogfish	63	0.0	2	0.0	35	0.0	0	0.0	0	0.0	99	0.0
Whiting	6	0.0	1	0.0	30	0.0	2	0.0	15	0.0	54	0.0
Sharks	-	-	-	-	0	0.0	-	-	25	0.0	27	0.0
Lemon sole	1	0.0	0	0.0	0	0.0	23	0.0	0	0.0	24	0.0
Flatfishes	6	0.0	0	0.0	2	0.0	2	0.0	12	0.0	22	0.0
Basking shark	8	0.0	1	0.0	-	-	-	-	0	0.0	9	0.0
Porbeagle	8	0.0	0	0.0	0	0.0	-	-	0	0.0	9	0.0
Turbot	4	0.0	0	0.0	0	0.0	1	0.0	0	0.0	5	0.0
Common dab	0	0.0	-	-	0	0.0	-	-	1	0.0	2	0.0
Unindentified	28	0.0	0	0.0	117	0.1	0	0.0	15	0.0	161	0.0
Total	149,689	100.0	29,372	100.0	136,434	100.0	101,693	100.0	245,658	100.0	665,994	100.0

* Comprising 3 species of ~equal quantities ≤ 2% each

3.4.9.1 NE Arctic cod

Gadus morhua is a main retained species in the haddock gillnet 102 090 t, 68.2% of total gillnet catch; jigger 24 093 t, 82.0%; longline 60 344 t, 44.2 t; Danish seine 66 726 t, 65.6%; demersal trawl 128 934 t, 52.5% (Table 19).

The NEA cod stock is subject to a full age-based analytical extended survivor analysis (XSA) version of virtual population analysis (VPA) assessment. Data from four Russian–Norwegian research-vessel trawl–acoustic surveys and commercial CPUE data are used to validate and refine the assessment, not least by providing estimates of recruitment. It is assumed that discarding is negligible. A full suite of biological reference points have been estimated for the stock and the JNRFC have agreed a management plan and harvest control rules that ICES considers it to be in accordance with the precautionary approach and not in contradiction to the MSY approach ($ACOM_{neac}$, 2014).[100] The assessment is subject to internal and external peer review, not least during the periodic ICES benchmark review, which is next due in 2015.

Among the factors influencing cod growth and recruitment are water temperature, food supply, and cod population abundance. Environmental drivers (capelin biomass, ice coverage, temperature, and oxygen saturation) were used in the estimation of recruitment and temperature in the estimation of cod cannibalism. Changes in growth, maturity, and cod cannibalism are linked to the abundance of capelin but this linkage appears to be less pronounced in recent years than in the 1980s and 1990s ($ACOM_{neac}$, 2014).

Recruitment has been at or above the long-term average for a number of years with some strong year classes within the past decade. These have boosted SSB such that it is *c.* twice as high as any time in the past 70 years; *i.e.* well in excess of MSY $B_{trigger}$. Fishing mortality rate is well below the target level of F_{MSY}. ICES is satisfied that the stock is being fished sustainably and the it retains full reproductive capacity ($ACOM_{neah}$, 2014).

3.4.9.2 NE Arctic haddock

Melanogrammus aeglefinus is a main retained species in the cod longline 46 844 t, 34.3% of total longline catch; Danish seine 27 634 t, 27.2%; demersal trawl 61 042 t, 24.8% (Table 18).

The NEA haddock stock is subject to a full age-based analytical extended survivor analysis (XSA) version of virtual population analysis (VPA) assessment. Data from four Russian–Norwegian research-vessel trawl–acoustic surveys are used to validate and refine the assessment, not least by providing estimates of recruitment. Although there is probably some discarding of juvenile haddock, particularly when strong year classes first recruit to the fishery, discarding is not taken explicitly into account in the assessment. A full suite of biological reference points have been estimated for the stock (see scoring PI 2.1.1) and the JNRFC have agreed a management plan (MP) and harvest control rules (HCR) that ICES considers to be in accordance with the precautionary approach and not in contradiction to the MSY approach ($ACOM_{neah}$, 2014).[101] The assessment is subject to internal and external peer review, not least during the periodic ICES benchmark review, which is next due in 2015.

Recruitment has been above the long-term average for a number of years with two or three very strong year classes within the past decade. These have boosted SSB such that it is c. twice as high as any time in the past 70 years; i.e. well in excess of MSY Btrigger. Fishing mortality rate is well

[100] $ACOM_{neac}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Northeast Arctic cod). ICES Advice Book 3.3.2.

[101] $ACOM_{neah}$, 2014. Barents Sea and Norwegian Sea: northeast Arctic haddock (subareas I and II). ICES Advice Book 3.3.4.

below the target level of FMSY. ICES is satisfied that the stock is being fished sustainably and the it retains full reproductive capacity (ACOMneah, 2014).

3.4.9.3 NE Arctic saithe

Pollachius virens is a main retained species taken by: gillnet 27 996 t, 18.7% of total gillnet catch; jigger 4809 t, 16.4%; Danish seine 6480 t, 6.4%; demersal trawl 48 119 t, 19.6% (Table 18, Table 19).

The NEA saithe stock is subject to a state–space assessment model SAM (AFWG, 2014), using data from a Norwegian scientific acoustic survey to refine and validate the stock analysis. The assessment methods were last subject to a benchmark review in 2011, with an inter-benchmark review in 2014, which included validation of the current suite of biological reference points. It is assumed that discarding is negligible. A full suite of biological reference points have been estimated for the stock (see scoring PI 2.1.1) and Norway has implemented an MP and HCRs 2007. ICES evaluated the HCR in 2007 and concluded that it is consistent with the precautionary approach ($ACOM_{neas}$, 2014).[102]

Recruitment has been relatively stable, neither strong nor weak, for a number of years with the occasional stronger year class. Following a succession of above average year classes in the 1990s, SSB increased from a level *c.* B_{lim} in the 1980s to a peak value *c.* 600 000 t 2005–2007, a level not seen since the 1970s. This peak was short lived and SSB has been falling in the absence of stronger than average recruitment. Fishing mortality has been about or below F_{pa} for the past two decades. ICES considers the stock retains full reproductive capacity and is above MP $B_{trigger}$ but as stock falls towards B_{pa} there is increased risk for the stock ($ACOM_{neas}$, 2014).

The client fleet tends to fish further east than where saithe are normally caught, consequently, the average annual catch of saithe (23 t) is trivial.

3.4.9.4 Tusk

Brosme brosme is a notional main retained species in the longline fishery only: 8894 t, 6.5% the total longline catch but <1% the total catch by any one of the other six methods of fishing (Table 18, Table 19, Table 21). Tusk, however tend to be a longline target species caught in areas and seasons where the associated cod and haddock catches are bycatch, rather than target species. Consequently, when catches are looked at in detail, it is apparent that tusk does not meet the criteria for consideration as a main retained species.

The biological data available for stock assessment of tusk is very limited and ICES is unable to undertake more than a trends-based assessment using commercial catch per unit of effort (CPUE). Even so, these data do not enable any firm conclusions to be drawn and ICES advice has been to maintain international catches at the same level year on year (ACOMtusk, 2014).[103] In this context, it should be noted that Norway's catch has declined year-on-year in recent years (Table 17).

The species is most common along the western shelf edge and in Norwegian coastal waters, rather than in the Barents Sea (Wienerroither et al., 2013), where it is not common (Prokhorova, 2013). This is shown by the distribution of Norwegian 2013 tusk catches shown in Table 20, as recorded by the Directorate of Fisheries. These data show that tusk notionally exceeds the 5% criterion for a main retained species in two regions: the inshore west coast statistical areas (Figure 23) 00, 05, 06 and 07 (Table 21; area 28 is outside the unit of certification), and offshore areas 30. 37, 39, 41,

[102] $ACOM_{neas}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic saithe (subareas I and II). ICES Advice Book 3.3.8.
[103] $ACOM_{tusk}$, 2014. Widely distributed and migratory stocks: tusk (*Brosme* brosme) in subareas I and II. ICES Advice Book 9.3.29.1.

42, 43, 47 and 52, of which only areas 37 and 39 are areas in which NE Arctic cod and haddock might be found (i.e. the remainder are outside the unit of certification).

Table 20 The Norwegian 2013 catch (tonnes) of tusk, ling, cod and haddock by Norwegian statistical areas (Figure 22) in the NE Atlantic and Barents Sea. (Data from Directorate of Fisheries)

Area	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Tusk	390			513	562	2,427	1,456	1,086	9	13	12
Ling	258			12	122	1,181	990	1,035	2	1	
Cod	1,888	102	209	10,368	1,408	6,780	175	155	4	1	4,401
Haddock	829	62	8	7,092	2,324	2,711	610	511	1	1	731
Total	**3,365**	**164**	**217**	**17,985**	**4,415**	**13,098**	**3,231**	**2,787**	**16**	**15**	**5,144**

Area	**11**	**12**	**13**	**15**	**20**	**21**	**22**	**23**	**24**	**27**	**28**
Tusk	0	537	133	10	108	2		1		7	156
Ling		146	77	7	58			1			308
Cod	140	9,915	3,231	2,628	3,053	81	114	1,378	38	97	57
Haddock	52	4,861	604	193	1,422	19	177	299		57	86
Total	**193**	**15,459**	**4,045**	**2,838**	**4,641**	**103**	**291**	**1,679**	**38**	**161**	**607**

Area	**30**	**37**	**39**	**41**	**42**	**43**	**47**	**52**	**61**	**68**	**81**
Tusk	9	282	18	27	1,084	1,204	46	191	24		1
Ling	8	33	9	52	2980	1,423	532	293	2		
Cod			77	275	503	22	3	51	1,141	7	393
Haddock		175	21	63	161	5	121	23	9		
Total	**17**	**490**	**125**	**417**	**4,728**	**2,654**	**702**	**558**	**1,176**	**7**	**394**

Table 21 The Norwegian 2013 catch (tonnes) of tusk, ling, cod and haddock as a percentage of the total catch of these four species by Norwegian statistical areas (Figure 23) in the NE Atlantic and Barents Sea. Shaded areas indicate where the catch of tusk or ling exceed 5% the total catch of these four species (i.e a conservative indicator of the MSC criteria for main retained species, which is ≥5% of total catch of all species).

Area	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Tusk	12	0	0	3	13	19	45	39	54	84	0
Ling	8	0	0	0	3	9	31	37	15	8	0
Cod	56	62	96	58	32	52	5	6	23	5	86
Haddock	25	38	4	39	53	21	19	18	8	3	14

Area	**11**	**12**	**13**	**15**	**20**	**21**	**22**	**23**	**24**	**27**	**28**
Tusk	0	3	3	0	2	2	0	0	0	4	26
Ling	0	1	2	0	1	0	0	0	0	0	51
Cod	73	64	80	93	66	79	39	82	100	60	9
Haddock	27	31	15	7	31	19	61	18	0	36	14

Area	**30**	**37**	**39**	**41**	**42**	**43**	**47**	**52**	**61**	**68**	**81**
Tusk	54	58	14	6	23	45	7	34	2	0	0
Ling	46	7	7	12	63	54	76	52	0	0	0
Cod	0	0	62	66	11	1	0	9	97	100	100
Haddock	0	36	17	15	3	0	17	4	1	0	0

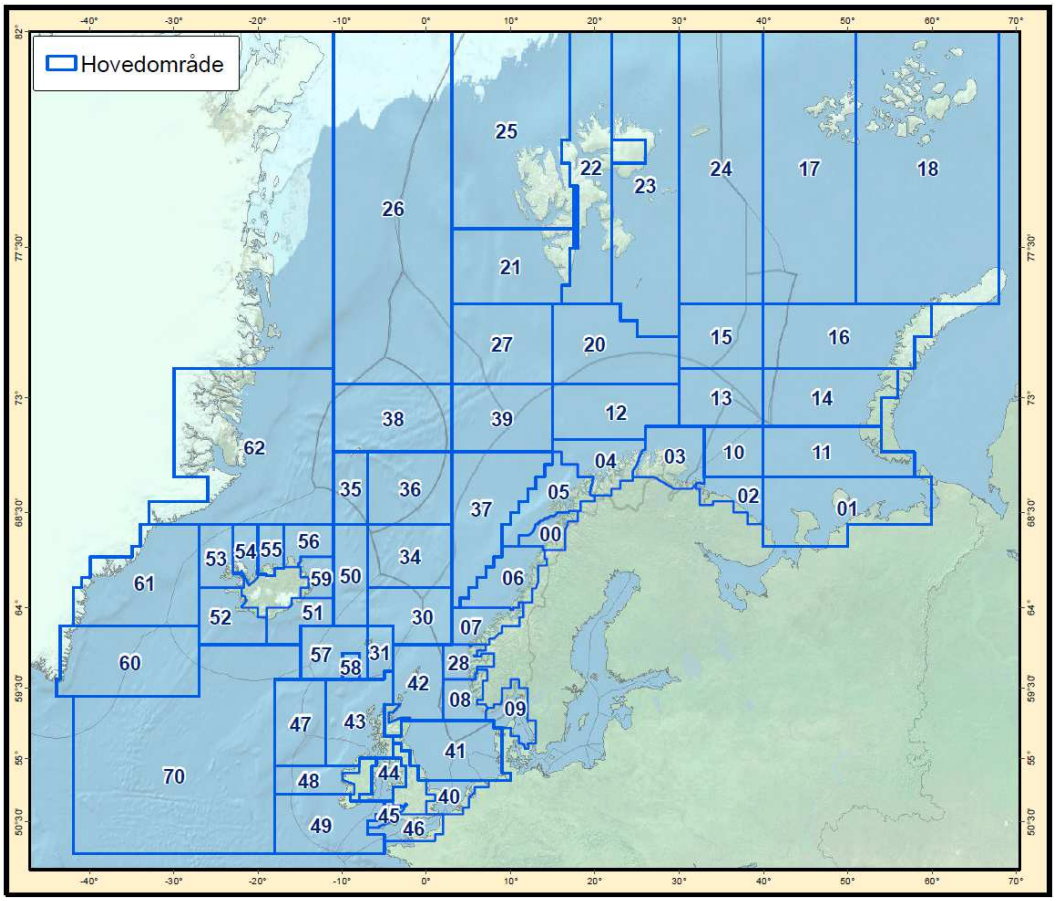

Figure 23 Statistical areas by which the Directorate of Fisheries records catches (Directorate of Fisheries).

When the catches of cod, haddock, tusk (and ling) are examined month by month in the areas in which tusk notionally meets the main retained species criterion three things become apparent. The first is that where cod (and haddock) is taken in any relatively high quantities in any month, the quantities of tusk taken are small by comparison (e.g. areas 00, 05 and 39; Figure 24). The second point, in contrast, is that where tusk is taken in relatively large quantities, the quantity of cod is relatively small (e.g. areas 06, 07, 37; Figure 24). The third, and arguably the most significant point, is that the cod and haddock, tend to be taken early in the year (in these areas) while tusk (and ling) tend to be taken later in the year. i.e. The fisheries for cod–haddock and tusk (and ling) are separated by season (and, in no small measure) by area; cod–haddock and tusk (ling) are taken in principally in directed fisheries with minimal interaction between the fisheries. On the basis of this more detailed overview of tusk catches relative to cod and haddock, it is more appropriate to treat tusk as a 'retained species' rather than as a 'main retained species'.

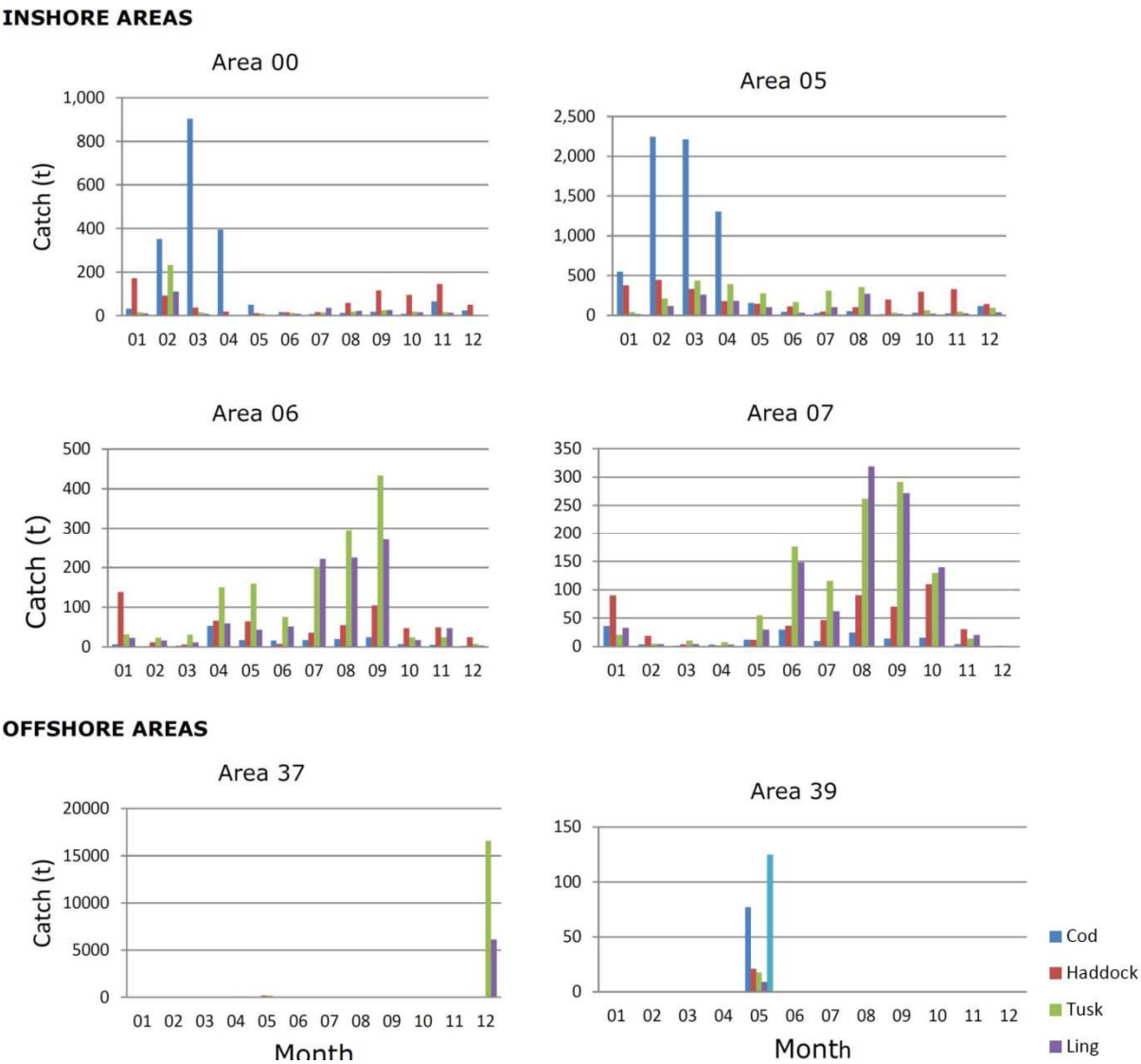

Figure 24 Monthly catch of cod, haddock, tusk and ling in areas where the total annual catch of tusk notionally meets the criterion for main retained species but shows that tusk (and ling) support a directed fishery in which cod and haddock are bycatch and form a minor bycatch during the cod fishing seasons or areas.

3.4.9.5 Ling

Molva molva is not a main retained species; it accounts for *c.* the total catch by gillnets and longlines but <1% of the total catch by any other method of fishing (Table 18). Ling is one of the target longline species with a similar seasonal and geographical distribution to that described above for tusk.

Ling is most common along the western shelf edge and in Norwegian coastal waters rather than in the Barents Sea (Wienerroither *et al*., 2013), where it is relatively rare (Prokhorova, 2013). NE Arctic ling are subject to a commercial CPUE trends-based assessment from two data sets that have shown consistent positive trends for more than the past decade. There are no other indicators of abundance ($ACOM_{ling}$, 2014).[104]

[104] $ACOM_{ling}$, 2014 Widely distributed and migratory stocks: ling (Molva molva) in subareas I and II. ICES Advice Book 9.3.15.1.

3.4.9.6 Greenland halibut

Reinhardtius hippoglossoides is caught principally in a targeted longline fishery but this still accounts for little more than 3% the total longline catch and about 1% the total catch by gillnet and demersal trawl.

The trends-based assessment of Greenland halibut stock biomass is derived from two scientific surveys and attempts are being made to develop an XSA assessment from a catch-per-unit-effort series. Other data are obtained from biological sampling of commercial landings. Discards are assumed to be negligible. There has been a positive trend in biomass indices for the past 10–20 years ($ACOM_{gh}$, 2014)[105] but the abundance index in the JNRFC survey 2013 was below the long-term average (Prokhorova, 2013).

3.4.9.7 Wolffishes

The total catch comprising three species, the Atlantic or striped wolfish, *Anarhichas lupus*, the spotted wolfish *A. minor* and the northern wolfish *A. denticulatus*, contribute 7239 t, 5.3% to the longline catch (Table 18) but the relatively widespread distribution of the three species (Wienerroither et al., 2013) and comparable abundance indices (Prokhorova, 2013), suggest that each species probably contributes an equal amount to the total. Consequently, the individual species do not qualify as main retained species.

The three species are found throughout the Barents Sea but, as the names suggests, the northern wolffish has a more northerly distribution and the striped wolffish tends to be less abundant in the north. Wolffish are not subject to ICES assessment but their distribution and abundance is monitored as part of the annual JNRFC Barents Sea (and Norwegian coastal) trawl surveys. The frequent presence of juveniles in the Barents Sea surveys, with higher abundance indices in 2013 than 2012 (Prokhorova, 2013), suggests that there is not a problem with recruitment. Russian estimates of biomass in the Barents Sea have indicated an increasing trend in recent years (Wienerroither et al., 2013).

3.4.9.8 Redfishes

There are two commercial species of redfish, the relatively more abundant beaked redfish *Sebastes mentella* and golden redfish *S. norvegicus (*previously *S. marinus)*. Directed trawl fishing for both species is prohibited and there is an all-gears requirement to avoid and minimise the capture of redfish in other fisheries at all times, backed up by a total redfish bycatch and annual quota limit on landings. There is, however, a licensed gillnet and longline fishery for redfish that accounts for almost half the total quantity of redfish (2 species) landed (www.imr.no/redfish), i.e. c. 3000 t of c. 6400 t, which comprises c. 1% the total catch of all species landed by the demersal fishing fleet (Table 17). Under normal circumstances, therefore, it would be appropriate to discuss both of these species the same as any other retained species. In this instance, however, both species are named on the Norwegian Redlist (Gjøsæter et al., 2010)[106] (*S. mentella* – vulnerable; *S norvegicus* – endangered and must be considered in this context.

Beaked redfish

Based on the newly established statistical catch-at-age analysis (SCAA) 1992–2013 assessment for this stock, ICES classifies the NE Arctic *S. mentella* as in good reproductive capacity and stable. The spawning stock biomass has been steadily increasing since 1992 and the total stock biomass

[105] $ACOM_{gh}$, 2014. Ecoregion Barents Sea and Norwegian Sea: Greenland halibut in subareas I and II. ICES Advice Book 3.3.5.

[106] Gjøsæter, J., Hesthagen, T., Borgstrøm, R., Brabrand, Å., Byrkjedal, I., Christiansen, J., S., Nedreaas,, K., Pethon, P., Uiblein, F., Vøllestad, L. A. & Wienerroither, R., 2010. Pisces. In *The 2010 Norwegian Red List for Species* (Kålås, J.A., Viken, Å., Henriksen, S. & Skjelseth, S. eds.) pp. 403 – 412. Trondheim: Norwegian Biodiversity Information Centre.

has fluctuated around one million tonnes since 2001. The current fishing mortality is low but owing to recruitment failure for year-classes 1996–2003, it is projected that SSB will decline slightly in coming years before returning to current levels, subject to the fishing mortality, in response to a succession of year classes estimated to be stronger than any recorded in the previous 50–60 years ($ACOM_{smen}$, 2014).[107]

Data comprise commercial catches: international landings (tonnes), age frequencies and weight-at-age from catch sampling and data from four Russian–Norwegian research-vessel trawl–acoustic surveys. Discarding is assumed to be negligible. ICES considers "fishing pressure is below any relevant reference point" ($ACOM_{smen}$, 2014). The assessment was subject to benchmark review in 2012 and draft management plans were reviewed by ICES in 2014 ($ACOM_{smen}$, 2014).

A request for ICES to review the draft management plans and HCRs was made by both NEAFC and JNRFC for *Sebastes mentella* in Subareas I and II. ICES evaluated a wide variety of proposed settings for a management plan for this stock and identified a number of options that it considered precautionary and consistent with the MSY approach, concluding that the following elements should be incorporated in a future management plan:

- A *biomass trigger* of 600 kt is a good starting point for management.
- There is little long-term gain in yield if F_{target} is increased above 0.039.
- The stock and recruitment might benefit from a delayed or gradual implementation of a management plan, or a gradual increase of F (fishing at F_{target} only after the stronger incoming year classes have fully recruited to the fishery in 2017/2018). A low fixed TAC in the initial period or a stabilizing element in the management plan might have a similar effect if implemented on the basis of recent catches.

Currently, ICES advises on the basis of the MSY approach that a commercial fishery can operate on *S. mentella* in Subareas I and II, given that the total catch level, including bycatches and discards, does not exceed 24 000 tonnes. Measures currently in place to protect juveniles have proven successful and should be maintained.

Thus, although the species appears on the Norwegian Red List for 2010 as vulnerable, ICES is satisfied that appropriate management measures are in place and that these are delivering positive results. This being the case, it is appropriate to continue to treat *S. mentella* as a retained species.

Golden redfish

The stock is subject to the age–length structured Globally Applicable Area Disaggregated General Ecosystem Toolbox (Gadget) model analysis. Data are provided by sampling commercial catches and from scientific trawl surveys in the Barents Sea. The status of golden redfish is uncertain but although there may have been a recent improvement in the abundance of juvenile (3–6 year old) fish (twice the number in 2013 that were observed in 2012;)[108], the stock assessment indicators point in the opposite direction, *i.e.* SSB is decreasing and fishing mortality increasing. There is neither a management plan nor HCR and ICES recommends a total ban on (directed) fishing for this species ($ACOM_{snor}$, 2013).[109] More than half the catch of *S. norvegicus* is taken in a directed

[107] $ACOM_{smen}$, 2014. Ecoregion Barents Sea and Norwegian Sea: beaked redfish (*Sebastes mentella*) in subareas I and II. ICES Advice Book 3.3.6.

[108] Prozorkevich, D. & Gjøsæter, H. 2013. Fish community. In: *Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October* (Prokhorova, T. ed.) IMR/PINRO Joint Report Series, No.4/2013. Bergen: IMR

[109] $ACOM_{snor}$, 2014. Ecoregion Barents Sea and Norwegian Sea: golden redfish (*Sebastes marinus*) in subareas I and II. ICES Advice Book 3.3.7.

(i.e. not as retained bycatch) Norwegian gillnet and longline fishery in August and in the period 1th of October–19th of December. IMR has recommended that this directed fishery should be closed and stronger limitations should be introduced in the trawl fishery (IMR – *S. Marinus*)[110].

Thus, whether viewed purely as an exploited fish or as an ETP species, it is clear that stronger, more effective management measures need to be put in place than is currently the case. In practice, however, it is difficult to see what measures could be applied to directed cod and haddock fisheries other than stringent bycatch limitation and move-on rules per haul. As "more than half" of the species catch is taken in a licensed direct fishery by gillnet and longline, the appropriate action would seem to be a ban on this fishery, which, arguably, is a recommendation beyond the remit of this assessment, albeit a recommendation supported by IMR (IMR – *S. marinus*). Nevertheless, the continuing poor status of the stock justify treating *S. norvegicus* as an ETP species.

3.4.10 Other retained species

Other retained species comprising >0.1% of total catch (i.e. 710 t, three-year mean 2011–13) are: angler fish Lophius piscatorius (3921 t, 0.6% of total all gears catch), mostly taken by gillnet; Atlantic halibut *Hippoglossus hippoglossus* (1913 t, 0.3%), mostly taken by gillnet and longline; lumpfish *Cyclopterus lumpus* 1074 t, 0.2%, virtually all taken in a directed (spring) fishery for the roe; pollack *Pollachius pollachius* (1074 t, 0.1%), all taken by gillnet; European hake *Merluccius merluccius* (780 t, 0.1%) taken equally by gillnet and demersal trawl. The only other species that account for >0.1% of catch by any one gear are European plaice *Pleuronectes platessa* in the Danish seine fishery (333 t, 0.3%) and blue ling *Molva dypterigia* in the gillnet fishery (126 t, 0.1%; Table 18). All other species are taken as isolated individuals (e.g. sharks) or trivial quantities.

Among these minor retained species there are formal ICES assessments or advice only for angler fish, blue ling and European hake. Although halibut is not subject to formal assessment, Norway has specific management measures in place aimed at rebuilding the halibut stock. It is illegal to fish for halibut during the spawning season (20 Dec–31 March). Also, any halibut less than 80 cm in total length must be returned to the sea alive. The species is not widespread in the Barents Sea; it is found mainly in Norwegian coastal waters (Wienerroither et al., 2013).

3.4.10.1 Anglerfish

In Norway, anglerfish (*Lophius piscatorius*) are taken almost exclusively in a large-meshed gillnet fishery targeting fish over 60 cm. Catches of anglerfish from the NE Arctic are assumed to be part of a wider NE Atlantic stock; there is neither assessment nor advice specific to the Norwegian or Barents Seas. Anglerfish mature at large size, resulting in a large proportion of the catch consisting of immature fish. This makes the stock susceptible to recruitment overfishing and management measures are required to ensure sufficient numbers to survive to spawning size. The stock west of Scotland is subject to a trends-based assessment using abundance indices from directed Irish and Scottish anglerfish surveys that show a positive trend in abundance and relatively stable biomass ($ACOM_{monk}$, 2014).[111] There are no management plans or specific objectives for this fishery.

[110] IMR – S. marinus. http://www.imr.no/radgivning/kvoterad/kvoterad_for_2014/ices_rad_for_arktiske_bestander/vanlig_uer_sebastes_marinus_i_ices-omrade_i_og_ii/en

[111] ACOMmonk, 2014. Celtic Sea and West of Scotland + North Sea – Anglerfish (*Lophius piscatorius* and *L. budegassa*) in Division IIIa, and Subareas IV and VI. ICES Advice Book 5.3.2.

3.4.10.2 European hake

The northern hake (*Merlussuius merluccius*) stock extends from west of the British Isles into the Norwegian Sea but the species is not found in the Barents Sea. It is subject to a length-based SS3112 assessment with supporting information from biological sampling of commercial landings and four scientific trawl and acoustic surveys. Two very strong year classes 2007–08 helped boost the stock to twice is previous highest observed level and this should be helped by another two very stong incoming year classes (2012 – 13). Although fishing mortality rate is still (slightly) above target, F has fallen from a peak in the 1990s (F = ~1.1) to little more than FMSY (0.27). The stock is subject to an E.U. recovery plan that incorporates HCR based on a suite of defined biological reference points. The plan has been reviewed by ICES and although the stock retains full reproductive capacity and is above MSY Btrigger, it has expressed the view that the reference points are no longer appropriate. The assessment methodology, protocols and reference points will be subject to a benchmark review during 2014 ($ACOM_{hake}$, 2014).113

3.4.10.3 Blue ling

Blue ling (*Molva dypterigia*) is a deep-water species found along the shelf edge from the SW Barents Sea, southwards past the west of the British Isles. It is subject to a trends based assessment but there are no biological reference points, management plans or HCRs. ICES advice is that "there should be no directed fisheries for blue ling, and a reduction in bycatches should be considered until the scientific information is sufficient to prove the fishery sustainable. Measures should be implemented to minimize the bycatch. Closed areas to protect spawning aggregations should be maintained and expanded where appropriate". At present there are no closed areas for this species in Norwegian waters; the total quantity caught by Norwegian vessels (138 t, three-year average 2011–13) may appear trivial, and is within the annual quota limit of 150 t, but it is virtually the total catch of this species in the NE Arctic (WGDEEP, 2014).[114]

3.4.11 Bycatch Species

There is rigorously enforced discard ban on all vessels fishing within Norwegian waters; all commercial fish species must be retained, recorded in the electronic logbook and landed. There are over 250 species of fish reported from the Norwegian Sea, the majority of which are either pelagic or small (<30 cm total length) species not vulnerable to capture by large-mesh or large-hook commercial fishing gears. Insofar as non-commercial bycatch species are caught, they are caught either as very occasional individuals or in trivial quantities (Bowering et al., 2011). For all practical purposes, there are no bycatch species taken in the NEA gadoid fisheries.

3.4.12 ETP Species and Sensitive Marine Habitats

In addition to the designated marine protected areas in Norwegian waters, within which all fishing is prohibited (as is also the case in Russian waters), it is now an offence for any fishing vessel to fish in the areas where corals and sponges occur. . In the event that a vessel finds >60kg of coral in the fishing gear, it must be reported to the Coastguard and the vessel must move a minimum of 2 miles before shooting the gear once more. Whether or not vessels honour these obligations is monitored in quasi real time through the VMS. The Directorate of Fisheries is satisfied that there is a very high degree of compliance with these requirements (DoF pers. comm.). Vessels equipped with electronic logbooks are also required to keep records (including 'zero' observation) of

[112] Anderson, S.*C.*, Monnahan, *C.C.*, Johnson, K.F., Ono, K.& Valero, J.L. 2014. ss3sim: An R Package for Fisheries Stock Assessment Simulation with Stock Synthesis. PLoS ONE 9(4): e92725.

[113] $ACOM_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10

[114] WGDEEP, 2014. Report of the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources. ICES CM 2014/ACOM:17.

interactions with marine mammals and seabirds although the DoF has said that it will be 2015 at the earliest before the time or resources will be available to analyse these data.

Monitoring of the marine environment and all aspects of its living resources are ongoing research programmes by IMR in support of Norwegian seas management plans[115], and further afield under the auspices of JNRFC (Prokhorova, 2013; Wienerroither et al., 2013). These programmes include monitoring the effects of trawling on sensitive marine habitats and developing further protection measures where appropriate.

Among the fishes, all large elasmobranchs (sharks and rays) are listed at one level of concern or another by the IUCN.[116] Despite the legal requirement not to discard commercial species, most fishing vessels will return large sharks to the sea if they are still alive but some, *e.g.* basking shark *Cetorhinus maximus* and porbeagle *Lamna nasus*, do become enmeshed in gillnets and are landed (Table 18). Similarly, the picked dogfish (spurdog) *Squalus acanthias* is listed as on the IUCN and Norwegian red list (IUCN;[117] Gjøsæter, 2010). There are specific measures prohibiting targeted fishing for the dogfish, basking shark and porbeagle but if caught they should be landed. (In practice, if still alive they are more likely to be released.) Nevertheless, all have been recorded at minor levels, mostly in gillnets (c. 100 t; i.e. << 0.1% of total gillnet catch; Table 18) but also on longlines. The quantities of other sharks, skates and rays are taken in too small numbers to justify identifying them by species in the landing statistics and, again, the total quantities involved are very small (*c.* 250 t;Table 19) relative to the total catch of demersal species (710 kt; Table 18). Both golden redfish and beaked redfish are also on the Norwegian Red List (Gjøsæter, 2010) but are subject to specific management measures to assist stock rebuilding and are landed as retained bycatch in small quantities (see § 3.4.9.8 above). . Targeted fishing is controlled by a ban on all directed trawl fisheries and specific licensing for seasonal gillnet and longline fisheries. . These measures are having a positive effect on beaked redfish stock status with signs of stock rebuilding (ACOMsmen, 2014). Consequently, it is scored as a retained species but golden redfish continues to be at an all-time low with no signs of recovery (ACOMsmar, 2014) and is scored as an ETP species.

Norway continues to be a signatory to a wide range of international conventions that embrace the conservation and protection of marine biota, their habitats and environment. There are no records either in the mandatory logbooks but some records have been made by reference-fleet records of direct interactions (*i.e.* catches) with seabird and marine mammal populations. In its most recent report NAMMCO (2014)[118] has expressed concern about the number of harbour porpoise (*Phocoena phocoena*) taken in the inshore cod (and monkfish) gillnet fishery in Norwegian coastal waters. The numbers taken (estimated to be 6000–7000 year^{-1}, C.V. 30%) are possibly more than the population can sustain but as the porpoise population size is unknown, this is a matter of conjecture rather than certainty and specific concerns have not been raised hitherto. These concerns are sufficiently great that they have triggered a gillnet-based CRISP research programme to investigate the use of deterrent pingers as a means to reduce this undesirable catch. It is recommended that gillnet vessels within this UoC take proactive steps to engage with and support this programme. Although the original NEA cod fishery assessment report highlighted comparable

115 http://www.imr.no/ forskning/programmer/okosystem_norskehavet/en

116 www.iucnredlist.org

117 http://www.iucnredlist.org/details/39326/0

118 NAMMCO, 2014. Report of the Twentieth Meeting of the Scientific Committee of NAMMCO. Tromso. http://www.nammco.no/webcronize/images/Nammco/1001.pdfpdf

risks for all gears, evidence has not been produced to justify such concerns, least of all in the NEA cod fishery (WGMME, 2014)[119].

Similarly for seabirds, there is always concern with respect to static-gear fisheries (Fangel *et al*., 2011)[120] but records of seabird capture made in the statutory logbooks have yet to be analysed. The most recent joint IMR–NINA survey and analysis of seabird captures in 2009 estimated that less than 3000 seabirds (all species combined) were taken in the cod gillnet fishery with comparable numbers in the cod longline fishery (Fangel et al., 2014).[121] While undesirable, these numbers are small relative to the size of the seabird populations in the NEA Arctic. These findings are consistent with the ICES working group on seabird ecology (WGSE, 2014),[122] which has not identified NE Arctic fisheries as specific cause for concern. Furthermore, surveys with a remote electronic monitoring system of gillnet and longline fishing (in the Baltic) found that in >1000 hours of recording during hauling operations, only 136 seabirds were captured (both gears combined) and no marine mammals (WGBYA, 2014)[123]. By observation and inference, therefore, these reports would tend to confirm the industry's contention that the capture of seabirds, by any method of fishing, is extremely rare.

3.5 Principle Three: Management System Background

Following the developments at the United Nations conference on the Law of the Sea (UNCLOS) 1974-1982, coastal states, including Norway and Russia, established 200 nautical miles 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 and haddock 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.

An important feature of the Norwegian fisheries is that most of the 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 nautical mile zones in the 1970´s. A 1975 agreement between Norway and the then Soviet Union establishes a joint Fisheries Commission, and a 1976 agreement on reciprocal fisheries rights established the conditions for the cooperation. In addition, a 1978 agreement defines areas of responsibility in enforcement of fisheries regulations in an adjacent area in the Barents Sea where jurisdiction issues are not settled. Four fish stocks are shared between the two countries: NEA cod, NEA haddock, capelin and Greenland halibut. Cod and haddock are shared 50-50 between the two countries, and about 10% of the annual TAC for these species is allocated to third countries. The annual meetings of the Commission decide on Total Allowable Catches (TACs) for the following year, as well as on issues pertaining to research, regulation and enforcement.

119 WGMME, 2014. Report of the Working Group on Marine Mammal Ecology. ICES CM 2014/ACOM:27. http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WGMME/wgmme_2013.pdf

120 Fangel, K., Wold, L.C, Aas, Ø., Christensen-Dalsgaard, S., Qvenild, M. & Anker-Nilssen, T. 2011. Bifangst av sjøfugl i norske kystfiskerier. Et kartleggings- og metodeutprøvingsprosjekt med focus på fiske med garn og line. NINA Rapport 719. http://www.nina.no/archive/nina/PppBasePdf/rapport/2011/719.pdf

121 Fangel, K., Nedreaas, K., Aas, Ø., Vølstad, J., Wold, L., Christensen-Dalsgaard, S., Anker-Nilssen, Y. & Overvik, M. 2014. Unintended bycatch of seabirds in Norwegian coastal fisheries: comparison of estimation methods. Presentation at the Second Symposium on Fishery-Dependent Information (FDI), 3-6 March 2014 in Rome, Italy. http://www.imr.no/prosjektsiter/fdi/presentations/pdfs/bycatch_of_seabirds_in_norwegian_coastal_fisheries_final.pdf/en

122 WGSE, 2013. Report of the Working Group on Seabird Ecology. ICES CM 20131/SSGEF:19.

123 WGBYC, 2014. Report of the Working Group on Bycatch of Protected Species. ICES CM 2014/ACOM:28

The knowledge base for the management of NEA cod and haddock is developed by the Institute for Marine Research (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. 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.

The most important organizations involved in Norwegian fisheries management are government bodies such as the Ministry of Trade, Industry and Fisheries, the Directorate of Fisheries and the Coast Guard, sales organizations such as Norwegian Fishermen's Sales Organization (Norges Råfisklag), fishermen's organizations such as the Norwegian Fishermen's Association (Norges Fiskarlag) and environmental NGOs such as Greenpeace, WWF and the Norwegian Society for the Conservation of Nature (Norges Naturvernforbund). The roles, functions and responsibilities of the various actors are clearly defined in long-standing practice and are now codified in the Marine Resources Act.

The Ministry of Trade, Industry and Fisheries decides on policy and regulatory schemes, while the Directorate of Fisheries acts as a technical body with a main responsibility for secondary legislation. The Directorate, the Coast Guard and the Sales Organisations perform compliance control, on shore and at sea. The decision-making processes include the allocation of national quotas to fleet groups according to an elaborate distributional scheme based on vessel groups defined by gear and length of the vessels. Further, technical regulations are defined by the Directorate of Fisheries, after consultations with user-groups and other stakeholders, as well as with other nations for shared stocks.

Norway has a long tradition of corporate policy-and decision-making in the fisheries sector, with continuous consultation and close cooperation between government agencies and user group organisations, in particular the Norwegian Fishermen's Association and the Norwegian Fishermen's Sales Organization. As these organisations have regional branches, whose representatives are actively involved in policy-making, local knowledge is also taken into consideration in the management process. The Regulatory Meetings organized twice a year are open to all. User-group organizations attend on a regular basis and various NGOs participate regularly. In addition there is regular day-to-day contact by telephone and e-mail between authorities, user-groups and other interested parties.

The 2008 Marine Resources Act, which covers all living marine resources, requires that Norwegian fisheries management be guided by the precautionary approach and by an ecosystem approach that takes into account habitats and biodiversity. The same objectives are found in the most relevant policy documents, such as the integrated management plans for the Barents and Norwegian Seas, and for the North Sea and Skagerrak. At the regional level, the management plan agreed upon by the Joint Russian–Norwegian Fisheries Commission in 2004 was modified in 2007 from a three-year rule to a one-year rule on the basis of the harvest control rule (HCR) evaluation conducted by ICES. The plan is to be used until 2015. ICES has evaluated the modified management plan and concluded that it is in accordance with the precautionary approach and not in contradiction to the maximum sustainable yield (MSY) approach.

Specifically the Marine Resources Act lists the following objectives for Norwegian fisheries management:

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 utilization of resources,

d) appropriate allocation of resources, which among other things can help to ensure employment and maintain settlement in coastal communities,

e) optimal utilization 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.

Monitoring, control and surveillance is taken care of through shared responsibility and close collaboration between the Directorate of Fisheries, the Coast Guard and the Sales Organizations. The Directorate of Fisheries keeps track of how much fish is taken of the quotas of different vessels, vessel groups or other states at any given time, based on reports from the fishing fleet. Norwegian vessels are required to have electronic logbooks, where real-time catch data are forwarded to the Directorate of Fisheries.

The self-reported catch data can be checked at sales operations through the sales organizations, which have a monopoly on first-hand sale of fish in Norway, and through physical checks performed by the sales organizations, the Directorate of Fisheries and the Coast Guard. The sales organizations are required to record all landings of fish in Norway and keep track of how much remains of a vessel's quota at any given time, on the basis of the landings data. This information is compared to the figures provided by the vessels to the Directorate of Fisheries through the electronic logbook. The value of any catch delivered above a vessel's quota is retained by the sales organization and used for control purposes. The sales organizations have their own inspectors who carry out physical controls of landings. For instance, the Norwegian Fishermen's Sales Organization has inspectors scattered along the Norwegian coastline from Nordmøre in the southwest to Finnmark in the northeast. The Directorate has seven regional offices along the coast, staffed with inspectors that carry out independent physical control of the fish at the point of landing, including total volume, species and fish size. The landed volumes are then compared to the volumes reported to the Directorate through the logbooks.

The Coast Guard is administratively part of the Norwegian Navy but performs tasks on behalf of several ministries, including the Ministry of Trade, Industry and Fisheries. Its most important field of work, in practice, is fishery inspections. Coast Guard inspectors board fishing vessels and control the catch (e.g. catch composition and fish size) and fishing gear (e.g. mesh size) on deck and the volume of fish in the holds. Using the established conversion factors for the relevant fish product, the inspectors calculated the volume of the fish in round weight and compare this with the catches reported to the Directorate through the logbooks. Hence there are a number of possibilities for enforcement authorities to physically check whether the data provided by fishers through self-reporting are indeed correct. In addition, VMS data enables control of whether area restrictions are observed, among other things.

Norway has a research plan embodied in the objectives of the Marine Resource Act as well as in the statutory documents of the Institute of Marine Research. A coherent and strategic approach to research across all three MSC principles is primarily found in the integrated regional seas management plans for the Barents Sea, the Norwegian Sea, the North Sea and Skagerrak,, where

economic and social viability are emphasized along with precautionary and ecosystem-based resource management. The various national plans feed into plans affecting the North East Atlantic at the international level, primarily in the ICES, OSPAR and NAMMCO research and management systems. Further at the international level research plans exist in the Coastal State management plans. The primary objective of the research plans is to ensure the collection of scientific data necessary to conduct fisheries management according to the precautionary and ecosystem approaches. The various research plans are peer reviewed and the integrated management plans regularly revised and updated. CRISP and MAREANO and IMR-PINRO projects are more dedicated research plans.

4 EVALUATION PROCEDURE

4.1 Harmonized Fishery Assessment

4.1.1 Harmonization processes and activities

CABs assessing overlapping fisheries shall ensure consistency of products and outcomes so as not to undermine the integrity of MSC fishery assessments.

There are several other fisheries targeting NEA cod and haddock that are already MSC Fishery certified or undergoing the certification process (Table 22).

Table 22 Overlapping fisheries

Fishery	Assessment status	Area	Gear
Russian Federation Barents sea cod and haddock	Certified May 2014	FAO 27, ICES I, II	Bottom trawl
AGARBA Spain Barents Sea cod	Certified 2013	FAO 27, ICES I, II	Bottom trawl
Barents sea cod and haddock (Ocean Trawlers)	Certified 2010	FAO 27, ICES I, II	Demersal trawl
Comapêche and Euronor cod and haddock	Certified 2012	FAO 27, ICES I, II	Demersal otter trawl
Faroe Islands North East Arctic cod and haddock	Certified 2012	FAO 27, ICES I, II	Demersal trawl
Greenland cod, haddock and saithe trawl fishery in the Barents sea	In assessment	FAO 27, ICES I, II	Demersal trawl
UK Fisheries/DFFU/Doggerbank Northeast Arctic cod, haddock and saithe	Certified 2012	FAO 27, ICES I, II	Demersal otter trawl
FIUN Barents & Norwegian Seas cod and haddock	Certified 2013	FAO 27, ICES Ia, Ib, IIa, IIb	Demersal trawl, longline

Most overlapping fisheries for the Norway NEA cod and haddock fishery are already certified fisheries, and the team has based the assessment on the rationale and scores detailed for the previously scored fishery. Information from the assessment reports, including surveillance reports, on the fisheries which directly or partialy overlap with the units of certification have been used to validate the evidence presented here.

The Greenland cod, haddock and saithe trawl fishery was announced 8 August 2013. Site visit was conducted in the week commencind 7 October 2013, peer review was completed in April 2014, and the PCDR was published 29 July 2014. As the Greenland fishery was already scored at the time of the Norway NEA cod and haddock assessment, the team has based the assessment on the rationale and scores detailed for the previously scored fishery also for this assessment.

In order to ensure consistency of products and outcomes (evaluation, scoring, and conditions) in assessments of overlapping fisheries, the following activities were undertaken:

- Coordinated certification process
- Use of common default assessment tree.
- Sharing of fishery information
- Information from the assessment reports on the fisheries which directly or partialy overlap with the units of certification have been used to validate the evidence presented here. Review of published reports from the overlapping fisheries; evaluation, scoring and conditions were taken into consideration.

Assessment team members also had detailed knowledge about some of the fisheries through contribution as assessment team members or peer reviewers of assessments (Norway NEA cod and haddock previous assessments, Russian Federation Barents sea cod and haddock, Faroe Islands North East Arctic cod and haddock, Greenland cod, haddock and saithe trawl fishery in the Barents Sea). Peer reveiewers selected for this assessment have experience as team members or peer reviewers for overlapping fisheries (AGARBA Spain Barents Sea cod, Barents Sea cod and haddock (Ocean Trawlers), Greenland cod haddock and saithe trawl fishery in the Barents Sea, FIUN Barents & Norwegian Seas cod and haddock).

4.1.2 Harmonization outcomes

Given the considerable number of MSC assessments that have been carried out on cod and haddock fisheries in the Barents Sea, it is not feasible to compare individual scores between the client fishery and every other UoC, but to identify those PIs where the current fishery scored outside the main range of all UoCs and where there is a material difference to the outcome between fisheries. This is particularly important where other fisheries have scored below 80 and a condition has been set.

Detailed overview of scoring in the overlapping fisheries is included in Appendix 7. Summaries of scoring ranges and comments on main differences for the target species (**Principle 1**) are included in Table 23 and Table 24. All the assessments included in Table 22 include evaluation of fisheries using trawl as harvest method. A summary of scoring and comments on **Principle 2** performance indicator evaluation for **trawl fisheries** is included in Table 25. Only the Norway NEA cod and haddock fisheries and the FIUN Barents & Norwegian Seas cod and haddock include evaluation of longline fisheries. A summary of scoring and comments on **Principle 2** performance indicator evaluation for **longline fisheries** is included in Table 26. A summary of scoring ranges and comments on main differences for **Principle 3** is included in Table 27.

Table 23 Principle 1 – NEA cod

PI	Comment
1.1.1	All assessments score this PI within the range 90-100.
1.1.2	All assessments score this PI within the range 80-100.
1.1.3	NA
1.2.1	All assessments score this PI within the range 85-100, except the Barents Sea cod (Ocean Trawlers) fishery where the score is 75 and a condition assigned. Whilst all the elements of a good harvest control rule were present in 2010 the management process at the time was not fully implementing the agreed management plan but had seen fit to override it due to the high biomass levels. This situation no longer persists and landings have been consistent with the advice and TAC over recent years.
1.2.2	All assessments score this PI within the range 80-100.
1.2.3	All assessments score this PI within the range 90-95, except the Barents Sea cod (Ocean Trawlers) fishery where the score is 70 and a condition assigned. This relates to the presence of significant IUU catches and discarding at the time. This implied that the estimates of total removals from the stock were unreliable and a Condition was required to address the issue of unrecorded mortality. This situation has now been addressed to the point where ICES no longer consider that IUU landings are a cause for concern. There is also a rigorously enforced ban on discarding of commercial species.
1.2.4	All assessments score this PI within the range 90-95.

Table 24 Principle 1 – NEA haddock

PI	Comment
1.1.1	All assessments score this PI within the range 90-100.
1.1.2	All assessments score this PI within the range 80-100.
1.1.3	NA
1.2.1	All assessments score this PI within the range 80-100.
1.2.2	All assessments score this PI within the range 80-100.

1.2.3	All assessments score this PI within the range 80-95, except the Barents Sea cod (Ocean Trawlers) fishery where the score is 70 and a condition assigned This relates to the presence of IUU catches and some discarding at the time. This implied that the estimates of total removals from the stock were unreliable and a Condition was required to address the issue of unrecorded mortality. This situation has now been addressed to the point where ICES no longer consider that IUU landings are a cause for concern. There is also a rigorously enforced ban on discarding of commercial species
1.2.4	All assessments score this PI within the range 85-95.

Table 25 Principle 2 – Trawl fisheries

PI	Comment
2.1.1	All assessments score this PI within the range 80-90, except the Barents Sea cod & haddock (Ocean Trawlers) and FIUN Barents & Norwegian Seas cod & haddock, where scores of 75 and 70 were assigned and conditions issued. These fisheries appear to have scored SG 60 and 80 with respect to all species, not 'main retained' species. In the Norwegian fishery, the three main species – cod, haddock and saithe – account for >90% of the total catch and other species account for very low percentages. The main retained species (i.e. SG 60 and 80) all meet the SG 80 standard.
2.1.2	All assessments score this PI within the range 85-95, except the Barents Sea cod & haddock (Ocean Trawlers) and FIUN Barents & Norwegian Seas cod & haddock, where scores of 75 were assigned and conditions issued. These fisheries appear to have scored SG 60 and 80 with respect to all species, not 'main retained' species. In the Norwegian fishery, the three main species – cod, haddock and saithe – account for >90% of the total catch and other species account for very low percentages. The main retained species (i.e. SG 60 and 80) all meet the SG 80 standard.
2.1.3	All assessments score this PI within the range 80-90, except the AGARBA Spain Barents Sea cod where a score of 70 was assigned and a condition issued. The AGARBA report does not appear to have given as much weight to the value of the IMR – PINRO annual ecosystem surveys as have other assessments. These surveys monitor distribution and relative abundance year on year, which provides a sound basis for meeting the SG80 standard.
2.2.1	All assessments score this PI within the range 80-100.
2.2.2	All assessments score this PI within the range 80-100.
2.2.3	All assessments score this PI within the range 80-100.
2.3.1	All assessments score this PI within the range 80-90.
2.3.2	All assessments score this PI within the range 80-85, except the AGARBA Spain Barents Sea cod where a score of 70 was assigned and a condition issued. The AGARBA assessors take the view that there is not a strategy with respect to ETP species whereas other assessors, including assessment presented her, take the view that Norway's Barents Sea management plan and the JNRFC convention epitomise a strategy for safeguarding the marine environment and all living marine resources.
2.3.3	All assessments have scored this PI at 80, except the AGARBA Spain Barents Sea cod where a score of 70 was assigned and a condition issued. IMR and NINA monitor populations; Norwegian reference-fleet vessels provide information on ETP bycatch. These data can and are used (cf porpoise bycatch in gillnet fishery) to estimate (Norwegian) fishery effects on ETP populations. The SG80 threshold is met.
2.4.1	Four of the assessments have scored this PI at 80, while the other five have scored it at 60 and 70 and issued conditions. This assessment concluded with a condition for burrowing megafauna (see scoring table) for Danish seine and trawl, for these fisheries to demonstrate that they are highly unlikely to reduce Pennatulacea (sea pens) habitat structure and function of to a point where there would be serious or irreversible harm. Impacts of bottom trawl gear in cod and haddock fisheries on VMEs such as corals are considered to be low due to higher risk of gear loss and gear damage in these areas and their complete avoidance by trawler skippers. Fishing for cod and haddock is most concentrated in areas that are known to be "clean ground" or have already been cleared of obstructions. Hence vessels in the UoC tend to fish the same ground repeatedly rather than stray into new areas. This approach and the environmental safeguards it represents (along with advisory and statutory protection measures) have been recognised, described and referred to both implicitly and explicitly in the MSC assessment reports on NE Arctic trawl fisheries. This evidence is supported by data from enforcement authorities confirming that there are no systematic non-compliances in regards to regulations applicable to coral habitats (e.g. reporting of by-catches of corals and respecting move on rules, marine protected areas and 12 nm ban on trawling of the baseline, where the most of coral habitats are located) by cod and haddock fishing vessels in the UoC.

2.4.2	Six of the fisheries have scored this PI within the range 80-95. Scores ranging from 65 to 75 were assigned by the AGARBA Spain Barents Sea cod, Barents Sea cod & haddock (Ocean Trawlers) and FIUN Barents & Norwegian Seas cod & haddock assessments. Earlier this year there was a significant change in the regulations that increased the degree of protection to sensitive marine habitats; i.e. no bottom contact fishing is permitted in any area of known coral reef, irrespective of whether it is a designated MPA. If a vessel has >60 kg coral in the net, it must report it and move a minimum of 2 miles before shooting the gear again. These new measures meet the SG80 threshold.
2.4.3	All assessments score this PI within the range 80-95, except the AGARBA Spain Barents Sea cod where a score of 75 was assigned and a condition issued. The AGARBA report does not appear to recognise the role played by the annual IMR – PINRO ecosystem and trawl surveys in this context. These surveys continue to improve the overall level and knowledge and to monitor change year on year to a standard that meets the SG80 threshold.
2.5.1	All assessments score this PI within the range 80-100.
2.5.2	All assessments score this PI within the range 80-100.
2.5.3	All assessments score this PI within the range 90-100.

Table 26 Principle 2 – Longline fisheries

PI	Comment
2.1.1	Both assessments have scored this PI within the range 65-75 and assigned a condition Conditions applied to both Norwegian and FIUN longline fisheries, albeit for different species. In the Norwegian fishery it is tusk that is the unassessed main retained species whereas in the FIUN fishery it is wolffish. Apart from the species, the reasoning is the same.
2.1.2	While the Norwegian assessment has scored this PI at 90, the FIUN Barents & Norwegian Seas assessment has scored this at 75 and assigned a condition. The difference can be attributed to two key points; the species difference and the stock status indices. The FIUN report makes no reference to the IMR – PINRO trawl and ecosystem surveys, which indicate a positive trend in tusk abundance but there are no comparable abundance indices for wolffish (Prokhorova, 2013).
2.1.3	Both assessments have scored this PI within the range 80-85.
2.2.1	Both assessments have scored this PI within the range 80-90.
2.2.2	Both assessments have scored this PI within the range 85-90.
2.2.3	Both assessments have scored this PI within the range 85-90.
2.3.1	Both assessments have scored this PI within the range 80-85.
2.3.2	Both assessments have scored this PI within the range 80-85.
2.3.3	Both assessments have scored this PI at 80.
2.4.1	Both assessments have scored this PI within the range 90-100
2.4.2	Both assessments have scored this PI within the range 85-90.
2.4.3	Both assessments have scored this PI within the range 85-95.
2.5.1	Both assessments have scored this PI within the range 90-95.
2.5.2	Both assessments have scored this PI within the range 85-90.
2.5.3	Both assessments have scored this PI within the range 90-95

Table 27 Principle 3

PI	Comment
3.1.1	All assessments score this PI within the range 90-95, except the UK Fisheries/DFFU/Doggerbank Northeast Arctic cod, haddock and saithe assessment. As the Norway NEA cod and haddock reassessment is in alignment with the majority of the other assessments, no further harmonization is required.
3.1.2	All assessments score this PI within the range 80-100, except the UK Fisheries/DFFU/Doggerbank Northeast Arctic cod, haddock and saithe assessment. As the Norway NEA cod and haddock reassessment is in alignment with the majority of the other assessments, no further harmonization is required.
3.1.3	All assessments score this PI at 100 except the FIUN Barents & Norwegian Seas cod & haddock assessment where a score of 80 was assigned. As the Norway NEA cod and haddock reassessment is in alignment with the majority of the other assessments, no further harmonization is required.
3.1.4	All assessments score this PI within the range 80-100.
3.2.1	All assessments score this PI at 90.

3.2.2	All assessments score this PI within the range 80-95, except the UK Fisheries/DFFU/Doggerbank Northeast Arctic cod, haddock and saithe assessment. As the Norway NEA cod and haddock reassessment is in alignment with the majority of the other assessments, no further harmonization is required.
3.2.3	All assessments score this PI within the range 80-100.
3.2.4	All assessments score this PI within the range 80-100.
3.2.5	All assessments score this PI within the range 80-100, except the UK Fisheries/DFFU/Doggerbank Northeast Arctic cod, haddock and saithe assessment. As the Norway NEA cod and haddock reassessment is in alignment with the majority of the other assessments, no further harmonization is required.

4.2 Previous assessments

4.2.1 Norway NEA cod

4.2.1.1 Summary of the original assessment

The Norwegian Seafood Industry's application for MSC certification of its NE Arctic cod fishery was announced September 2008 and combined inshore and offshore stocks as a single Unit of Certification for each gear type (trawl, long-line, Danish seine, gill-net and jigger).

Following an initial review, at which the significant issue of coastal cod by-catch was identified, each Unit of Certification was split into an offshore (outside of 12 nm limit) and inshore (inside of 12 nm limit) component (ref. Advisory to Stakeholders; Clarification on Unit of Certification 17 November 2009). The offshore component, which does not interact with the coastal cod stocks, was certified in April 2010. The inshore component, which does interact with the coastal cod stocks, has been assessed on a separate timeline, taking account of the developing coastal cod management plan (see Advisory to Stakeholders; Resumption of Assessment of Inshore Cod and Haddock Fisheries, 14 January 2011) and has been certified as of 21st October 2011.

With the inshore fishery certified in November 2011, the inshore and offshore fisheries were recombined for each gear type, as unified Units of Certification, under a single certificate. The assessment process was performed according to the requirements set out in the MSC Fisheries Certification Methodology. The default assessment tree, according to the Fisheries Assessment Methodology (FAM) version 2, was used for this certification. Scope of certification is up to the point of landing and chain of custody commences from point of sale/landing.

The unit of certification is for all gears employed in the fishery, both in the offshore fishery (*i.e.* beyond 12 miles from baselines and where catches are assumed not to include coastal cod) and in the coastal fishery, [*i.e.* the fishery within the Norwegian Territorial Sea where coastal cod mix with NE Arctic (offshore) cod].

There were, however, some minor differences in the wording of conditions for the inshore vs. offshore components. It was therefore agreed to:

- Carry out recertification of both inshore and offshore components according to the shorter of the two timelines *i.e.* the offshore certificate timescale.
- On recertification, the fishery assessments would be consolidated into a single timescale.
- Where inshore components have slightly different conditions, these would be evaluated according to the timescale established in the inshore fishery Public Certification Report. If necessary, these timescales would be continued into the recertification period, assuming progress is on-target for completion.

- The surveillance audits will follow the shorter timeline i.e the existing offshore certification timeline.

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any of the individual MSC Criteria. Principle scores from the initial assessments are provided in Table 28 and Table 29.

Table 28 Principle scores – Original assessment – Offshore cod:

Principle	Trawl	Long-line	Gill-net	Danish seine	Hook and line
Principle 1 – Target Species	91	91	91	91	91
Principle 2 – Ecosystem	88	88	88	89	89
Principle 3 – Management System	94	94	94	94	94

Table 29 Principle scores – Original assessment – Inshore cod:

Principle	Trawl	Long-line	Gill-net	Danish seine	Hook and line
Principle 1 – Target Species	91.3	91.3	91.3	91.3	91.3
Principle 2 – Ecosystem	87.0	87.0	87.0	87.0	89.0
Principle 3 – Management System	94.0	94.0	94.0	94.0	94.0

Three conditions were set at the initial certification of offshore and inshore components of the cod stock. Conditions raised were identical for inshore and offshore components and were combined (Table 30). No recommendations were made at the initial certification.

Following the successful assessment of the inshore component of the fisheries in 2011, a variation was granted by MSC 28 November 2011 to combine the inshore and already certified (2010) offshore components. The variation stated that "Where the inshore components have slightly different conditions, they will be evaluated according to the timescale established in the inshore fishery Public Certification Report" and that "if necessary, these timescales would be continued into the recertification period, assuming progress is on-target for completion".

Conditions 1 and 2 from the initial assessment are therefore carried over into the reassessment period and do not hinder receommendation of recertification. The client was considered to be fully compliant with Condition 3 from the initial assessment at the 4th surveillance audit in 2014, and this condition is therefore not carried over.

Table 30 Norway NEA cod – summary of previous assessment conditions

Condition	Closed (Y/N)	Justification
Condition 1 (all gears): Performance indicator 2.1.1: 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. Condition: Assess the effects of catches of non-target species in relation to the distribution, ecology and abundance of	N	From SA4 report: All demersal fishing vessels with quota to catch NE Arctic cod also have quota for the other major demersal species; principally NE Arctic haddock and NE Arctic saithe (DoF). It is illegal for any vessel to discard fish in Norwegian or Russian waters. Up-dated regulations require all fish caught to be retained (commercial) and recorded (both commercial and non-commercial), and commercial species counted against the corresponding vessel and national quotas.

the species and populations affected (including coastal cod). The potential consequences of non-target species removals on the populations affected and the wider ecosystem should be evaluated. Where assessments of fishery interactions with these species are shown to be significant, appropriate measures to reduce catches to acceptable and precautionary levels shall be developed and implemented.		For vessels >15 m length, these data are now recorded electronically. The client fleet complies with these regulations (DoF, pers. comm.); thus, **the necessary data specified by this condition are being collected as required**. The status of several retained species stocks specified in the original assessment for certifications (*e.g.* redfish, tusk) are still either in a vulnerable condition or there are insufficient data to complete a stock assessment and **the client has not demonstrated that they have made an "Initial evaluation of any potential impacts completed within 3 years"** (*i.e.* by 2013) of certification" other than is implied by ICES assessments of these stocks. Specific measures for the management and conservation of coastal cod continue to be developed and implemented. Similarly, there are specific measures in place to safeguard redfish stocks; **the client is fully compliant** with these measures (DoF, per comm.) but again, **the client has not demonstrated that they have made an "Initial evaluation of any potential impacts completed within 3 years"** (*i.e.* by 2013) of certification" other than is implied by ICES assessments of these stocks. Through discussions with the client it seems highly probable that they have met the requirements of this condition in principle but they have failed to draw all their actions together (consultations with DoF, IMR, and participation in CRISP etc) and present it as a coherent evaluation of the fishery and their contribution to its management.
Condition 2 (all gears): Performance indicator 2.3.1: **The fishery meets national and international requirements for protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.** **Condition:** The fishery must meet the overall SG80 requirement for PI 2.3.1 within the timescale of this certification,	N	From SA4 report: Norwegian legislation now requires that all by-catches, including those of marine mammals and sea birds are recorded and reported electronically within 24 hours. In addition to that, IMR observers embarked on reference-fleet vessels record any occurrence of marine mammal (ETP) by-catch and henceforth will also record bird (ETP) by-catch. It is therefore considered that **the client is compliant with the data collection aspect of condition 2** appropriately and it is expected that all Norwegian vessels targeting offshore cod in the unit of certification comply with the requirements of regulation on electronic reporting on by-catch of marine mammals and sea birds. **With the exception of the gillnet fishery**, the body of evidence from ICES and NAMMCO working group reports is that there is no significant interaction between the NEA cod fishery and ETP species and

		the client is compliant with this aspect of Condition 2. In consultation with IMR and, or NINA (as appropriate) the **client needs to assess the level of interaction between gillnet fishing and marine mammals**, as highlighted in the NAMMCO (2014) report, before this condition can be closed on gillnets.
Condition 3 (Demersal trawl, Danish seine, Gillnet and longline) Performance indicator 2.4.1: The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function. The trawl, Danish seine, longline and gill-net fisheries must meet the overall SG80 requirement within the timescale of this certification.	Y	From SA4 report: At the time of the original assessment, sensitive marine areas were only given formal protection from fishing activities in designated marine protected areas. In consultation with the industry, this statutory protection has been developed so that there can be no bottom-contact fishing at depths >1000 m nor are bottom-contact fishing methods permitted in any known area of cold-water corals reefs. Where vessels find evidence of coral on hauling their gear, they must report its presence and move a minimum of 2 miles before shooting the gear once more. Following the introduction of these new and more extensive safeguards for sensitive marine habitats, **the client is fully compliant with this condition.**

4.2.1.2 First annual surveillance, 2011

The first annual audit was carried out for the offshore component of cod fishery only, following certification of this component in April 2010. The surveillance audit was announced on the MSC website in March 2011 followed with a supporting notice to stakeholders issued by the MSC. Direct email notification was also sent to the stakeholders that had previously been identified for this fishery, inviting interested parties to contact the audit team. The audit team carried out a site visit 19- 20 May 2011 where the client, MFCA, IMR and DoF were consulted. The surveillance audit was conducted by member of the original assessment team Dr. Stephen Lockwood and DNV team leader Mrs. Sandhya Chaudhury.

4.2.1.3 Second annual surveillance, 2012

The second surveillance audit was performed as an on-site audit and conducted according to MSC Certification Requirements, v1.2, 10 January 2012. The default assessment tree, set out in the MSC Certification Requirements, was used for this surveillance.

The second surveillance audit covered both inshore and offshore components of cod stock and was combined with the surveillance audits of the following Norwegian fisheries and the recertification of the two saithe fisheries:

- North East Arctic haddock
- North East Atlantic mackerel
- North Sea and Skagerrak herring
- Norwegian Spring Spawning herring
- North East Arctic saithe
- North Sea saithe

The surveillance audit was announced on the MSC website on 31st May 2012 followed by a supporting notice to stakeholders issued by the MSC on the same date. Direct email notification was also sent to the stakeholders that had previously been identified for this fishery, inviting interested parties to contact the audit team. The audit team carried out a site visit and consulted the client, DoF, IMR and MFCA between 18th and 21st June 2012. The surveillance audit was conducted by member of the original assessment team Dr. Stephen Lockwood and DNV team leader Mrs. Sandhya Chaudhury.

4.2.1.4 Third annual surveillance, 2013

The third surveillance audit was performed as an on-site audit and conducted according to MSC Certification Requirements, v1.2, 10 January 2012. The default assessment tree, set out in the MSC Certification Requirements, was used for this surveillance.

The surveillance was announced on the MSC website 2. April 2013 followed by a supporting notice to stakeholders issued by the MSC on the same date. Direct email notification was also sent to the stakeholders that had previously been identified for this fishery, inviting interested parties to contact the audit team.

The third surveillance audit covered both inshore and offshore components of cod stock and was combined with surveillance audits of the following Norwegian fisheries and the recertification of the two herring fisheries:

- North East Arctic haddock
- North East Atlantic mackerel
- North Sea and Skagerrak herring
- Norwegian Spring Spawning herring

The surveillance visit for this fishery was conducted on 24th and 25th June 2013. The surveillance audit was conducted by member of the original assessment team Dr. Stephen Lockwood and DNV team leader Mrs. Sandhya Chaudhury, who gathered input through consultations with the client, DoF, IMR and MFCA.

4.2.1.5 Fourth annual surveillance, 2014

The fourth surveillance audit was performed as an on-site audit and conducted according to MSC Certification Requirements, version 1.3, 14 January 2013. The default assessment tree, set out in the MSC Certification Requirements, was used for this surveillance.

The surveillance was announced on the MSC website 20. May 2014 followed by a supporting notice to stakeholders issued by the MSC on the same date. Direct email notification was also sent to the stakeholders that had previously been identified for this fishery, inviting interested parties to contact the audit team. No comments or requests for consultations were received. The audit was combined with the surveillance audits of the following Norwegian fisheries and the recertification of the Norway NEA cod and haddock fisheries:

- North East Arctic haddock
- North East Arctic saithe
- North Sea saithe
- Norway North East Arctic cold water prawn

The surveillance visit was conducted on 23.-24. June 2014. This surveillance audit was carried out by Principle expert Dr. Stephen Lockwood (member of the initial assessment team), MSC Fishery Team Leader Mr. John Nichols and DNV GL project manager/Chain of custody responsible Mrs. Guro Meldre Pedersen. Changes to the assessment team were announced on the MSC website and listed stakeholders informed by direct mail notification. The assessment team gathered input from the various stakeholders, incl. Ministry of Trade, Industry and Fisheries, Directorate of Fisheries, the Institute of Marine Research and the client, through site visit meetings and telephone consultations. There were no changes to scoring of performance indicators at the fourth surveillance audit.

4.2.2 Norway NEA haddock

4.2.2.1 Summary of the original assessment

The Norwegian Seafood Industry's application for MSC certification of its NE Arctic haddock fishery was announced September 2008 as a single Unit of Certification for each gear type (trawl, long-line, Danish seine, gill-net and jigger), both in the offshore fishery (*i.e.* beyond 12 miles from baselines and where catches are assumed not to include coastal cod) and in the coastal fishery, [*i.e.* the fishery within the Norwegian Territorial Sea where coastal cod mix with NE Arctic (offshore) cod].

Following an initial review, at which the significant issue of coastal cod by-catch was identified, each Unit of Certification was split into an offshore (outside of 12 nm limit) and inshore (inside of 12 nm limit) component (ref. Advisory to Stakeholders; Clarification on Unit of Certification 17 November 2009). The offshore component was certified in April 2010. The inshore component, which does interact with the coastal cod stocks, was assessed on a separate timeline, taking account of the developing coastal cod management plan (see Advisory to Stakeholders; Resumption of Assessment of Inshore Cod and Haddock Fisheries, 14 January 2011) and was certified as of 21st October 2011.

The initial assessment processes were performed according to the requirements set out in the MSC Fisheries Certification Methodology. The default assessment tree, according to the Fisheries Assessment Methodology (FAM) version 2, was used for this certification.

With the inshore fishery certified in November 2011, the inshore and offshore fisheries were recombined for each gear type, as unified Units of Certification, under a single certificate. Scope of certification is up to the point of landing and chain of custody commences from point of sale/landing.

The fishery attained a score of 80 or more against each of the MSC Principles and did not score less than 60 against any of the individual MSC Criteria. Principle scores from the initial assessments are provided in Table 31 and Table 32.

Table 31 Principle scores – Original assessment – offshore haddock

Principle	Trawl	Long-line	Gill-net	Danish seine	Hook and line
Principle 1 – Target Species	89	89	89	89	89
Principle 2 – Ecosystem	87	87	87	88	89
Principle 3 – Management System	94	94	94	94	94

Table 32 Principle scores – Original assessment – inshore haddock

Principle	Trawl	Long-line	Gill-net	Danish seine	Hook and line
Principle 1 – Target Species	90.6	90.6	90.6	90.6	90.6
Principle 2 – Ecosystem	87.0	87.0	87.0	88.0	89.0
Principle 3 – Management System	94.0	94.0	94.0	94.0	94.0

The fishery achieved a score of below 80 against three scoring indicators. Three conditions were set at the initial certification of offshore and inshore components of the haddock stock for continuing certification that the client is required to address. Conditions raised are identical for inshore and offshore components and are later combined (Table 33). No recommendations were made at the initial certification.

Following the successful assessment of the inshore component of the fisheries in 2011, a variation was granted by MSC 28 November 2011 to combine the inshore and already certified (2010) offshore components. The variation stated that "Where the inshore components have slightly different conditions, they will be evaluated according to the timescale established in the inshore fishery Public Certification Report" and that "if necessary, these timescales would be continued into the recertification period, assuming progress is on-target for completion".

Conditions 1 and 2 from the initial assessment are therefore carried over into the reassessment period and do not hinder receommendation of recertification. The client was considered to be fully compliant with Condition 3 from the initial assessment at the 4th surveillance audit in 2014, and this condition is therefore not carried over.

Table 33 Norway NEA haddock – summary of previous assessment conditions

Condition	Closed (Y/N)	Justification
Condition 1 (all gears): Performance indicator 2.1.1: 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. Condition: Assess the effects of catches of non-target species in relation to the distribution, ecology and abundance of the species and populations affected (including coastal cod). The potential consequences of non-target species removals on the populations affected and the wider ecosystem should be evaluated. Where assessments of fishery interactions with these species are shown to be significant, appropriate measures to reduce catches to acceptable and precautionary levels shall be developed and implemented.	N	From SA4 report: All demersal fishing vessels with quota to catch NE Arctic haddock also have quota for the other major demersal species; principally NE Arctic cod and NE Arctic saithe (DoF). It is illegal for any vessel to discard fish in Norwegian or Russian waters. Up-dated regulations require all fish caught to be retained (commercial) and recorded (both commercial and non-commercial), and commercial species counted against the corresponding vessel and national quotas. For vessels >15 m length, these data are now recorded electronically. The client fleet complies with these regulations (DoF, pers. comm.); thus, **the necessary data specified by this condition are being collected as required**. The status of several retained species stocks specified in the original assessment for certifications (*e.g.* redfish, tusk) are still either in a vulnerable condition or there are insufficient data to complete a stock assessment and **the client has not demonstrated that they have made an "Initial evaluation of any potential impacts completed within 3 years"** (*i.e.* by 2013) of certification" other than is

		implied by ICES assessments of these stocks. Specific measures for the management and conservation of coastal cod continue to be developed and implemented. Similarly, there are specific measures in place to safeguard redfish stocks; **the client is fully compliant** with these measures (DoF, per comm.) but again, **the client has not demonstrated that they have made an "Initial evaluation of any potential impacts completed within 3 years"** (*i.e.* by 2013) of certification" other than is implied by ICES assessments of these stocks. Through discussions with the client it seems highly probable that they have met the requirements of this condition in principle but they have failed to draw all their actions together (consultations with DoF, IMR, and participation in CRISP etc) and present it as a coherent evaluation of the fishery and their contribution to its management.
Condition 2 (all gears): Performance indicator 2.3.1: **The fishery meets national and international requirements for protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.** **Condition:** The fishery must meet the overall SG80 requirement for PI 2.3.1 within the timescale of this certification,	N	From SA4 report: Norwegian legislation now requires that all by-catches, including those of marine mammals and sea birds are recorded and reported electronically within 24 hours. In addition to that, IMR observers embarked on reference-fleet vessels record any occurrence of marine mammal (ETP) by-catch and henceforth will also record bird (ETP) by-catch. It is therefore considered that **the client is compliant with the data collection aspect of condition 2** appropriately and it is expected that all Norwegian vessels targeting offshore haddock in the unit of certification comply with the requirements of regulation on electronic reporting on by-catch of marine mammals and sea birds. **With the exception of the gillnet fishery**, the body of evidence from ICES and NAMMCO working group reports is that there is no significant interaction between the NEA haddock fishery and ETP species and **the client is compliant with this aspect of Condition 2**. In consultation with IMR and, or NINA (as appropriate) the **client needs to assess the level of interaction between gillnet fishing and marine mammals**, as highlighted in the NAMMCO (2014) report, before this condition can be closed on gillnets.
Condition 3 (Demersal trawl, Danish seine, Gillnet and longline) Performance indicator 2.4.1: The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.	Y	From SA4 report: At the time of the original assessment, sensitive marine areas were only given formal protection from fishing activities in designated marine protected areas. In consultation with the industry, this statutory protection has been developed so that there can be no bottom-contact fishing at depths >1000 m nor are

The trawl, Danish seine, longline and gill-net fisheries must meet the overall SG80 requirement within the timescale of this certification.	bottom-contact fishing methods permitted in any known area of cold-water corals reefs or gardens. Where vessels find evidence of coral on hauling their gear, they must report its presence and move a minimum of 5 miles before shooting the gear once more. Following the introduction of these new and more extensive safeguards for sensitive marine habitats, **the client is fully compliant with this condition.**

4.2.2.2 First annual surveillance, 2011

The first annual audit was carried out for the offshore component of haddock fishery only, following certification of this component in April 2010. The surveillance audit was announced on the MSC website in March 2011 followed with a supporting notice to stakeholders issued by the MSC. Direct email notification was also sent to the stakeholders that had previously been identified for this fishery, inviting interested parties to contact the audit team. The audit team carried out a site visit 19- 20 May 2011 where the client, MFCA, IMR and DoF were consulted. The surveillance audit was conducted by member of the original assessment team Dr. Stephen Lockwood and DNV team leader Mrs. Sandhya Chaudhury.

4.2.2.3 Second annual surveillance, 2012

The second surveillance audit was performed as an on-site audit and conducted according to MSC Certification Requirements, v1.2, 10 January 2012. The default assessment tree, set out in the MSC Certification Requirements, was used for this surveillance.

The second surveillance audit covered both inshore and offshore components of the Norway North East Arctic haddock fishery and was combined with the surveillance audits of the following Norwegian fisheries and the recertification of the two saithe fisheries:

- North East Arctic cod
- North East Atlantic mackerel
- North Sea and Skagerrak herring
- Norwegian Spring Spawning herring
- North East Arctic saithe
- North Sea saithe

The surveillance audit was announced on the MSC website on 31st May 2012 followed by a supporting notice to stakeholders issued by the MSC on the same date. Direct email notification was also sent to the stakeholders that had previously been identified for this fishery, inviting interested parties to contact the audit team. The audit team carried out a site visit and consulted the client, DoF, IMR and MFCA between 18th and 21st June 2012. The surveillance audit was conducted by member of the original assessment team Dr. Stephen Lockwood and DNV team leader Mrs. Sandhya Chaudhury.

4.2.2.4 Third annual surveillance, 2013

The third surveillance audit was performed as an on-site audit and conducted according to MSC Certification Requirements, v1.2, 10 January 2012. The default assessment tree, set out in the MSC Certification Requirements, was used for this surveillance.

The surveillance was announced on the MSC website 2. April 2013 followed by a supporting notice to stakeholders issued by the MSC on the same date. Direct email notification was also sent to the stakeholders that had previously been identified for this fishery, inviting interested parties to contact the audit team.

The third surveillance audit covered both inshore and offshore components of haddock stock and was combined with surveillance audits of the following Norwegian fisheries and the recertification of the two herring fisheries:

- North East Arctic cod
- North East Atlantic mackerel
- North Sea and Skagerrak herring
- Norwegian Spring Spawning herring

The surveillance visit for this fishery was conducted on 24th and 25th June 2013. The surveillance audit was conducted by member of the original assessment team Dr. Stephen Lockwood and DNV team leader Mrs. Sandhya Chaudhury, who gathered input through consultations with the client, DoF, IMR and MFCA.

4.2.2.5 Fourth annual surveillance, 2014

The fourth surveillance audit was performed as an on-site audit and conducted according to MSC Certification Requirements, version 1.3, 14 January 2013. The default assessment tree, set out in the MSC Certification Requirements, was used for this surveillance.

The surveillance was announced on the MSC website 20. May 2014 followed by a supporting notice to stakeholders issued by the MSC on the same date. Direct email notification was also sent to the stakeholders that had previously been identified for this fishery, inviting interested parties to contact the audit team. No comments or requests for consultations were received. The audit was combined with the surveillance audits of the following Norwegian fisheries and the recertification of the Norway NEA cod and haddock fisheries:

- North East Arctic cod
- North East Arctic saithe
- North Sea saithe
- Norway North East Arctic cold water prawn

The surveillance visit was conducted on 23.-24. June 2014. This surveillance audit was carried out by Principle expert Dr. Stephen Lockwood (member of the initial assessment team), MSC Fishery Team Leader Mr. John Nichols and DNV GL project manager/Chain of custody responsible Mrs. Guro Meldre Pedersen. Changes to the assessment team were announced on the MSC website and listed stakeholders informed by direct mail notification. The assessment team gathered input from the various stakeholders, incl. Ministry of Trade, Industry and Fisheries, Directorate of Fisheries, the Institute of Marine Research and the client, through site visit meetings and telephone consultations. There were no changes to scoring of performance indicators at the fourth surveillance audit.

4.3 Assessment Methodologies

The basis for the MSC-certification is the standard denoted as the "MSC Principles and Criteria for Sustainable Fisheries", organised in three main principles.

- **Principle 1** concentrates on the need to maintain the target stock at a sustainable level;
- **Principle 2** draws attention to maintaining the ecosystem in which the target stock exists;
- **Principle 3** addresses the requirement for an effective fishery management system in order to fulfil Principles 1 and 2. In addition Principle 3 takes into account national and international regulations. The Principles 1-3, with pertaining criteria, are presented below.

The assessment team used the default assessment tree without modifications as defined in the MSC Certification Requirements v1.3. The MSC Full Assessment Reporting Template V1.3 is used as basis for this report.

PRINCIPLE NUMBER 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[124]:

Intent:

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:

- 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.
- 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.
- 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 NUMBER 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.

Intent:

[124] 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:

- 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.
- 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.
- 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 NUMBER 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.

Intent:

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.

Part A: Management System Criteria

- The fishery shall not be conducted under a controversial unilateral exemption to an international agreement.
- The management system shall:
- 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.
- 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.
- 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.
- Incorporates an appropriate mechanism for the resolution of disputes arising within the system[125].

[125] Outstanding disputes of substantial magnitude involving a significant number of interests will normally disqualify a fishery from certification.

- Provide economic and social incentives that contribute to sustainable fishing and shall not operate with subsidies that contribute to unsustainable fishing.
- 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.
- 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.
- Require that assessments of the biological status of the resource and impacts of the fishery have been and are periodically conducted.
- Specify measures and strategies that demonstrably control the degree of exploitation of the resource, including, but not limited to:
    - 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.
    - Identifying appropriate fishing methods that minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas.
    - Providing for the recovery and rebuilding of depleted fish populations to specified levels within specified time frames.
    - Mechanisms in place to limit or close fisheries when designated catch limits are reached.
    - Establishing no-take zones where appropriate.
- 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.

Part B: Operational Criteria

Fishing operation shall:

- 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.
- Implement appropriate fishing methods designed to minimise adverse impacts on habitat, especially in critical or sensitive zones such as spawning and nursery areas.
- Not use destructive fishing practices such as fishing with poisons or explosives.
- Minimise operational waste such as lost fishing gear, oil spills, on-board spoilage of catch, etc.
- Be conducted in compliance with the fishery management system and all legal and administrative requirements.

- 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.

The MSC Principles and Criteria presented above set the requirements for the fishery that undergoes certification. MSC's certification methodology is based on a structured hierarchy of *Sub-criteria* and *Performance indicators*. The overall performance is decided on the basis of the scoring criteria that the fishery gets during assessment. These sub-criteria and performance indicators have been developed by the MSC in the form of a default assessment tree.

When a fishery is evaluated the performance indicators (normally specific statements or questions) are checked out, and each performance indicator has three different "scoring guideposts" that can be defined. MSC characterises these scoring points as follows:

- Perfect practice, representing the level of performance that would be expected in a theoretically 'perfect' fishery (100 points).
- Exemplary or best practice (80 points).
- Minimum sustainable practice (60 points).

An overview of the assessment methodology is given in Marine Stewardship Council Certification Requirements v 1.3 and Guidance to the MSC certification requirements v 1.3. This guidance illustrates how the MSC Principles and Criteria give a basis for sub-criteria and performance indicators defined by DNV GL, resulting in various scores for the fishery.

4.4 Evaluation Processes and Techniques

Site visits to the fishery were performed by DNV GL's assessment team, and consultations were done with interested stakeholders. The performance indicators and the pertaining scoring systems were evaluated, and it was judged if the fishery meets the requirements for MSC Certification.

In order to fulfil the requirements for certification the following minimum scores are required:

- The fishery must obtain a score of 80 or more for each of the three MSC Principles, based on the weighted aggregate scores for all Performance Indicators under each Criterion in each Principle.
- The fishery must obtain a score of 60 or more for each Performance Indicator under each Criterion in each Principle.

Even though a fishery fulfils the criteria for certification, there may still be some important potential risks to future sustainability that are revealed during assessment. These are performance indicators that score less than 80, but more than 60. In order to be granted a MSC fishery certificate the client must agree to further improvements to raise the score to 80. The certification body (here DNV GL) then sets a timescale for the fishery to improve the relevant areas, so that the certification process can continue.

Default performance indicators and the scorings allocated in the evaluation are enclosed in section 6 and detailed information about Performance Indicators scoring and rationale in Appendix 1.1.

4.4.1 Site Visits

The assessment team met with relevant stakeholders in June 2014 as outlined in Table 35. A variation was submitted to and granted by the MSC to allow the Principle 3 expert not to

participate in the site visit meetings taking place Monday 23 June 2014. The Variation Request and MSC response is included in Appendix 10 Variation request and response – partial site visit.

The audit activities were combined with other surveillance audits for the Norwegian fisheries Norges Fiskarlag is responsible client for (Table 34).

Table 34 Surveillance audits conducted in parallel with the reassessment

Fishery	Surveillance activity
Norway NEA cod fishery	SA 4
Norway NEA haddock fishery	SA 4
Norway North Sea saithe	SA 1
Norway North East Arctic saithe	SA 1
Norway North East Arcitc cold water prawn	SA 2

Information gathered relevant for the Norway NEA cod and haddock fisheries is presented in this report and in the enclosed scoring tables.

Client representatives participated in all stakeholder meetings. All stakeholder representatives were informed that the client could be instructed by DNV GL to leave the room at their request or when DNV GL considered this to be appropriate.

Table 35 Stakeholder meetings conducted and key issues discussed

Date	Name and affiliation	Key issues
23 June 2014 9:00-12:00 at the Directorate of Fisheries' offices in Bergen	**Inspection – Directorate of Fisheries** - Modulf Overvik - Bjarne Schultz **Research – Institute for Marine Research** - Bjarte Bogstad - Sigbjørn Mehl - Gjert E. Dingsør - Carsten Hvingel (participation per phone, situated in Tromsø)	**Inspection – Directorate of Fisheries** - Function, role and responsibility of the organization - Review of regulations for the fisheries under assessment in the relevant geographical area - Consultation processes / routines with stakeholders (transparency of process) - Use of GIS database on coastal resources in fisheries management. - Control, surveillance and monitoring routines applied to fisheries under assessment - Fishermen's compliance with regulations. Significant non-compliances found during inspections in 3 preceding years. - Allegations on cheating in Norwegian fishing industry (ref report from NOFIMA "Urapportert fiske I torskefiskeriene"[126]). - Observed fishing patterns (gear used, fishing area, number of boats, fishing season). - Level of discards in cod and haddock fisheries - VMS data for the fleet of the fisheries under assessment in the last fishing year - Significant discrepancies found at landing control. **Research – Institute for Marine Research** - Function, role and responsibility of the institution - Role in stock assessments - Sampling programmes and level of sampling, surveys - Integration of national data collection programmes and stock assessments with ICES assessments. - Stock status, stock structure and recruitment of the fisheries under assessment - Review of Limit and Target reference points established for the stocks - Harvest strategy and harvest control rules - Short-term and long-term management objectives for the country's fisheries, incl. specific objectives for the fisheries under assessment - Knowledge base, research plans / strategies and management of discrete coastal stocks. Use of Local Ecological Knowledge? - Monitoring programmes for non-target species - Level of discards (composition of species, quantities) - Level of by-catch (composition of species, quantities) - Monitoring programmes for ETP species. Can extent of interactions with ETP species be quantified? - Strategy for minimising/ eliminating ETP/ by-catch - Impact of fisheries on marine habitats. Does the fishery overlap with sensitive habitats? Which habitats are protected/ closed? - Strategy/ plans for protection of sensitive habitats - Impact of the fisheries under assessment on the ecosystem. - Ecological role of the fisheries under assessment - Ecosystem surveys in the Geographical area - Strategy in scientific research. Research programmes for the fisheries under assessment, and other important species.
24 June 2014 12:00-14:00 Ministry offices, Kongens gate 8, Oslo	**Government - Ministry of Trade, Industry and Fisheries** - Elisabeth Wilmann - Geir Ervik - Guri Mæle Breigutu	- Function, role and responsibility - Strategy of the institution - Harvest strategy for the fisheries - Short-term and long-term management objectives for the countries fisheries, incl. for the fisheries under assessment - Precautionary approach in management of marine resources - Consultation and decision-making process for the stocks of the fisheries under assessment - Stakeholder involvement in decision-making. - Review of regulations for the fisheries under assessment in the relevant geographical area

[126] http://www.nofima.no/filearchive/Rapport%2026-2014.pdf

		- Control, surveillance and monitoring routines/regulations applied to the fisheries under assessment in the relevant geographical area - Logbooks: recording of non-commercial species - Fishermen's compliance with laws and regulations. - Significant discrepancies found at landing control for the fisheries under assessment in the 3 preceding years - Allegations on cheating in Norwegian fishing industry (ref report from NOFIMA "Urapportert fiske I torskefiskeriene"[126]). - Quota and level of catches (3 preceding years) - Observed fishing patterns (gear used, fishing area, fleet composition, fishing season). - Level of discards in the fisheries under assessment - VMS data for the fisheries under assessment - Mechanisms for resolution of legal disputes - Strategy for minimising or eliminating ETP by-catch - Strategy in scientific research; Research programmes for fishery under assessment - Strategy and plans for protection of sensitive habitats
24 June 2014 15:00-17:00 DNV GL office, Oslo	**Client** - Jan Birger Jørgensen (Norges Fiskarlag) - Tor-Edgar Ripman (Norges Råfisklag) - Atle Vartdal (Norges Fiskarlag member, fishing vessel owner)	Basic info about the company: - General - Ownership - History - Organizational structure Review of fishing operations: - Fishing season - Fishing area - Gear used (specifications) - Historical fishing levels (quotas and catches) Review of impact on ecosystem: - List of all by-catch of fish species: (species and quantities 3 preceding years) - By-catch of marine mammals, ETP species, birds (species and quantities). - List of commercial/non-commercial species which are usually discarded (quantities/if known) - Loss / recovery of fishing gear - Does the fishery overlap with sensitive habitats? Which habitats are protected/ closed in the fishery area? Compliance with rules and regulations - Control, surveillance and monitoring routines / regulations applied to the fishery / geographical area. - "Code of Conduct" and possible special instructions given to MSC cod and haddock certified vessels - Disputes with national/ international authorities for the last 5 years. - Records of sanctions and penalties (if any) during the last 3 years. - Allegations on cheating in Norwegian fishing industry (ref report from NOFIMA "Urapportert fiske I torskefiskeriene"[126]). Chain of Custody start: - Review of traceability system on board and at landing - Labelling of products - First point of landing - First point of sale - Main products - Main markets Conditions and recommendations from Initial assessment

4.4.2 Consultations

Several stakeholders have been identified and contacted during the assessment of the Norway NEA cod and haddock fisheries. Relevant main stakeholders were interviewed in June 2014 as outlined in Table 35. Information gathered is presented in this report and in the enclosed scoring tables. Information was also mad publicly available at different stages of the assessment (Table 36). Notifications on the MSC website were distributed to listed stakeholders in directed mails. The assessment was announced at www.intrafish.com to reach international and Norwegian stakeholders. The assessment was also announced on the websites of Norges Fiskarlag (www.fiskarlaget.no), Norges Råfisklag (http://www.rafisklaget.no/) and Norske Sjømatbedrifters Landsforening (http://www.nsl.no/) to reach Norwegian stakeholders.

Table 36 Consultations during assessment process

Consultation subject	Consultation channels	Date of announced consultation
Notification of full assessment	Notification on MSC website / direct email to listed stakeholders	6 May 2014 / 7 May 2014
Nomination of assessment team	Notification on MSC website / direct email to listed stakeholders	6 May 2014 / 7 May 2014
Notification of assessment timeline	Notification on MSC website / direct email to listed stakeholders	6 May 2014 / 7 May 2014
Confirmation of assessment team	Notification on MSC website / direct email to listed stakeholders	19 May 2014 / 23 May 2014
Notification of assessment tree	Notification on MSC website / direct email to listed stakeholders	20 May 2014 / 22 May 2014
Notification of site visit scheduled	Notification on MSC website / direct email to listed stakeholders	20 May 2014 / 22 May 2014
Notification of change in assessment team	Notification on MSC website / direct email to listed stakeholders	17 June 2014 / 20 June 2014
Confirmation of assessment tree	Notification on MSC website / direct email to listed stakeholders	24 June 2014 / 30 June 2014
Notification of variation; partial site visit	Notification on MSC website / direct email to listed stakeholders	24 June 2014 / 20 June 2014
Confirmation of assessment team	Notification on MSC website / direct email to listed stakeholders	1 July 2014 / 2 July 2014
Announcement of assessment in media with invitation to contribute to assessment process	Advertisement at www.Intrafish.com and at www.fiskarlaget.no, www.rafisklaget.no and www.nsl.no	23 May 2014 / 23 May 2014 / 23 May 2014 / 23 May 2014
Nomination of peer reviewers	Notification on MSC website / direct email to listed stakeholders	28 August 2014 / 29 August 2014
Confirmation of peer reviewers	Notification on MSC website / direct email to listed stakeholders	16 September 2014 / 17 September 2014
Notification of variation; to allow Norwegian coastal cod to be considered an IPI species	Notification on MSC website / direct email to listed stakeholders	16 September 2014 / 17 September 2014
Notification of variation; IPI status of Coastal cod extended for recertification period	Notification on MSC website / direct email to listed stakeholders	27 November 2014 / 1 December 2014
Notification of revised assessment timeline	Notification on MSC website / direct email to listed stakeholders	16 December 2014 / 17 December 2014
Notification of Public Comment Draft Report	Notification on MSC website / direct email to listed stakeholders	20 January 2015 / 21 January 2015
Notification of variation – certificate extension	Notification on MSC website / direct email to listed stakeholders	2 April 2015 / 7 April 2015
Notification of revised assessment timeline	Notification on MSC website / direct email to listed stakeholders	9 April 2015 / 7 April 2015
Notification of Final Report	Notification on MSC website / direct email to listed stakeholders	28 May 2015 / 1 June 2015
Notification of revised assessment timeline	Notification on MSC website / direct email to listed stakeholders	30 June 2015 / 27 August 2015
Notification of variation; certificate extension	Notification on MSC website / direct email to listed stakeholders	20 August 2015 / 26 August 2015
Notification of revised assessment timeline	Notification on MSC website / direct email to listed stakeholders	25 August 2015 / 26 August 2015

4.4.3 Evaluation Techniques

The assessment was announced at www.intrafish.com to reach international and Norwegian stakeholders. The assessment was also announced on the websites of Norges Fiskarlag (www.fiskarlaget.no), Norges Råfisklag (http://www.rafisklaget.no/) and Norske Sjømatbedrifters Landsforening (http://www.nsl.no/) to reach Norwegian stakeholders.

Site visits to the fishery were performed by DNV GL's assessment team (Table 35) and consultations were done with interested stakeholders (Table 36). The performance indicators and the pertaining scoring systems were evaluated jointly by the assessment team and all scoring was based on unanimous conclusions by the entire team.

In order to fulfill the requirements for certification the following minimum scores are required:

- The fishery must obtain a score of 80 or more for each of the three MSC Principles, based on the weighted aggregate scores for all *Performance Indicators* under each *Criterion* in each *Principle*.
- The fishery must obtain a score of 60 or more for each *Performance Indicator* under each *Criterion* in each *Principle*.

Even though a fishery fulfills the criteria for certification, there may still be some important potential risks to future sustainability that are revealed during assessment. These are performance indicators that score less than 80, but more than 60. In order to be granted a MSC fishery certificate the client must agree to do some further improvements regarding these points. The certification body (here DNV GL) sets a timescale for the fishery to improve the relevant areas, so that the certification process can continue. Summary of conditions and determination is provided in section 6 of this report.

Default performance indicators and the scorings allocated in the evaluation are included in section 6 of this report. The set of scoring elements that have been considered in each outcome PI in Principles 1 and 2 are included in tables 36-40 below.

Table 37 Scoring elements Norway NEA cod – Component 2.1.1 Main retained species

Scoring elements	Gillnet	Jigger	Longline	Danish Seine	Trawl	Data-deficient or not	
						Yes	No
Haddock			X	X	X		X
Saithe	X	X		X	X		X

Table 38 Scoring elements Norway NEA cod Component 2.1.1 Not main Retained species

Scoring elements	Gillnet	Jigger	Longline	Danish Seine	Trawl	Data-deficient or not	
						Yes	No
Haddock	X	X					X
Saithe			X				X
Tusk	X	X	X			X	
Ling	X		X		X	X	
Greenland halibut	X		X	X	X	X	
Wolffish - Anarhichas lupus			X		X	X	
Wolffish - Anarhichas minor			X		X	X	
Wolffish - Anarhichas denticulatus			X		X	X	
Angler (monkfish)	X					X	
Lumpfish	X					X	
Pollack	X					X	
European hake	X						X
European plaice				X		X	
Blue ling	X					X	
Coastal cod	X	X	X	X	X	X	
Atlantic halibut	X	X	X	X	X	X	
Redfish - Sebastes mentella	X	X	X	X	X	X	

Table 39 Scoring elements Norway NEA haddock – Component 2.1.1 Main retained species

Scoring elements	Gillnet	Jigger	Longline	Danish Seine	Trawl	Data-deficient or not	
						Yes	No
Cod	X	X	X	X	X		X
Saithe	X	X		X	X		X

Table 40 Scoring elements Norway NEA haddock – Component 2.1.1 Not main Retained species

Scoring elements	Gillnet	Jigger	Longline	Danish Seine	Trawl	Data-deficient or not	
						Yes	No
Saithe			X				X
Tusk	X	X	X			X	
Ling	X		X		X	X	
Greenland halibut	X		X	X	X	X	
Wolffish - Anarhichas lupus			X		X	X	
Wolffish - Anarhichas minor			X		X	X	
Wolffish - Anarhichas denticulatus			X		X	X	
Angler (monkfish)	X					X	
Lumpfish	X					X	
Pollack	X					X	
European hake	X						X
European plaice				X		X	
Blue ling	X					X	
Coastal cod	X	X	X	X	X	X	
Atlantic halibut	X	X	X	X	X	X	
Redfish - Sebastes mentella	X	X	X	X	X	X	

Table 41 Scoring elements Norway NEA cod and haddock – other components

Component	Gear	Scoring elements	Main / not main	Data-deficient or not
2.3.1	Gillnet; jigger; longline	Dogfish	Not main	DD
2.3.1	Gillnet	Basking shark	Not main	DD
2.3.1	Gillnet; trawl	Porbeagle	Not main	DD
2.3.1	Gillnet	Harbour porpoise	Not main	DD
2.3.1	All gears	Redfish - Sebastes norvegicus	Not main	DD

4.4.4 Risk Based Framework

The Risk Based Framework has not been used during the reassessment of the Norway NEA cod and haddock fisheries.

5 TRACEABILITY

5.1 Eligibility Date

During the assessment product, DNV GL shall nominate a date from which product from a certified is likely to be eligible to bear the MSC ecolabel; the target eligibility date.

The **target eligibility date** for the Norway NEA cod and haddock fisheries was set to **25 April 2015** in the Public Comment Draft Report, the **expiry date of preceding certificates** for these fisheries. In April 2015 a variation was requested by the assessment team and granted by the MSC to extend the preceding certificates for the Norway NEA cod and haddock certificates to **25 August 2015**. In August 2015 a variation was requested by the assessment team and granted by the MSC to extend the preceding certificates for the Norway NEA cod and haddock certificates to **25 October 2015**.

The **actual eligibility date** for the reassessment of the Norway NEA cod and haddock fisheries is **26 October 2015**, following the expiry date of the preceding certificates following extensions.

5.2 Traceability within the Fishery

As described in section 3.5, monitoring, control and surveillance is taken care of thorough shared responsibility and close collaboration between the Directorate of Fisheries, the Coast Guard and the regional sales organizations. Coast Guard inspectors board fishing vessels and control the catch (e.g. catch composition and fish size) and fishing gear (e.g. mesh size) on deck and the volume of fish in the holds. Norwegian vessels are required to have electronic logbooks, where real-time catch data are forwarded to the Directorate of Fisheries. The Directorate of Fisheries keeps track of how much fish is taken of the quotas of different vessels, vessel groups or other states at any given time, based on reports from the fishing fleet. The self-reported catch data can be checked at sales operations through the sales organizations, which have monopoly on first-hand sale of fish in Norway, and through physical checks performed by the sales organizations, the Directorate of Fisheries and the Coast Guard.

The sales organizations are required to record all landings of fish in Norway. This information is compared to the figures provided by the vessels to the Directorate of Fisheries through the electronic logbook. Physical controls of landings are carried out both by inspectors from the sales organizations and DoF.

Catch certificate is mandatory for export to EU. Norges Sildesalgslag has the responsibility for the catch certificate for all Norwegian fisheries through a separate company (Catch Certificate SA, https://www.catchcertificate.no/). The catch certificate accompanies the delivery note from the vessel. Buyers can access and extract catch certificates electronically.

Fish is sold either through auctions organized by the sales organizations or directly from vessel to buyer. In both cases the same requirements for reporting apply. All transactions are done through the sales organizations, logged and publically available, but the sales organizations do not take ownership of the fish. All relevant information on catch is provided to the sales organizations on a pre-delivery note. Vessel will complete the pre-filled delivery note and set correct quantity and size distribution in accordance with requirements from DoF. After landing, the delivery note is signed electronically and sent to the sales organizations for invoicing and settlement to fishermen. Purchaser name is included in the delivery note. The current list of approved buyers in Norway can be accessed at http://www.fiskeridir.no/register/kjoperreg/, but eligible buyers outside of Norway are also permitted to buy the certified product. Fishery certificate number is provided on invoices,

and invoices are issued through the sales organizations. The fish changes ownership from vessel to processing plant.

Fishing outside the UoC

All vessels are monitored by the Directorate of Fisheries through VMS data. The client has access to tracking data, and organizational and peer pressure in addition to official control contributes to minimizing the possibility of fishing outside the unit of certification. Catch details including catch locations are logged real time.

At sea processing and trans-shipping

At sea processing on the Norwegian vessels from these fisheries is mainly the production of whole chilled fish, headed and gutted, frozen blocks, 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. Cod and haddock from these fisheries are also landed as unprocessed catch. There are no transhipment at sea activities involved in the Norwegian cod and haddock fisheries. All catches are subject to controls at landing.

Points of landing

Landing sites are mainly in Norway, with inspections by DoF and sales organization as described above. Product may also be landed outside of Norway, e.g. in Denmark, Scotland and Shetland. In these cases, landing information is transmitted to Norwegian Authorities who cooperate with national control bodies at points of landing to ensure correct information. Norway is contracting party to the NEAFC Port-State Control regime[127], which require that port state authorities ascertain with the relevant flag state that catches intended to be landed are within the total quota of the vessel in question. Each Contracting Party shall carry out inspections of at least 15% of landings or transhipments in its ports during each reporting year.

5.3 Eligibility to Enter Further Chains of Custody

Products landed by Norwegian vessels from the Norway North East Arctic cod and haddock fisheries are being accurately recorded and identified through the Directorate of Fisheries and sales organizations as described above. Fish is sold either through auctions organized by the sales organizations or directly from vessel to buyer. In both cases the same requirements for reporting apply. All transactions are done through the sales organizations, logged and publically available, but the sales organizations do not take ownership of the fish.

Norway NEA cod and haddock products landed by Norwegian vessels, recorded by the Directorate of Fisheries and the sales organizations, and sold through or by approval from the sales organizations, are eligible to enter further Chain of Custody. The scope of the MSC Fishery certification is up to the point of landing and Chain of Custody will commence from the point of landing.

Sales organizations:

- Norges Råfisklag
- Surofi
- Vest-Norges Fiskesalslag
- Rogaland Fiskesalgslag
- Skagerakfisk

[127] http://www.neafc.org/mcs/scheme/2014 - NEAFC Scheme of Control and Enforcement

5.4 Eligibility of Inseparable or Practically Inseparable (IPI) stock(s) to Enter Further Chains of Custody

Coastal cod qualify as an IPI stock as it cannot be separated in the catches from cod of the Northeast Arctic stock, it forms less than 15% of the total combined catches of the two stock components, it is not an ETP species and it is not certified separately. **A Variation was granted by MSC 10 September 2014 to allow fish or fish products to be considered as coming from IPI stocks to enter into chains of custody**. Information of this variation was sent to stakeholders 17 September 2014. Variation request and variation response are included in Appendix 8 Variation request and response – IPI stock(s).

The MSC Certification Requirements v1.3 section CH 4.2.2 requires that an IPI stock is likely to be within biologically based limits, or if outside the limits, there are measures in place that are expected to make sure that all fishing-related mortality does not hinder the recovery and rebuilding of the depleted IPI stock. The performance of IPI stocks eligible to enter further certified chains of custody shall be reviewed and documented during surveillance activities.

After the above mentioned variation had been requested and granted, it became clear to the MSC and the assessment team that Coastal cod had already been granted IPI status through a variation requested by the CAB and granted by the MSC after the initial assessments were completed, in November 2011. MSC CR v1.3 CH4.1 states that The CAB shall only allow defined and limited proportions of catches from MSC approved IPI stocks to enter into certified chains of custody and use the MSC ecolabel for a maximum of one certification period. **A variation was granted by the MSC 26. November 2014 to allow Coastal cod in the Norway NEA cod fishery to enter into certified chains of custody and use the MSC ecolabel for the full lifetime of the certificate to be issued following the reassessment of the Norway NEA cod fishery,** pending the successful reassessment of the Norway NEA cod fishery.

The response from MSC specifies that no further variation to this effect will be granted to extend the allowance beyond the next certification period.

To continue using the Ecolabel on certified products after the reassessment period, the fishery will have to either include coastal cod as a P1 species, or have mechanisms in place to reduce their catches below 2% of the total catch, or find means to effectively separate their catches on landing by the time of the next reassessment. A recommendation has been placed on this fishery to achieve one of these goals and progress against this recommendation shall be monitored in the annual surveillance reports. Information of this variation was sent to stakeholders 1.12.2014. Variation request and variation response are included in Appendix 9 Variation request and response – IPI status extended for recertification period.

Coastal cod will enter chains of custody along with the Norway NEA cod should the fishery pass this reassessment. Coastal cod is described in section 3.4.8 and assessed under PI 2.1 Retained species in this assessment.

MSC CR v1.3 Annex CH for IPI fisheries applies to this assessment, except CH 4.1 where a variation has been granted.

6 EVALUATION RESULTS

6.1 Principle Level Scores

Table 42 Principle scores for the Norway NEA cod fishery

	Trawl	Longline	Gill-net	Danish seine	Hook and line gears
Principle 1 – Target Species	95.6	95.6	95.6	95.6	95.6
Principle 2 – Ecosystem	85.3	86.7	85.7	85.7	87.0
Principle 3 – Management system	95.5	95.5	95.5	95.5	95.5

Table 43 Principle scores for the Norway NEA haddock fishery

	Trawl	Longline	Gill-net	Danish seine	Hook and line gears
Principle 1 – Target Species	95.6	95.6	95.6	95.6	95.6
Principle 2 – Ecosystem	85.3	86.7	85.7	85.7	87.0
Principle 3 – Management system	95.5	95.5	95.5	95.5	95.5

6.2 Summary of Scores

Summary of scores for the Norway NEA cod and haddock fisheries are presented per gear in Table 44 and Table 45. The MSC Fishery Assessment Scoring worksheet v1 (Nov 2011) was used for calculations of overall scores.

Table 44 Summary of scores for the Norway NEA cod fisheries per gear.

Principle	Component	PI No.	Performance Indicator (PI)	Score				
				Trawl	Long-line	Gillnet	Danish seine	Hook and line
One	Outcome	1.1.1	Stock status	100	100	100	100	100
		1.1.2	Reference points	90	90	90	90	90
		1.1.3	Stock rebuilding	NA	NA	NA	NA	NA
	Manage-ment	1.2.1	Harvest strategy	100	100	100	100	100
		1.2.2	Harvest control rules & tools	100	100	100	100	100
		1.2.3	Information & monitoring	90	90	90	90	90
		1.2.4	Assessment of stock status	95	95	95	95	95
Two	Retained species	2.1.1	Outcome	80	80	80	80	80
		2.1.2	Management	95	90	95	95	95
		2.1.3	Information	85	85	85	85	85
	Bycatch species	2.2.1	Outcome	90	90	90	90	90
		2.2.2	Management	85	85	85	85	85
		2.2.3	Information	85	85	85	85	85
	ETP species	2.3.1	Outcome	75	75	70	75	75
		2.3.2	Management	85	85	70	85	85
		2.3.3	Information	80	80	80	80	80
	Habitats	2.4.1	Outcome	70	95	95	75	95
		2.4.2	Management	85	85	85	85	85
		2.4.3	Information	90	90	90	90	90
	Ecosystem	2.5.1	Outcome	95	95	95	95	95
		2.5.2	Management	85	85	85	85	85
		2.5.3	Information	95	95	95	95	95
Three	Governance and policy	3.1.1	Legal & customary framework	90	90	90	90	90
		3.1.2	Consultation, roles & responsibilities	100	100	100	100	100
		3.1.3	Long term objectives	100	100	100	100	100
		3.1.4	Incentives for sustainable fishing	90	90	90	90	90
	Fishery specific managemen t system	3.2.1	Fishery specific objectives	90	90	90	90	90
		3.2.2	Decision making processes	90	90	90	90	90
		3.2.3	Compliance & enforcement	100	100	100	100	100
		3.2.4	Research plan	100	100	100	100	100
		3.2.5	Management performance evaluation	100	100	100	100	100

Table 45 Summary of scores for the Norway NEA haddock fisheries per gear.

Principle	Component	PI No.	Performance Indicator (PI)	Score				
				Trawl	Long-line	Gillnet	Danish seine	Hook and line
One	Outcome	1.1.1	Stock status	100	100	100	100	100
		1.1.2	Reference points	90	90	90	90	90
		1.1.3	Stock rebuilding	NA	NA	NA	NA	NA
	Manage-ment	1.2.1	Harvest strategy	100	100	100	100	100
		1.2.2	Harvest control rules & tools	100	100	100	100	100
		1.2.3	Information & monitoring	90	90	90	90	90
		1.2.4	Assessment of stock status	95	95	95	95	95
Two	Retained species	2.1.1	Outcome	80	80	80	80	80
		2.1.2	Management	95	90	95	95	95
		2.1.3	Information	85	85	85	85	85
	Bycatch species	2.2.1	Outcome	90	90	90	90	90
		2.2.2	Management	85	85	85	85	85
		2.2.3	Information	85	85	85	85	85
	ETP species	2.3.1	Outcome	75	75	70	75	75
		2.3.2	Management	85	85	70	85	85
		2.3.3	Information	80	80	80	80	80
	Habitats	2.4.1	Outcome	70	95	95	75	95
		2.4.2	Management	85	85	85	85	85
		2.4.3	Information	90	90	90	90	90
	Ecosystem	2.5.1	Outcome	95	95	95	95	95
		2.5.2	Management	85	85	85	85	85
		2.5.3	Information	95	95	95	95	95
Three	Governance and policy	3.1.1	Legal & customary framework	90	90	90	90	90
		3.1.2	Consultation, roles & responsibilities	100	100	100	100	100
		3.1.3	Long term objectives	100	100	100	100	100
		3.1.4	Incentives for sustainable fishing	90	90	90	90	90
	Fishery specific managemen t system	3.2.1	Fishery specific objectives	90	90	90	90	90
		3.2.2	Decision making processes	90	90	90	90	90
		3.2.3	Compliance & enforcement	100	100	100	100	100
		3.2.4	Research plan	100	100	100	100	100
		3.2.5	Management performance evaluation	100	100	100	100	100

6.3 Summary of Conditions

Table 46 Summary of conditions for Norway NEA cod and haddock fisheries carried over from the initial assessment (detailed in Appendix 1.3)

Condition number	Performance indicator	Condition	Gear
1	2.1.1 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.	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.	All gear types
2	2.3.1 The fishery meets national and international requirements for protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of 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.	Trawl, longline, gill net, Danish seine

Table 47 Summary of new conditions for Norway NEA cod and haddock fisheries (full text available in Appendix 1.3)

Condition number	Performance indicator	Condition	Gear
3	2.3.1 The fishery meets national and international requirements for the protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species	The quantity and quality of data available for estimating porpoise population size and fishery related mortalities must be improved to a level where effects of the fishery are known and can be shown to be highly likely within limits of national and international requirements for protection of ETP species; i.e. gillnet induced mortality rates must be within internationally agreed levels of sustainability.	Gill-net
4	2.3.2 The fishery has in place precautionary management strategies designed to: • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species.	A strategy for managing the fishery's impact on porpoise shall be developed that includes measures to minimise gillnet-related mortality and is highly likely to achieve national and international requirements for the protection of ETP species, i.e. harbour porpoise.	Gill-net
5	2.4.1 The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function.	The fishery shall demonstrate that it is highly unlikely to reduce Pennatulacea (sea pens) habitat structure and function of to a point where there would be serious or irreversible harm.	Trawl, Danish seine

Condition number	Performance indicator	Condition	Gear
6	2.3.1 The fishery meets national and international requirements for the protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species	The effects of the fishery on the golden redfish (i.e. *Sebastes norvegicus*, previously *S. marinus)* should be highly likely to be within limits of national and international requirements for protection of this ETP species. The client must present evidence that the direct effects of the fishery are highly unlikely to create unacceptable impacts to this ETP species.	All gears

6.3.1 Recommendations

Table 48 Summary of recommendations

Recommendation number	Recommendation	Gear
1	Following a variation granted by the MSC 26. November 2014, the designation of the Norwegian coastal cod stock as an Inseparable or Practically Inseparable (IPI) stock will remain in effect for another certification period, pending the successful reassessment of the Norway NEA cod fishery. For any future re-assessment the MSC Certification Requirements, CR v1.3 CH 3.1, suggests that the CAB may make a recommendation to either - promote the future Principal 1 assessment of the IPI stock (CH 6.1.1.1) or - to develop techniques to effectively separate the catches of the currently IPI stock (CH 6.1.1.2) or - to develop measures to reduce the proportion of the IPI stock in the catches to 2% or less and ensure that the catch of the IPI stock does not create a significant impact on the state of the IPI stock as a whole (CH 6.1.1.3). For the Norwegian coastal cod we consider it unlikely that they can be practically separated in the mixed catches with NEA cod. The assessment team therefore recommends that the client make representations to the appropriate authority for action to ensure that, for any future re-assessment of the fishery the Norwegian coastal cod can either; • be dealt with under Principle 1 or • the catch of Coastal cod can be reduced to 2% or less of the total combined cod catch.	All gears
2	It is recommended that steps are taken to bring Norwegian SMH protection measures in line with internation standards recommended elsewhere. *i.e.* • the move-on rule should apply to all coaral catches (soft and hard) exceeding 30 kg; • the move-on rule should apply to sponge bycatch that exceeds 400 kg; • the move-on rule should be applied to all catches of sea pens, or similar burrowing megafauna, exceeding 7 kg; • the move-on rule should be increase from 2 to 5 nautical miles.	All gears

6.4 Determination, Formal Conclusion and Agreement

The Norway NEA cod and haddock fisheries achieved a score of 80 or more for each of the three MSC Principles, and did not score under 60 for any of the set MSC criteria.

The fisheries achieved a score of less than 80 for three individual performance indicators (PIs), including a below 80 score for two individual scoring elements for one of the PIs, and therefore four appropriate conditions have been raised.

Based on the evaluation of the Norway NEA cod and haddock fisheries as presented in this report, the assessment team recommends the certification of the fisheries, with four conditions and two recommendations for the client Norges Fiskarlag (Norwegian Fishermen's Association).

Two conditions from the initial assessment are carried over into the new certification period, based on process allowed by MSC in their response to the variation request to combine the inshore and offshore components of these fisheries (28.11.2011): *Where the inshore components have slightly different conditions, they will be evaluated according to the timescale established in the inshore fishery Public Certification Report. (If necessary, these timescales would be continued into the recertification period, assuming progress is on-target for completion.)*

The Technical Reviewer at DNV GL adheres to the recommendation of the assessment team and approves the certification of the Norway NEA cod and haddock Fishery for the client Norges Fiskarlag.

6.5 Changes in the fishery prior to and since Pre-Assessment

The Norway NEA cod and haddock fisheries have been monitored for compliance through Initial assessments and concurrent surveillance activities in the previous certification period. Details on previous assessments are included in section 4.2. Further information is available at www.msc.org.

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APPENDIX 1 SCORING AND RATIONALES

Appendix 1.1 Performance Indicator Scores and Rationale

Organization of scoring tables

As this report covers two target species caught by five different catch methods, the organization of the scoring tables for all PIs covering all Units of Certification is given in Table 49.

Table 49 Organization of scoring tables

Principle	PI	Target species	Gear
P1	1.1.1/2/3 1.2.1/2/3/4	Norway NEA cod	All gears
	1.1.1/2/3 1.2.1/2/3/4	Norway NEA haddock	All gears
P2	2.1.1	Norway NEA cod	Trawl, Danish seine, jigger, Gillnet
	2.1.1	Norway NEA cod	Longline
	2.1.2	Norway NEA cod	Trawl, Danish seine, jigger, Gillnet
	2.1.2	Norway NEA cod	Longline
	2.1.3	Norway NEA cod	All gears
	2.1.1	Norway NEA haddock	Trawl, Danish seine, jigger, Gillnet
	2.1.1	Norway NEA haddock	Longline
	2.1.2	Norway NEA haddock	Trawl, Danish seine, jigger, Gillnet
	2.1.2	Norway NEA haddock	Longline
	2.1.3	Norway NEA haddock	All gears
	2.2.1/2/3	Norway NEA cod and haddock	All gears
	2.3.1	Norway NEA cod and haddock	Trawl, Danish seine, jiggers
	2.3.1	Norway NEA cod and haddock	Gillnet
	2.3.1	Norway NEA cod and haddock	Longline
	2.3.2	Norway NEA cod and haddock	Trawl, Danish seine, jiggers
	2.3.2	Norway NEA cod and haddock	Gillnet
	2.3.2	Norway NEA cod and haddock	Longline
	2.3.3	Norway NEA cod and haddock	All gears
	2.4.1	Norway NEA cod and haddock	Trawl
	2.4.1	Norway NEA cod and haddock	Danish seine
	2.4.1	Norway NEA cod and haddock	Jiggers, longlines, gillnet
	2.4.2/3	Norway NEA cod and haddock	All gears
	2.5.1/2/3	Norway NEA cod and haddock	All gears
P3	3.1.1/2/3/4 3.2.1/2/3/4/5	Norway NEA cod and haddock	All gears

Principle 1 - Norway North East Arctic cod

Evaluation Table for PI 1.1.1 - Norway NEA cod

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.
	Met?	Y	Y	Y
	Justification	The stock is well above its biomass precautionary reference point which is the lowest SSB with >90% probability that the stock is above its limit reference point. The biomass limit point is set at the change point in the regression of SSB vs recruitment below which recruitment could be impaired. The current SSB is well above both this biomass limit point and the precautionary approach level. SSB has been below Blim (220,000t) on numerous occasions in the past and was a low as 102,000t in 1965. However it has not been below Blim since 1988. SSB at spawning time in 2014 was estimated to be at the third highest level in the historic time series and well above Blim and the management plan, biomass MSY trigger and precautionary biomass level of 460,000t levels. The biomass precautionary approach level is set to ensure that the stock is above the point (Blim) where recruitment might be impaired with >90% probability; a high degree of certainty.		
b	**Guidepost**		The stock is at or fluctuating around its target reference point.	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.
	Met?		Y	Y
	Justification	The SSB at spawning time in 2014 was estimated to be almost four times the current management plan target, MSY biomass trigger point and the biomass precautionary approach level. It has been well above 1 million tonnes for the past six years. The SSB has been above its management plan and MSY target points (460,000t) since 2002. Since then SSB has gradually increased and since 2009 it has been well over 1 million tonnes. It is currently over 1.8 million tonnes the third highest level recorded in the time series dating back to 1946. There is therefore a high degree of certainty, 95% probability, that the stock has been above its target reference point since 2009.		
References		ICES, 2003; ICES, 2010c ; ICES, 2011c ; ICES 2014a: ICES 2014b.		
Stock Status relative to Reference Points				
		Type of reference point	**Value of reference point**	**Current stock status relative to reference point**
Target		SSB management	460,000t	1,797,496t

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
reference point	plan:MSY B trigger: Bpa F Management plan Fmsy: F pa	F 0.40	F 0.34
Limit reference point	Blim; F lim	220,000t F 0.74	1,797,496 F0.34
OVERALL PERFORMANCE INDICATOR SCORE:			**100**
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 1.1.2 - Norway NEA cod

PI 1.1.2		Limit and target reference points are appropriate for the stock		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	
	Met?	Y	Y	
	Justification	A raft of appropriate biological reference points, for biomass and fishing mortality have been defined and agreed by the JNRFC since 2004. The reference points meet internationally agreed standards and have been endorsed by ICES as consistent with a precautionary approach to managing the stock and not in contradiction to the maximum sustainable yield (MSY) approach.		
b	**Guidepost**		The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.
	Met?		Y	Y
	Justification	The biomass limit point (Blim) is set at the change point in the regression of SSB vs recruitment a point below which impaired recruitment might be expected but above which there have been no clear signs of impaired recruitment. The biomass limit reference point (Blim) is set at a point above which there has been no evidence of impaired reproductive capacity. A raft of appropriate environmental drivers is used in the calculation of the annual estimates of recruitment. These data are derived from fishery independent IMR-PINRO trawl surveys and an ecosystem survey and the estimate of recruitment does therefore take into account precautionary issues.		
c	**Guidepost**		The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.
	Met?		Y	N

PI 1.1.2		Limit and target reference points are appropriate for the stock		
	Justification	The management plan has an agreed target (Fmsy = 0.4), supported by Bmsy trigger point in the Harvest control rule. The current management plan / harvest control rule is clearly consistent with MSY reference points for both fishing mortality and biomass. Environmental factors and cod cannibalism are clearly incorporated into the stock modelling and are considered to be a vital part of the whole management strategy. However it is difficult to assert, with a 95% probability, that the ecological role of the stock is directly considered in establishing the Fmsy or Bmsy trigger reference point.		
d	Guidepost		For key low trophic level stocks, the target reference point takes into account the ecological role of the stock.	
	Met?		Not relevant	
	Justification	Cod is not defined as an LTL species nevertheless it is worthy of note that estimates of cod cannibalism are incorporated into the estimate of natural mortality in the assessment modelling procedures. *(Reference: CR Annex CB2.3.13- CB2.3.21)*]		
References		Bogstad and Mehl (1997); Bogstad et al (2000); ICES, 2003; ICES, 2014a: ICES 2014b; IMR-PINRO _ecosystem survey- 2013.pdf		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.1.3 - Norway NEA cod

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Where stocks are depleted rebuilding strategies, which have a reasonable expectation of success, are in place.		Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe.
	Met?	(Y/N)		(Y/N)
	Justification	N/A		
b	Guidepost	A rebuilding timeframe is specified for the depleted stock that is the shorter of 30 years or 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock.
	Met?	(Y/N)	(Y/N)	(Y/N)
	Justification	N/A		
c	Guidepost	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within a specified timeframe.	There is evidence 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 specified timeframe.	
	Met?	(Y/N)	(Y/N)	

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe	
	Justification	N/A	
References		[List any references here]	
OVERALL PERFORMANCE INDICATOR SCORE:			N/A
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 1.2.1 - Norway NEA cod

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	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.
	Met?	Y	Y	Y
	Justification	The JNRFC management plan was formulated in 2002 and the resultant harvest control rules applied for the first time in setting the quotas for 2004. The plan was reviewed and amended by the JNRFC in 2009 and is clearly achieving its objectives as evidenced by the current levels of SSB and F. The management plan is clearly designed to be responsive to the current status of the stock and to maintain fishing mortality and SSB at levels which support the maximum sustainable yield. The biomass precautionary approach level (460,000t) is the lowest SSB estimate having a >90% probability of remaining above Blim (220,000t). The strategy has resulted in a steady increase in the SSB since the management plan started in 2004 and SSB is currently at the third highest level in the 68 year time series. Fishing mortality was reduced from a high of F0.7 in 2004 to F0.24 in 2012. It did increase, with the increase in SSB, to F0.34 in 2013 but is still below the management plan target (F0.4).		
b	**Guidepost**	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	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.
	Met?	Y	Y	Y

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
	Justification	The harvest strategy has been operating since 2004 and has clearly achieved its objectives since then as evidenced by the current levels of SSB and F in relation to their management plan reference points. The harvest strategy is clearly working and achieving its objectives with fishing mortality below the management plan / Fmsy precautionary level since 2007 and below Flim since 2001. SSB has been above the management plan Bmsy trigger level since 2002 and has not been below Blim since 1988. The harvest strategy was subject to a full evaluation within the JNRFC in 2009 (and is due for re-evaluation in 2015). It has been accepted by ICES (ACOM) as being consistent with a precautionary approach to managing the stock and not in contradiction to the MSY approach. The annual ICES stock assessment is, in effect, an annual evaluation of the plan's performance. The levels of SSB and F, since the management plan was introduced in 2004, clearly show that the strategy is achieving its objectives in terms of maintaining both maximum sustainable yields and full reproductive capacity.		
c	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	There is a comprehensive IMR-PINRO stock monitoring and assessment programme in place that includes environmental, biological and acoustic surveys, plus rigorous fishery monitoring, control and surveillance that lead to an annual evaluation of the success of the harvest strategy. The fishery based monitoring programme is strongly supported by appropriate fishery independent surveys. ICES publishes an annual evaluation of current stock status in relation to fishing mortality at Fmsy, the precautionary approach Fpa and Flim and F management plan levels. For the stock biomass the evaluation is provided in relation to MSY B trigger, the precautionary approach Bpa and Blim levels and the SSB management plan level. This evaluation clearly demonstrates whether or not the harvest strategy is working.		
d	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Y

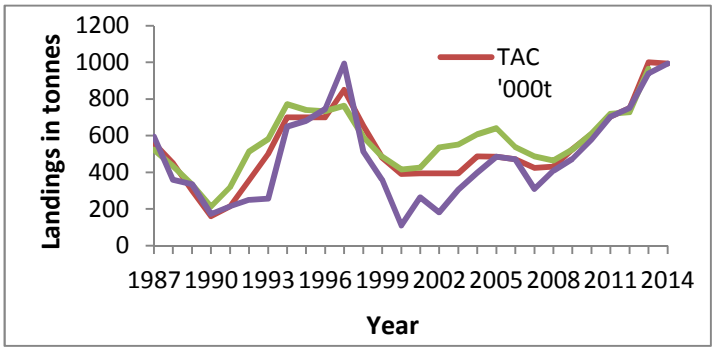
PI 1.2.1		There is a robust and precautionary harvest strategy in place
	Justification	The management plan which underpins the harvest strategy was formulated by the JNRFC in 2002 and amended in 2004 before its introduction. It was evaluated by ICES in 2005 and endorsed as being consistent with the precautionary approach and is judged not to be in contradiction to the MSY approach to stock management and conservation. A further evaluation by ICES in 2007 noted a potential problem with the 'three year rule' for TAC setting. As a result the plan was subject to a full evaluation within the JNRFC in 2009 and an amendment was made modifying the three year rule. The amended strategy was confirmed by the JNRFC as the basis for managing the fishery until 2015 when the plan is scheduled to be re-evaluated. The current management plan was further endorsed by ICES as consistent with the precautionary approach in 2010. The Plan states: "The Parties agreed that the management strategies for cod and haddock should take into account the following: • *conditions for high long-term yield from the stocks* • *achievement of year-to-year stability in TACs* • *full utilization of all available information on stock development* On this basis, the Parties determined the following decision rules for setting the annual fishing quota (TAC) for Northeast Arctic cod (NEA cod): • estimate the average TAC level for the coming 3 years based on Fpa. TAC for the next year will be set to this level as a starting value for the 3-year period. • the year after, the TAC calculation for the next 3 years is repeated based on the updated information about the stock development, however the TAC should not be changed by more than +/- 10% compared with the previous year's TAC**. If the TAC, by following such a rule, corresponds to a fishing mortality (F) lower than 0.30 the TAC should be increased to a level corresponding to a fishing mortality of 0.30.** • if the spawning stock falls below Bpa, the procedure for establishing TAC should be based on a fishing mortality that is linearly reduced from Fpa at Bpa, to F= 0 at SSB equal to zero. At SSB-levels below Bpa in any of the operational years (current year, a year before and 3 years of prediction) there should be no limitations on the year-to-year variations in TAC.. At the 39th Session of the Joint Russian–Norwegian Fisheries Commission in October 2010 it was agreed that the current management plan should be used 'for five more years' before it is evaluated.

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
e	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	(Y/N/Not relevant)	(Y/N/Not relevant)	(Y/N/Not relevant)
	Justification	N/A		
References		ICES, 2005; ICES, 2007; ICES, 2010a; 2010b ; ICES, 2010c ; ICES, 2014a; ICES, 2014b; JNRFC, 2010.		
OVERALL PERFORMANCE INDICATOR SCORE:				100
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.2 - Norway NEA cod

PI 1.2.2		There are well defined and effective harvest control rules in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Generally understood harvest 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.	Well defined 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.	
	Met?	Y	Y	
	Justification	The current strategy is to set an annual TAC, based on managing the stock in accordance with the agreed JNRFC management plan. The annual TAC is firmly based on the predicted catch corresponding to the ICES advice which is firmly based on managing the stock according to the agreed target and limit reference points for SSB and F. The TAC control rules and the other conservation measures have maintained the SSB, of the Northeast Arctic cod stock, above the JNRFC management plan target of 460,000t since 2002. Fishing mortality has been below the management plan target (F0.4) since 2007. The SSB has not been below the biomass limit point since 1989 and has been below the fishing mortality limit reference point since 2001. The harvest strategy has clear rules which effectively reduce the annual TAC if target and limit reference points for SSB are approached. The strategy is clearly designed to set the annual TAC at a level consistent with maintaining the SSB above, and the fishing mortality below, the management plan and MSY targets. The strategy is strongly supported by a raft of technical measures including minimum mesh size regulations, minimum landing size, area closures when juvenile density is high and other area and seasonal restrictions.		
b	**Guidepost**		The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules takes into account a wide range of uncertainties.
	Met?		Y	Y

PI 1.2.2		There are well defined and effective harvest control rules in place		
	Justification	The main uncertainties affecting the harvest control rule are the reliability of the annual stock assessment in estimating current SSB and fishing mortality. The major problem, prior to 2001, was estimating the extent of IUU landings. IUU landings have been addressed and are now formalized within the 2009 FAO Port State Measures Agreements and increased surveillance. ICES now consider the level of IUU landings to be negligible and discard levels are assumed to be low but are unknown. These main uncertainties have been taken into account when selecting the current harvest rules and in particular the "three year rule" in setting the annual TAC. There are still some issues relating to scientific sampling of the landings, limited survey coverage and also discrepancies in the methods for apportioning the catch of Norwegian Coastal cod. Within the assessment modelling procedure the effect of very strong year classes on the catch at age parameter can also generate some uncertainty in the final assessment. These uncertainties are satisfactorily addressed when selecting the current harvest rules and in particular the amended 'three year rule 'in the management plan for setting the annual TAC This clause in the management plan provides both stability and an opportunity to correct for any retrospective problems in the estimation of SSB and F and acts as an appropriate buffer against uncertainty.		
c	**Guidepost**	There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
	Met?	Y	Y	Y

PI 1.2.2		There are well defined and effective harvest control rules in place
	Justification	Monitoring, control and surveillance of the catches and landings has been working effectively in this fishery for many years. The problem of illegal, unreported and unregulated landings was addressed and is since 2009 considered by ICES to be negligible. Evidence of the success of the tools used to monitor and control the TAC can be seen in the close agreement, since 2009, between the agreed TAC, official landing statistics and the ICES working group estimate of total catches used for the assessment.  Further clear evidence of the effectiveness of the tools used to control exploitation is the increase in SSB from above the management plan, MSY target level of 460,000t in 2002 to its current level of 1.8million tonnes. Fishing mortality has also been below the management plan and Fmsy level of F0.4 since 2007.
References		ICES, 2002; ICES, 2007 ; ICES, 2009; ICES, 2010a; ICES, 2014a; ICES, 2014b.
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 1.2.3 - Norway NEA cod

PI 1.2.3		**Relevant information is collected to support the harvest strategy**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	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 related to the current harvest strategy, is available.
	Met?	Y	Y	Y

	Justification	The Northeast Arctic cod has been the target of national research programmes in Russia and Norway and other countries that in the past have had a fishery interest in the area. This research effort has provided comprehensive information on stock structure, stock productivity and fleet composition in support of the harvest strategy. This research effort has built up a significant fund of appropriate knowledge, on stock structure, spawning and spawning migrations, seasonal distributions and stock productivity, which adequately supports the current harvest strategy. There is also comprehensive knowledge on the structure of the fleets exploiting the resource both past and present. This includes knowledge of gear types and gear configurations in use throughout the fishery. These data are regularly reviewed and updated by the ICES working group in the stock annexe to their annual assessment report. Information on age and growth rates is routinely collected as part of the scientific sampling programmes by Norway, Russia, Germany and Spain and maturity data is collected by Norway and Russia. In addition to this onshore scientific sampling programme sampling of the catch at sea is carried out on Norwegian reference fleet fishing vessels and by observers on some Russian vessels. This wide range of relevant information is considered to be comprehensive in relation to the requirements at SG 100. The stock assessment is supported by three fishery independent surveys, two bottom trawl and one acoustic survey and by a Russian commercial trawl cpue index. The joint bottom trawl survey has been running from 1985 and covers ages 3 to 8yrs in the stock. The Russian bottom trawl survey started in 1994 and covers ages 3-9yrs The joint acoustic survey started in 1985 and also covers ages 3-9yrs. The Russian commercial trawl cpue index started in 1985 and covers the age range 9-11yrs in the stock. In addition to the basic data needed for an analytical stock assessment in support of a harvest strategy environmental data are collected on the annual IMR-PINRO ecosystem survey. This provides information on the role of cod as a top predator in the ecosystem and the role of temperature, food supply and stock abundance in influencing cod growth and recruitment. Factors influencing the level of cod cannibalism are also taken into account in the estimation of natural mortality. The effect of the polar front on cod distributions and the removal of cod on the abundance of prey stocks such as capelin, redfish and haddock are also taken into account where possible.

b	**Guidepost**	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.	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.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Y	Y	N

	Justification	Basic landings data is provided by all countries participating in the Northeast Arctic cod fishery. Principally, the basic biological data are gathered by Norway and Russia. Although all vessels carry observers in the Russian zone, only observers on Russian vessels undertake biological sampling. Some additional information is provided by some of the nations (Spain, Germany) fishing in the area in support of the analytical stock assessment. The stock assessment is supported by four fishery independent surveys. Sampling levels for length, age sex and maturity are considered by ICES to be adequate but they have commented that an increase in the biological sampling programme is desirable. Fishery removals are monitored intensively. Estimates have been made of IUU landings in the past, but IUU no longer give cause for concern. The stock assessment is supported by three fishery independent surveys, two bottom trawl and one acoustic survey and by a Russian commercial trawl CPUE index. **Survey** / **Year range** / **Age range (yrs)** Russian bottom trawl survey. Oct/Dec. Q1 / 1991 – last data year / 3-7 (1-7 in predation run) Joint Russian / Norwegian trawl survey. February Q1 / 1990 – last data year / 3-8 (1-8 in predation run) Joint Russian / Norwegian Acoustic survey. February Q1 / 1990 – last data year / 3-7 (1-7 in predation run) Joint Russian / Norwegian Ecosystem survey. Aug/Sept Q3 / 2004 – last data year / 3-8 (1-8 in predation run) Monitoring of landings in support of the TAC control is carried out contemporaneously with the fishery and enforcement action can be introduced quickly. However, there are still some uncertainties in the data sources which need further clarification. For example, there is an ongoing issue over the best method for estimating the catch of coastal cod in this fishery. A new method was introduced by the assessment working group in 2014 which has changed the perception of the proportion coastal cod in the landings in the last two years. This method now needs to be applied to the whole historic time series of landings data. Whilst the uncertainties are not serious enough to affect confidence in the robustness of the current assessment the fishery does not meet the high standard (high degree of certainty) required at the SG 100 level, but fully justifies the SG 80 score.
c	**Guidepost**	There is good information on all other fishery removals from the stock.

	Met?		Y	
	Justification	Landings from all vessels operating in the North East Arctic are well monitored. There is a rigorously enforced total discard ban on all commercial species throughout the North East Arctic. All fish caught must be retained, recorded and landed. In addition, all vessels fishing in the Russian zone must carry a Russian observer. Supporting information in the Norwegian zone is collected through the reference fleet. Estimates of coastal cod catches, which are deducted from Northeast Arctic cod catches, are made post hoc following otolith analysis by IMR. It is recognised that there is a recreational fishery in Norwegian inshore waters. Removals from this stock, by the recreational fishery, are not estimated butare assumed, by the AFWG, not to merit inclusion in ICES stock assessment. Thus, there is good information on all other fishery removals from the stock.			
References		Berg et al, 2005; Bogstad and Mehl, 1997; Bogstad et al 2000; ICES, 2003; ICES, 2007; ICES, 2010a; ICES, 2010c; ICES, 2011a; ICES, 2011c; ICES 2014a; ICES, 2014b; IMR-PINRO _ecosystem survey- 2013.pdf; ; IMR-PINRO _ fish-atlas_2013.pdf; Wheeler, 1969.		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.4 - Norway NEA cod

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost		The assessment is appropriate for the stock and for the harvest control rule.	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.
	Met?		Y	Y
	Justification	The assessment is based on a database going back to 1946. The major contributors to that database over recent years are Norway and Russia but there are also contributions by other countries who currently participate in the fishery or who have participated in the past. The assessment is carried out with an extended survivor analysis model (XSA) which is an analytical assessment model using catch data, biological sampling for length, age, weight and maturity and three fishery independent surveys as tuning indices. The tuning indices provide three separate views on the status of the stock. Their robustness is carefully reviewed annually by the assessment working group and their effect on the eventual stock assessment can be weighted accordingly. This assessment method, and the use of fishery independent data in support, is commonly used by ICES working groups for the assessment of demersal stocks. The assessment in 2014 of the status of the stock in 2013 and the SSB at the beginning of 2014 was an update assessment. The last benchmark assessment, with full data exploration, was in 2010. The available data fully support the analytical assessment which makes the fullest possible use of the abundant biological and environmental data that are relevant to both stock and fishery.		
b	Guidepost	The assessment estimates stock status relative to reference points.		
	Met?	Y		
	Justification	An annual assessment of stock status is carried out by the ICES assessment working group, AFWG. This describes stock status in relation to SSB and F reference points.		
c	Guidepost	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

PI 1.2.4		There is an adequate assessment of the stock status		
	Met?	Y	Y	N
	Justification	Uncertainties are identified by the assessment working group and the potential effect, on the estimation of stock status, evaluated Uncertainties in the catch and survey data have been identified and are given due consideration during the assessment. The related problems and their effect on the assessment are kept under regular review. A number of uncertainties are recognised in the assessment, including IUU landings in the past, changes in the intensity of scientific sampling, apportioning catches of Coastal cod and some uncertainty in the estimation of maturity at age. The strong year classes of 2004 and 2005 have also generated uncertainty in the catchability at age parameter in the assessment model. These uncertainties and their implications for the assessment and management of the stock are minimised by modulating the assessment by reference to indices from three fishery independent surveys, as described in 'a' above, and one commercial cpue data series. Nevertheless, they are not evaluated in a probabilistic way. Thus, the assessment falls short of the standard necessary to fully meet SG100 but does meet the requirement for SG80.		
d	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			Y
	Justification	The continuing increase in the SSB in the stock indicates that the assessment which underpins the harvest strategy and TAC controls is both appropriate and robust. Retrospective patterns do however show that there is a tendency to slightly overestimate fishing mortality whilst the estimates of spawning stock biomass have been fairly consistent over recent years. The main assessment procedures do include consideration and use of alternative models both for comparison and validation of the main model. The assessment method and potential alternatives are also rigorously explored during the regular (approximately every 5 years) benchmark assessments. The methods were also rigorously explored, and use of the current methods endorsed, at an ICES roundfish benchmark workshop in 2011. The next benchmark assessment is due in 2015.		
e	Guidepost		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	Met?		Y	Y

PI 1.2.4		There is an adequate assessment of the stock status
	Justification	The assessment is subject to peer review within JNRFC, AFWG and the ICES advisory committee, ACOM. The assessment of the stock is subject to rigorous annual review at a number of levels. The JNRFC meetings review the assessment independently of ICES, even though many of the same scientists are also members of the AFWG. Within ICES, the stock assessments are subject to internal peer review by the ICES advisory committee ACOM before advice is provided to member states and the JNRFC. ICES also commission occasional periodic reviews of specific stock assessments and its overall assessment methodology for example at the roundfish benchmark workshop in 2011 in which scientists, independent of ICES, participated. Assessments, assessment methods and management procedures and advice are also subject to frequent scrutiny by a range of third parties from the fishing industry itself to a variety of environmental NGOs.
References		ICES, 2002; ICES, 2003 ; ICES, 2009 ; ICES, 2010a; ICES, 2010b; ICES, 2011a; ICES, 2011b ; ICES, 2014a; ICES, 2014b.
OVERALL PERFORMANCE INDICATOR SCORE:		**95**
CONDITION NUMBER (if relevant):		

Principle 1 - Norway North East Arctic haddock

Evaluation Table for PI 1.1.1 – Norway NEA haddock

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	It is likely that the stock is above the point where recruitment would be impaired.	It is highly likely that the stock is above the point where recruitment would be impaired.	There is a high degree of certainty that the stock is above the point where recruitment would be impaired.
	Met?	Y	Y	Y
	Justification	The biomass limit point is set at Bloss, 50kt, the lowest observed level of SSB (1984) and above which there is no evidence of impaired recruitment. SSB in 2011 and 2012 reached peaks in the historic time series, dating back to 1950, of over 400,000t. Although the SSB fell to 342,000t in 2013 and to 254,000t at the start of 2014 it remains well above both the biomass limit and precautionary approach levels. These reference points ensure that the stock is above the biomass limit point, below which recruitment might be impaired, with 95% probability; a high degree of certainty. ICES accepts that the stock is currently at full reproductive capacity and that it is being harvested sustainably.		
b	Guidepost		The stock is at or fluctuating around its target reference point.	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.
	Met?		Y	Y
	Justification	The fishing mortality is currently at 0.29 and has been fluctuating around the target fishing mortality Fmsy and Fmanagement plan (0.35) since 1990. The SSB at the start of 2014 was estimated to be 254,451t which is more than three times the current management plan target, and higher than it was at any time 1950-2010. There is therefore a high degree of certainty (more than 95% probability) that the exploitation is at or about its target reference point of Fmsy and similarly, SSB is well above any level that may give cause for concern.		
References		ICES, 2006b; ICES, 2010c ; ICES, 2011c ; ICES 2014a; ICES 2014c.		

Stock Status relative to Reference Points			
	Type of reference point	Value of reference point	Current stock status relative to reference point
Target reference point	MSY B trigger / SSB management plan (mp); Bpa Fishing mortality Fmsy; (mp) F precautionary app.	Spawning stock biomass: 80,000t F0.35 F0.47	254,451t (2014) Fishing mortality (2013). F 0.29

PI 1.1.1	The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Limit reference point	Biomass limit level Fishing mortality limit	SSB 50,000t F 0.77	254,451t (2014) Fishing mortality (2013). F 0.29
OVERALL PERFORMANCE INDICATOR SCORE:			**100**
CONDITION NUMBER (if relevant):			

Evaluation Table for PI 1.1.2 – Norway NEA haddock

PI 1.1.2		Limit and target reference points are appropriate for the stock		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category.	Reference points are appropriate for the stock and can be estimated.	
	Met?	Y	Y	
	Justification	A raft of appropriate biological reference points, for biomass and fishing mortality have been defined and agreed by the JNRFC since 2004. The reference points meet internationally agreed standards and have been endorsed by ICES as consistent with a precautionary approach to managing the stock and not in contradiction to the maximum sustainable yield (MSY) approach.		
b	**Guidepost**		The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity.	The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues.
	Met?		Y	N
	Justification	The biomass limit point is set at Bloss (50,000t), the lowest observed level of SSB (1984) and above which there is no evidence of impaired recruitment. The fishing mortality reference point Flim of 0.77 is based on SSB per recruit relationship using geometric mean recruitment and Blim. ACOM accepts that there is no standard method for estimating Flim or Fpa but have endorsed this approach by the JNRFC to the estimation of Flim. The Bpa level of 80,000t, set to protect the stock against falling below Blim does take into account uncertainty in the assessment and stock dynamics. However there is no clear evidence that such uncertainty has been taken into account in establishing Blim at Bloss. The approach to establishing Flim, does consider precautionary issues in that it is based on geometric mean recruitment and Blim.		
c	**Guidepost**		The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome.	The target reference point is such that the stock is maintained at a level consistent with B_{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty.
	Met?		Y	Y

PI 1.1.2		Limit and target reference points are appropriate for the stock		
	Justification	The management plan has an agreed target (Fmsy = 0.35), supported by MSY B trigger level (80,000t) in the Harvest control rule. They have been evaluated and endorsed by ICES and are considered not to be in contradiction to the MSY approach. The Bpa level of 80,000t, set to protect the stock against falling below Blim with 95% probability, does take into account uncertainty in the assessment and stock dynamics. This level is also the MSY B trigger level. Environmental factors, in particular predation on haddock, are clearly incorporated into the stock modelling and are considered to be a vital part of the whole management strategy. Variable natural mortality in the assessment, for up to six year old fish, is based on predation on haddock by cod.		
d	Guidepost		For key low trophic level stocks, the target reference point takes into account the ecological role of the stock.	
	Met?		Not relevant	
	Justification	Haddock is not defined as an LTL species nevertheless it is worthy of note that estimates of predation on haddock are taken into account in the estimation of natural mortality in the assessment modelling procedures. An awareness of the role of haddock as a prey item in the arctic ecosystem is also given due consideration in the assessment process (see c above)		
References		Bogstad et al (2000); ICES, 2006b; ICES 2014a; ICES 2014c; IMR-PINRO _ecosystem survey- 2013.pdf		
OVERALL PERFORMANCE INDICATOR SCORE:				90
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.1.3 - Norway NEA haddock

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Where stocks are depleted rebuilding strategies, which have a reasonable expectation of success, are in place.		Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe.
	Met?	(Y/N)		(Y/N)
	Justification	[Note: Insert as much text as required to justify the SG level achieved for this scoring issue]		
b	Guidepost	A rebuilding timeframe is specified for the depleted stock that is the shorter of 30 years or 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.	The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock.
	Met?	(Y/N)	(Y/N)	(Y/N)
	Justification	[Note: Insert as much text as required to justify the SG level achieved for this scoring issue]		
c	Guidepost	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within a specified timeframe.	There is evidence 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 specified timeframe.	
	Met?	(Y/N)	(Y/N)	

PI 1.1.3		Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe
	Justification	[Note: Insert as much text as required to justify the SG level achieved for this scoring issue]
References		[List any references here]
OVERALL PERFORMANCE INDICATOR SCORE:		N/A
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 1.2.1 - Norway NEA haddock

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points.	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.
	Met?	Y	Y	Y
	Justification	The JNRFC management plan was agreed in 2004 and the resultant harvest control rules applied for the first time in setting the quotas for 2005. The plan was modified by the JNRFC in 2007 as a result of an evaluation of the harvest control rule by ICES. The plan is firmly linked to the established target and limit reference points.The overarching management plan which drives the harvest strategy is clearly designed to be responsive to the current status of the stock and to maintain fishing mortality and SSB at levels which support the maximum sustainable yield. For example the TAC is set at a level corresponding to Fmsy and the plan embraces action points for managers linked to Bpa and designed to maintain the SSB above the biomass limit point. The strategy also incorporates SSB and F precautionary levels which are designed to maintain the stock above the biomass limit level with a 95% probability. This strategy does take into account uncertainty in the assessment and in the stock dynamics. The strategy is clearly achieving its objectives as evidenced by the current levels of SSB and F.		
b	**Guidepost**	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	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.
	Met?	Y	Y	Y

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
	Justification	The design and main features of the management plan which underpins the harvest strategy is typical of many such management plans evaluated and endorsed by ICES as being in accordance with the precautionary approach. As such it is likely to work based on –prior experience and plausible argument. The harvest strategy is clearly working with fishing mortality well below current Flim for most of the historic time series, below Fpa since 2006 and fluctuating around Fmsy since 2008. SSB has been well above precautionary levels since 1989. The harvest strategy based on the current management plan has been in force since 2004. It has been tested and resultant modifications made and evaluated. The strategy has clearly achieved its objectives in terms of maintaining SSB above MSY B trigger and fishing mortality below Fpa. This provides strong evidence that the harvest strategy is working with the stock being harvested sustainably and maintained at full reproductive capacity. In determining their annual advice the ICES advisory committee (ACOM) take into account the assessment working group's estimations of current stock status in relation to the MSY and management plan target levels. The annual TAC is based on MSY fishing mortality. This approach by ICES which is reviewed and endorsed by the JNRFC clearly constitutes an annual evaluation of the performance and success of the harvest strategy. Furthermore the strategy, in the form of the plan itself, is subject to regular, rigorous evaluation and where necessary modification, by ICES. For an example the plan was modified in 2007 from a three year rule to a one year rule on the basis of the harvest control rule evaluation conducted by ICES. The modified plan was evaluated by ICES who endorsed the change as being in agreement with the precautionary approach and not in contradiction to the MSY approach. The levels of SSB and F, since the management plan was introduced in 2004, clearly show that the strategy is achieving its objectives in terms of the reference point target levels for SSB and F. The ICES evaluation of current stock status is that the stock is being harvested sustainably and has full reproductive capacity. Fishing mortality is below MSY target and SSB is above the MSY trigger and management plan level. This provides strong evidence that the strategy is achieving its objectives and is clearly able to maintain stocks at target levels.		
c	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	There is a comprehensive IMR-PINRO stock monitoring and assessment programme in place that includes environmental, biological and acoustic surveys, plus rigorous fishery monitoring, control and surveillance that lead to an annual evaluation of the success of the harvest strategy. The fishery based monitoring programme is strongly supported by appropriate fishery independent surveys. ICES publishes an annual evaluation of current stock status in relation to fishing mortality at Fmsy, the precautionary approach Fpa and Flim and F management plan levels. For the stock biomass the evaluation is provided in relation to MSY B trigger, the precautionary approach Bpa and Blim levels and the SSB management plan level. This evaluation clearly demonstrates whether or not the harvest strategy is working.		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
d	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			Y
	Justification	The management plan, which is the basis of the harvest strategy, was established by the JNRFC in 2004. In 2007 the plan was modified from a three year to a one year rule which introduced an improvement in terms greater stability in managing the stock. The modified plan was evaluated by ICES who endorsed the change as being in agreement with the precautionary approach to managing the stock and not in contradiction to the MSY approach. The management plan is kept under constant review by the JNRFC and modifications implemented as necessary as in 2011 when both Flim and Fpa were revised. ICES have agreed that the current plan should remain in force until 2015 when they will re-evaluate it. The agreed HCR for haddock with the latest modifications is as follows: (Protocol of the 40th Session of The Joint Norwegian Russian Fishery Commission, 14 October 2011): *– TAC for the next year will be set at level corresponding to Fmsy.* *– The TAC should not be changed by more than +/- 25% compared with the previous year TAC.* *– If the spawning stock falls below Bpa, the procedure for establishing TAC should be based on a fishing mortality that is linearly reduced from Fmsy at Bpa to F= 0 at SSB equal to zero. At SSB-levels below Bpa in any of the operational years (current year and a year ahead) there should be no limitations on the year to-year variations in TAC.*		
e	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	(Not relevant)	(Not relevant)	(Not relevant)
	Justification			
References		ICES, 2006b; ICES, 2007; ICES, 2010b; ICES, 2010c; ICES, 2011b; ICES, 2011c; ICES, 2014a; ICES, 2014c		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.2 - Norway NEA haddock

PI 1.2.2		There are well defined and effective harvest control rules in place		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Generally understood harvest 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.	Well defined 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.	
	Met?	Y	Y	
	Justification	The current strategy is to set an annual TAC, based on managing the stock in accordance with the agreed JNRFC management plan. The annual TAC is firmly based on the predicted catch corresponding to the ICES advice to apply the management plan. That plan is firmly based on managing the stock according to the agreed target and limit reference points for SSB and F. This is supported by a raft of technical and conservation measures The TAC control rules, introduced in 1987, together with other conservation measures have maintained the SSB, of the Northeast Arctic haddock stock, above the current JNRFC management plan $MSYB_{trigger}$ of 80,000t since 1989. Fishing mortality has only been marginally above the precautionary approach level (F0.47) on two occasions (1997, 2005) since 1989 and has fluctuated around the management plan target and MSY trigger level (F0.35) since 1998. The harvest strategy has clear rules which effectively reduce the annual TAC if target and limit reference points for SSB or F are approached. The current rule dictates that if SSB falls below the precautionary approach level then the fishing mortality, on which the annual TAC is based, must be linearly reduced from Fmsy at Bpa to zero at SSB zero. This rule is clearly aimed at appropriate reductions in the exploitation rate to avoid the stock falling below the biomass limit level. The strategy is clearly designed to set the annual TAC at a level consistent with maintaining the SSB above, and the fishing mortality below, the management plan and MSY triggers. The strategy is strongly supported by appropriate technical measures including mesh size restrictions, minimum landing size, maximum by-catch of undersized fish, area closures when juvenile density is high and other area and seasonal restrictions.		
b	**Guidepost**		The selection of the harvest control rules takes into account the main uncertainties.	The design of the harvest control rules takes into account a wide range of uncertainties.
	Met?		Y	Y

PI 1.2.2		There are well defined and effective harvest control rules in place		
	Justification	The main uncertainties affecting the harvest control rule are the reliability of the annual stock assessment in estimating current SSB and fishing mortality. The major problem, prior to 2001, was estimating the extent of IUU landings. The issue of IUU landings has been addressed and is now formalized within the 2009 FAO Port State Measures Agreements and increased surveillance. ICES now consider the level of IUU landings to be negligible. These main uncertainties have been taken into account when selecting the current harvest rulesfor setting the annual TAC. Assessment uncertainty and stock dynamics have been taken into account in the calculation of reference points which firmly underpins the harvest strategy and the harvest control rules which the strategy generates. There are still some issues relating to the estimation of discarding which is known to occur in the long line and trawl fisheries. Scientific sampling of the catches at landing and by observers at sea has been declining. The precautionary nature of the whole harvest strategy and in particular the reference points which drive it do take into account these inherent uncertainties. The raft of technical measures, targeted at the protection of juveniles, clearly recognizes the natural volatility of haddock year class strength. The technical measures are clearly designed to ensure sustainable recruitment to the fishable stock and subsequent spawning stock biomass.		
c	Guidepost	There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules.	Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules.
	Met?	Y	Y	Y
	Justification	Monitoring, control and surveillance of the catches and landings has been working effectively in this fishery for many years. The problem of illegal, unreported and unregulated landings was addressed and is since 2009 considered by ICES to be negligible. Evidence of the success of the tools used to monitor and control the TAC can be seen in the close agreement, since 2009, between the agreed TAC, official landing statistics and the ICES working group estimate of total catches used for the assessment. Further evidence of the effectiveness of the tools used to control exploitation is the current high level of SSB. This has increased from just below the current management plan, MSY B trigger level of 80,000t in 1988 to over four times that level between 2011 and 2013 and remaining at over three times that level at the beginning of 2014. Fishing mortality has only been marginally above the precautionary approach level (F0.47) on two occasions (1997, 2005) since 1989 and has fluctuated around the management plan target and MSY target level (F0.35) since 2006.		
References		ICES, 2006b ; ICES, 2007; ICES, 2010c; ICES, 2011c; ICES, 2014a; ICES, 2014c		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 1.2.3 - Norway NEA haddock

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	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 related to the current harvest strategy, is available.
	Met?	Y	Y	Y
	Justification	The Northeast Arctic haddock is a major component in the much larger cod fishery. In that context it benefits from the comprehensive knowledge on the structure of the fleets exploiting that resource both past and present. Both species have been the target of national research programmes in Norway and Russia and other countries, in particular the UK, who in the past have had a significant fishery interest in the area. This research effort has provided relevant information on stock structure, stock productivity, ecosystem aspects and fleet composition in support of the harvest strategy. The research has generated a fund of appropriate knowledge, on stock structure, spawning and spawning migrations, seasonal distributions and stock productivity, which supports the current harvest strategy. This includes knowledge of gear types and gear configurations in use throughout the fishery There are also some directed long line fisheries for haddock in particular when the stock biomass is high. These data are regularly reviewed and updated by the ICES working group in the Northeast Arctic haddock stock annexe. Information on cod predation on haddock, up to six years old, is used in an age variable natural mortality relationshipfor haddock in the stock assessment process. In addition to the basic data needed for an analytical stock assessment in support of a harvest strategy there are additional environmental data collected on the annual IMR-PINRO ecosystem survey. This survey together with the three trawl surveys provide information on the role of haddock both as a predator and prey item in the Arctic ecosystem. Temperature data provide a valuable insight into the effect of bottom temperatures on survival of haddock through their first and second years. These data are useful in helping to predict the strength of a year class about to enter the fishery although it is recognised that the age structure of the spawning biomass also has an effect. The range of information, described above, both directly related to the current harvest strategy and other related information collected, is considered to be comprehensive.		

PI 1.2.3		Relevant information is collected to support the harvest strategy		
b	**Guidepost**	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.	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.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Y	Y	N

PI 1.2.3		Relevant information is collected to support the harvest strategy		
	Justification	Basic landings data is provided by all countries participating in the Northeast Arctic haddock fishery. Principally, the basic biological data are gathered by Norway and Russia. Although all vessels carry observers in the Russian zone, only observers on Russian vessels undertake biological sampling. Some additional information is provided by some of the nations (Spain, Germany) fishing in the area in support of the analytical stock assessment. The stock assessment is supported by four fishery independent surveys. Sampling levels for length, age sex and maturity are considered by ICES to be adequate but noted that in recent years there has been a lack of samples from some gears / areas / seasons and that an increase in the biological sampling programme is desirable. Fishery removals are monitored intensively. Estimates have been made of IUU landings in the past, but IUU no longer give cause for concern. The stock assessment is supported by three fishery independent surveys, two bottom trawl and one acoustic survey and by a Russian commercial trawl CPUE index. Data from these surveys provide fishery independent indices on stock status and are used to modulate the information direct from the fishery. These fishery independent data are carefully examined and reviewed at each assessment and their effect can if deemed necessary, be down weighted. **Survey** / **Year range** / **Age range (yrs)** Russian bottom trawl survey. Oct/Dec. Q1 / 1991 – last data year / 3-7 (1-7 in predation run) Joint Russian / Norwegian trawl survey. February Q1 / 1990 – last data year / 3-8 (1-8 in predation run) Joint Russian / Norwegian Acoustic survey. February Q1 / 1990 – last data year / 3-7 (1-7 in predation run) Joint Russian / Norwegian Ecosystem survey. Aug/Sept Q3 / 2004 – last data year / 3-8 (1-8 in predation run) All the relevant information required for carrying out an annual stock assessment is appropriately monitored. Monitoring of landings in support of the TAC control is carried out contemporaneously with the fishery and enforcement action can be introduced quickly. There are still some uncertainties in the data sources relating to both catch and survey data which need further clarification. There are concerns about a declining level of scientific sampling of catches both in Norway and Russia. This can affect the precision of the basic input data used in the assessment and the quality of the final output. There is a good understanding of these uncertainties in relation to most of the data required in support of the harvest control rule and they are not considered serious enough to affect the robustness of the assessment. Whilst the uncertainties are not serious enough to affect confidence in the robustness of the current assessment the fishery does not meet the high standard (high degree of certainty) required at the SG 100 level, but fully justifies the SG 80 score.		
c	Guidepost		There is good information on all other fishery removals from the stock.	
	Met?		Y	

PI 1.2.3		Relevant information is collected to support the harvest strategy
	Justification	Landings from all vessels operating in the North East Arctic are well monitored. There is a rigorously enforced total discard ban on all commercial species throughout the North East Arctic. All fish caught must be retained, recorded and landed. In addition, all vessels fishing in the Russian zone must carry a Russian observer; supporting information in the Norwegian zone is collected through the reference fleet. Thus, there is good information on all other fishery removals from the stock.
References		Berg et al, 2005; Bogstad and Mehl, 1997; Bogstad et al 2000; ICES, 2006b; ICES, 2007; ICES, 2010c; ICES, 2011a; ICES, 2011b; ICES, 2011c; ICES 2014a; ICES, 2014c; IMR-PINRO _ecosystem survey- 2013.pdf; ; IMR-PINRO _ fish-atlas_2013.pdf; Russell , 1976; Wheeler, 1969.
OVERALL PERFORMANCE INDICATOR SCORE:		**90**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 1.2.4 - Norway NEA haddock

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**		The assessment is appropriate for the stock and for the harvest control rule.	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.
	Met?		Y	Y
	Justification	The assessment method is an extended survivor analysis (XSA) using data from the fishery and tuning indices from four fishery independent surveys. This assessment method is commonly used by ICES for the assessment of demersal stocks. The method is considered by ICES and independent reviewers to be appropriate for this stock and this fishery. The outputs from the assessment provide appropriate information on biomass and fishing mortality for the harvest control rule. The assessment is based on a database going back to 1950 for all parameters except weight at age in the stock which goes back to 1983. The major contributors to that historic database are Norway and Russia and, up to the late 1970s, the UK. The assessment in 2014 of the status of the stock in 2013 was an update assessment. The last benchmark assessment, with full data exploration, was in January 2011 on the status of the stock in 2010. The next benchmark assessment is due in January 2015. The available data fully support the analytical assessment which makes the fullest possible use of the abundant biological and environmental data from the fishery and surveys. The role of haddock in the arctic ecosystem, both as predator and prey item, is taken into account in the assessment process. An awareness of the natural volatility of haddock recruitment is also a feature of the assessment process and resultant advice on future stock status. Predation on haddock, up to six years old, by cod is taken into account in an age variable natural mortality relationship.		
b	**Guidepost**	The assessment estimates stock status relative to reference points.		
	Met?	Y		
	Justification	An annual assessment of stock status is carried out by the ICES assessment working group, AFWG. This describes stock status in relation to SSB and F reference points.		
c	**Guidepost**	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.

PI 1.2.4		There is an adequate assessment of the stock status		
	Met?	Y	Y	N
	Justification	The major sources of uncertainty are identified and listed by the assessment working group and the potential effect, on the estimation of stock status is evaluated. The uncertainties identified in the catch and survey data are given due consideration during the assessment. The related problems and their effect on the assessment are kept under constant review. The four fishery independent surveys are important in modulating the potential effects of all the assessment uncertainty. All these potential sources of uncertainty are clearly identified each year by the AFWG as a routine part of the assessment process. In the most recent assessment the working group highlighted the problems of incomplete survey coverage affecting some of the fishery independent data. They also noted the unknown level of discarding which is known to occur in parts of the fishery but which is not recorded. Unreported catches and landings are a problem in the historic data series but the problem is considered to be diminishing with time as the practice is reported to have been eliminated. It is a unique feature of this assessment that predation on haddock by cod is incorporated into the estimates of total mortality in the assessment. However the working group notes that there is uncertainty related to these estimates. Sampling error both on the catch data and on surveys affects the precision of the estimates of catch at age. The problem is exacerbated by a notable decrease in scientific sampling levels both by Norway and Russia. All these uncertainties are taken into account and kept under regular review and carefully documented in the annual AFWG report advice on the stock status from the ICES advisory committee (ACOM). The results of the annual stock assessment and subsequent advice from ACOM is always expressed in relation to relevant reference points for SSB and F which can be directly related to the management plan. The uncertainties and their implications for the assessment and management of the stock are minimised by modulating the assessment by reference to indices from three fishery independent surveys, as described in 'a' above, and one commercial cpue data series. Nevertheless, they are not evaluated in a probabilistic way. Thus, the assessment falls short of the standard necessary to fully meet SG100 but does meet the requirement for SG80.		
d	**Guidepost**			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			Y

PI 1.2.4		There is an adequate assessment of the stock status		
	Justification	The continuing increase in the SSB in the stock indicates that the assessment which underpins the harvest strategy and TAC controls is both appropriate and robust. Retrospective patterns for SSB and F are good and show that there is only a slight tendency to overestimate fishing mortality. The periodic benchmark assessments do carefully explore the data sources and make recommendations on changes to XSA settings. Norway has started to test out the haddock assessment using a 'state space' model SAM and presented the results of running the model at the 2014 working group meeting. This is a statistical catch-at-age model now used by ICES for the assessment of a number of other stocks. The 'state space' modelling approach has a number of highly desirable characteristics which include stochastic treatment of all observations and a full statistical framework for evaluating the model results. This and other alternative assessment models will be investigated in the next benchmark meeting (2015).		
e	Guidepost		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	Met?		Y	Y
	Justification	The assessment is subject to peer review within JNRFC, AFWG and the ICES advisory committee, ACOM. The assessment of the stock is subject to rigorous annual review at a number of levels. The JNRFC meetings review the assessment independently of ICES, even though many of the same scientists are also members of the AFWG. Within ICES, the stock assessments are subject to internal peer review by the ICES advisory committee ACOM before advice is provided to member states and the JNRFC. ICES also commission occasional periodic reviews of specific stock assessments and its overall assessment methodology for example at the roundfish benchmark workshop in 2011 in which scientists, independent of ICES, participated. Assessments, assessment methods and management procedures and advice are also subject to frequent scrutiny by a range of third parties from the fishing industry itself to a variety of environmental NGOs.		
References		Fryer, 2002; Gudmundssson, 1994; Neilsen et al 2012; ICES, 2006b; ICES, 2009; ICES, 2010b; ICES, 2011b; ICES, 2012b; ICES, 2013b; ICES, 2014a; ICES, 2014c		

OVERALL PERFORMANCE INDICATOR SCORE:	**95**
CONDITION NUMBER (if relevant):	

Principle 2 – Norway NEA cod and haddock

Evaluation Table for PI 2.1.1: Norway NEA cod - trawl, Danish seine, jiggers

PI 2.1.1		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		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).	Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).	There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.
	Met?	Y	Y	N

PI 2.1.1		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
	Justification	All commercial species of fish must be retained, recorded and landed; hence, all commercial demersal species qualify as retained species. The weights of each species caught are shown in Table 17 and Table 18 above, which shows that across the fishery cod, haddock and saithe account for 90% the total catch and it is their status that is used to bias the assessment but without ignoring other species where appropriate. Many are caught in such small quantities relative to the total that only those contributing >0.1% the total catch of demersal species are identified and discussed specifically; for those species where the catch is <0.1% of the total it is assumed that the fishery will not have any adverse effect with respect to biological limits or stock rebuilding. The three-year (2011–13) mean catch of all demersal species was 707 149 t of which cod contributed 382 457 t (54% of the total catch), including coastal cod. Coastal cod are an inseparable stock treated here as a retained species. Only haddock and saithe meet the criterion for main retained species. Other retained species comprise: tusk, ling, Greenland halibut, three species of wolffish (assumed to be caught in equal quantities), two species of redfish (but assumed to be predominantly beaked redfish (*Sebastes mentella*), anglerfish, Atlantic halibut, lumpfish, pollack, European hake and European plaice. For more than 5 years the **NEA haddock** stock is subject to an age-structured analytical (XSA) assessment. There is a species management plan and harvest control rules that ICES considers to be consistent with the precautionary and MSY approach. The stock has been at higher levels than at any other time for which records are available (almost 70 years). Haddock recruitment is typical of all haddock stocks, showing prolonged periods of low recruitment interspersed with the occasional high recruitment. There were two extremely strong year classes a decade ago that boosted stock biomass but their effect is now waning and biomass is now declining. Nevertheless, the stock maintains full reproductive capacity and recent recruitment has been better than the extreme lows of the early 1980s. Thus, all the indicators support a high degree of certainty that the NE haddock stock is above the point where recruitment would be impaired. ICES considers the stock to retain full reproductive capacity and that it is being exploited sustainably. The current state of the **NEA saithe** stock is subject to a state–space assessment model (SAM), using data from a Norwegian scientific acoustic survey to refine and validate the stock analysis. There is a species management plan and harvest control rules that ICES considers to be consistent with the precautionary approach. The assessment is less robust than is either the cod or haddock but it is highly likely that SSB is within biological limits: SSB is $>B_{pa}$ and fishing mortality is $\approx F_{pa}$. The stock retains full reproductive capacity and is above the management plan $B_{trigger}$. **Coastal cod** are subject to a scientific research vessel survey trends based assessment; there are no stock-specific reference points. The survey indicates that the SSB is close to its lowest value. Recruitment has remained low in recent years and F appears variable without a clear trend since 2000. A stock rebuilding plan defined by the Norwegian authorities was provisionally endorsed by ICES in 2010 as being consistent with the precautionary approach ($ACOM_{coast}$, 2014).[128]. The three-year mean estimate (2011–13) of commercial catch of coastal cod *c.* 28 000 (AFWG, 2014; *i.e. c.* 4% of total demersal fish catch), but the AFWG makes the explicit point that this is probably an over estimate owing to inherent sampling bias. By definition, it is probable that the pre cent coastal cod in the catches of inshore (static gear and jigger) vessels is greater than 4% (i.e. >5%, hence, a main retained species) but there are no data to confirm that this is the case. The combined (all gears) annual catch of **redfish** (2 spp.) by all fleets is *c.* 6000 t. The fishing mortality rate for **beaked redfish** (*Sebastes mentella*) is deemed to be "below any relevant reference point" but the status of **golden redfish** (*S. norvegicus*, previously *S. marinus*) is that the stock is depleted and there should be no directed fishing. There are species-specific management measures in place to minimise capture of redfishes.

[128] $ACOM_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3.

PI 2.1.1		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
		These include a ban on directed fishing other by licensed longline and gillnet vessels taking part in specific, designated seasonal fisheries and move-on rules where individual bycatch exceeds minimal permitted thresholds. (NB as both species appear on the Norwegian redlist they are given further consideration as ETP species.) International landings of **Greenland halibut** have been relatively stable for almost twenty years. The stock is subject to a CPUE trends-based assessment, which has shown a stable–positive trend since the mid 1990s, from which it might be inferred that recruitment is not impaired. It is anticipated that the stock will be subject to an analytical assessment from 2015. There are species-specific management measures in place to minimise capture of Greenland halibut. As with Greenland halibut**, ling** is subject to a CPUE trends-based assessment that has shown a strong positive trend since 2000, from which it might be inferred that recruitment is not impaired. The same data set is used for **tusk** with a similar picture and conclusions. **Wolffish** are not subject to ICES assessment but their distribution and abundance is monitored as part of the annual JNRFC Barents Sea (and Norwegian coastal) trawl surveys. The frequent presence of juveniles in the Barents Sea surveys, with higher abundance indices in 2013 than 2012, suggests that there is not a problem with recruitment. Russian estimates of biomass in the Barents Sea have indicated an increasing trend in recent years. **Anglerfish**, in Norway, are taken almost exclusively in a large-meshed gillnet fishery targeting fish over 60 cm. Catches of anglerfish from the NE Arctic are assumed to be part of a wider NE Atlantic stock; there is neither assessment nor advice specific to the Norwegian or Barents Seas. The stock west of Scotland is subject to a trends-based assessment using abundance indices from directed Irish and Scottish anglerfish surveys that show a positive trend in abundance and relatively stable biomass. There are no management plans or specific objectives for this fishery. Two very strong year classes 2007–08 helped boost the **European hake** stock to twice is previous highest observed level and this should be helped by another two very stong incoming year classes (2012 – 13). Although fishing mortality rate is still (slightly) above target, F has fallen from a peak in the 1990s (F = ~1.1) to little more than F_{MSY} (0.27). The stock is subject to an E.U. recovery plan that incorporates HCR based on a suite of defined biological reference points. The plan has been reviewed by ICES and although the stock retains full reproductive capacity and is above MSY $B_{trigger}$, it has expressed the view that the reference points are no longer appropriate. The assessment methodology, protocols and reference points will be subject to a benchmark review during 2014 ($ACOM_{hake}$, 2014).[129] **Blue ling** is a deep-water species found along the shelf edge from the SW Barents Sea, southwards past the west of the British Isles. It is subject to a trends based assessment but there are no biological reference points, management plans or HCRs. ICES advice is that "there should be no directed fisheries for blue ling, and a reduction in bycatches should be considered until the scientific information is sufficient to prove the fishery sustainable. Measures should be implemented to minimize the bycatch. Closed areas to protect spawning aggregations should be maintained and expanded where appropriate". At present there are no closed areas for this species in Norwegian waters; the total quantity caught by Norwegian vessels (138 t, three-year average 2011–13) may appear trivial, and is within the annual quota limit of 150 t, but it is virtually the total catch of this species in the NE Arctic. In common with many other retained species, **European plaice** (which is at the northern limits of its distribution in NEA waters) is caught in small quantities (Tables 16 & 17) and is not subject to specific monitoring or assessment. By implication, it is assumed by all concerned that the fishery does not pose a specific threat and that the stock is within safe biological limits.

[129] $ACOM_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10

PI 2.1.1		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		
b	Guidepost			Target reference points are defined for retained species.
	Met ?			N
	Justification	Target reference points have been defined for both NEA haddock, NEA saithe, northern hake: Two reference points are defined for beaked redfish *S. mentella*: F_{target} = 0.039 and $B_{trigger}$ 16 000 t. At present there are no target reference points for other retained species		
c	Guidepost	If main retained species are 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 main retained species are 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.	
	Met ?	Y	Y	
	Justification	The main retained species, haddock and saithe, are within the limits of all defined target reference points and there is a strategy in place (management plan and HCR) aimed at maintaining that status.		
d	Guidepost	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.		
	Met ?	Y		

		Haddock	Saithe	Hake
Management plan	SSB_{MP}	80 000 t	220 000 t	
	F_{MP}	0.35	0.32	
MSY approach	MSY $B_{trigger}$	80 000 t	Not defined	46 200 t
	F_{MSY}	0.35	Not defined	0.27
Precautionary approach	B_{lim}	50 000 t	136 000 t	33 000 t
	B_{pa}	80 000 t	220 000 t	46 200 t
	F_{lim}	0.77	0.58	
	F_{pa}	0.47	0.35	

PI 2.1.1	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
Justification	There are a wide suite of measures in place throughout Russian–Norwegian waters to safeguard all retained species, not only those whose status is know. There are real-time closure rules and regulations to safeguard aggregations of both juveniles of most species and aggregations of depleted species such as redfish, Greenland and Atlantic halibut. Where such species are taken as bycatch, there are stringent bycatch regulations in place to minimise the risk of cryptic targeting of the species. The regulations on which gears can be used where and under what circumstances are particularly rigorous in the fjords and coastal waters. The measures to safeguard and optimise the recovery of coastal cod are subject to frequent revision and the efficacy of such measures are reviewed annually by the AFWG.
References	$ACOM_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3. $ACOM_{neac}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Northeast Arctic cod). ICES Advice Book 3.3.2. $ACOM_{gh}$, 2014. Barents Sea and Norwegian Sea: Greenland halibut in Subareas I and II. ICES Advice Book 3.3.5. $ACOM_{ling}$, 2014. Widely distributed and migratory stocks: ling in Subareas I and II. ICES Advice Book 9.3.15.1. $ACOM_{neah}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic haddock (subareas I and II). ICES Advice Book 3.3.4. $ACOM_{neas}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic saithe (subareas I and II). ICES Advice Book 3.3.8. $ACOM_{smen}$, 2014. Ecoregion Barents Sea and Norwegian Sea: beaked redfish (*Sebastes mentella*) in subareas I and II. ICES Advice Book 3.3.6. $ACOM_{snor}$, 2014. Ecoregion Barents Sea and Norwegian Sea: golden redfish (*Sebastes marinus*) in subareas I and II. ICES Advice Book 3.3.7. $ACOM_{tusk}$, 2014. Widely distributed and migratory stocks: tusk in Subareas I and II. ICES Advice Book 9.3.29.1. AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. WGDEEP, 2014. Report of the Working Group on Biology and Assessment of Deep-sea Fisheries Resources. ICES CM 2014/ACOM:17 Gullestad, P., 2013. The "Discard Ban Package" – Norwegian experiences in efforts to improve fisheries exploitation patterns. http://www.fisheries.no/PageFiles/21748/HSM/pdf_vedlegg/Norwegian%20discard%20policy.pdf Minimum sizes: http://www.fisheries.no/PageFiles/371353/minstemalstabell-eng-04022011_1_.pdf Directorate of Fisheries: http://www.fiskeridir.no/english/fisheries JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea ACOMmonk, 2014. Celtic Sea and West of Scotland + North Sea – Anglerfish (*Lophius piscatorius* and *L. budegassa*) in Division IIIa, and Subareas IV and VI. ICES Advice Book 5.3.2. $ACOM_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10 WGDEEP, 2014. Report of the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources. ICES CM 2014/ACOM:17. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.

PI 2.1.1	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
OVERALL PERFORMANCE INDICATOR SCORE:	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.1.1: Norway NEA cod Gillnet & Longline

PI 2.1.1		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).	Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).	There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.
	Met?	Y	Y	N
	Justification	All commercial species of fish must be retained, recorded and landed; hence, all commercial demersal species qualify as retained species. The weights of each species caught are shown in Table 17 and Table 18 above, which shows that across the fishery cod, haddock and saithe account for 80% the total catch and it is their status that is used to bias the assessment but without ignoring other species, in particular tusk, where appropriate. Many are caught in such small quantities relative to the total that only those contributing >0.1% the total catch of demersal species are identified and discussed specifically; for those species where the catch is <0.1% of the total it is assumed that the fishery will not have any adverse effect with respect to biological limits or stock rebuilding. The three-year (2011–13) mean catch of all demersal species was 707 149 t of which cod contributed 382 457 t (54% of the total catch), including coastal cod. Coastal cod are an inseparable stock treated here as a retained species. Only haddock meets the criterion for main retained species. Other retained species comprise: saithe, ling, Greenland halibut, three species of wolffish (assumed to be caught in equal quantities), two species of redfish (but assumed to be predominantly beaked redfish (*Sebastes mentella*), anglerfish, Atlantic halibut, lumpfish, pollack, European hake and European plaice. For more than 5 years the **NEA haddock** stock is subject to an age-structured analytical (XSA) assessment. There is a species management plan and harvest control rules that ICES considers to be consistent with the precautionary and MSY approach. The stock has been at higher levels than at any other time for which records are available (almost 70 years). Haddock recruitment is typical of all haddock stocks, showing prolonged periods of low recruitment interspersed with the occasional high recruitment. There were two extremely strong year classes a decade ago that boosted stock biomass but their effect is now waning and biomass is now declining. Nevertheless, the stock maintains full reproductive capacity and recent recruitment has been better than the extreme lows of the early 1980s. Thus, all the indicators support a high degree of certainty that the NE haddock stock is above the point where recruitment would be impaired. ICES considers the stock to retain full reproductive capacity and that it is being exploited sustainably. The current state of the **NEA saithe** stock is subject to a state–space assessment model SAM, using data from a Norwegian scientific acoustic survey to refine and validate the stock analysis. There is a species management plan and harvest control rules that ICES considers to be consistent with the precautionary approach. The assessment is less robust than is either the cod or haddock but it is highly likely that SSB is within biological limits: SSB is $>B_{pa}$ and fishing mortality is $\approx F_{pa}$. The stock retains full reproductive capacity and is above the management plan $B_{trigger}$.		

PI 2.1.1		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
		Coastal cod are subject to a scientific research vessel survey trends based assessment; there are no stock-specific reference points. The survey indicates that the SSB is close to its lowest value. Recruitment has remained low in recent years and F appears variable without a clear trend since 2000. A stock rebuilding plan defined by the Norwegian authorities was provisionally endorsed by ICES in 2010 as being consistent with the precautionary approach ($ACOM_{coast}$, 2014).[130]. The three-year mean estimate (2011–13) of commercial catch of coastal cod *c.* 28 000 (AFWG, 2014; *i.e. c.* 4% of total demersal fish catch), but the AFWG makes the explicit point that this is probably an over estimate owing to inherent sampling bias. By definition, it is probable that the pre cent coastal cod in the catches of inshore (static gear and jigger) vessels is greater than 4% (i.e. >5%, hence, a main retained species) but there are no data to confirm that this is the case. The combined annual catch of redfish by this fleet is *c.* 4 t. There are species-specific management measures in place to minimise capture of redfishes.The fishing mortality rate for **beaked redfish** (*Sebastes mentella*) is deemed to be "below any relevant reference point" and stock status is expected to improve, albeit not in the immediate future (as it will take some time for the recent strong year classes to recruit to the spawning stock). The status of **golden redfish** (*S. norvegicus*, previously *S. marinus*) is that the stock is depleted and there should be no directed fishing. These include a ban on directed fishing other by licensed longline and gillnet vessels taking part in specific, designated seasonal fisheries (*i.e.* separate from the cod fishery) that take the greater part of the total catch: *c.* 6000 t pa. In the non-target fisheries move-on rules apply where redfish bycatch exceeds minimal permitted thresholds. There are practical limits as to what might be done within the directed cod and haddock fisheries to enhance golden redfish stock rebuilding but IMR supports the ICES recommendation that directed fisheries should cease. (NB as both species appear on the Norwegian redlist they are given further consideration as ETP species.) International landings of **Greenland halibut** have been relatively stable for almost twenty years. The stock is subject to a CPUE trends-based assessment, which has shown a stable–positive trend since the mid 1990s, from which it might be inferred that recruitment is not impaired. It is anticipated that the stock will be subject to an analytical assessment from 2015. There are species-specific management measures in place to minimise capture of Greenland halibut. As with Greenland halibut**, ling** is subject to a CPUE trends-based assessment that has shown a strong positive trend since 2000, from which it might be inferred that recruitment is not impaired. The **tusk** stock is subject to a CPUE trends-based assessment, which has shown a stable–positive trend since the mid 1990s, from which it might be inferred that recruitment is not impaired. There are neither reference points nor a management plan.

[130] $ACOM_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3.

PI 2.1.1		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		
		Wolffish are not subject to ICES assessment but their distribution and abundance is monitored as part of the annual JNRFC Barents Sea (and Norwegian coastal) trawl surveys. The frequent presence of juveniles in the Barents Sea surveys, with higher abundance indices in 2013 than 2012, suggests that there is not a problem with recruitment. Russian estimates of biomass in the Barents Sea have indicated an increasing trend in recent years. **Anglerfish**, in Norway, are taken almost exclusively in a large-meshed gillnet fishery targeting fish over 60 cm. Catches of anglerfish from the NE Arctic are assumed to be part of a wider NE Atlantic stock; there is neither assessment nor advice specific to the Norwegian or Barents Seas. The stock west of Scotland is subject to a trends-based assessment using abundance indices from directed Irish and Scottish anglerfish surveys that show a positive trend in abundance and relatively stable biomass. There are no management plans or specific objectives for this fishery. Two very strong year classes 2007–08 helped boost the **European hake** stock to twice is previous highest observed level and this should be helped by another two very stong incoming year classes (2012 – 13). Although fishing mortality rate is still (slightly) above target, F has fallen from a peak in the 1990s (F = ~1.1) to little more than F_{MSY} (0.27). The stock is subject to an E.U. recovery plan that incorporates HCR based on a suite of defined biological reference points. The plan has been reviewed by ICES and although the stock retains full reproductive capacity and is above MSY $B_{trigger}$, it has expressed the view that the reference points are no longer appropriate. The assessment methodology, protocols and reference points will be subject to a benchmark review during 2014 ($ACOM_{hake}$, 2014).[131] **Blue ling** is a deep-water species found along the shelf edge from the SW Barents Sea, southwards past the west of the British Isles. It is subject to a trends based assessment but there are no biological reference points, management plans or HCRs. ICES advice is that "there should be no directed fisheries for blue ling, and a reduction in bycatches should be considered until the scientific information is sufficient to prove the fishery sustainable. Measures should be implemented to minimize the bycatch. Closed areas to protect spawning aggregations should be maintained and expanded where appropriate". At present there are no closed areas for this species in Norwegian waters; the total quantity caught by Norwegian vessels (138 t, three-year average 2011–13) may appear trivial, and is within the annual quota limit of 150 t, but it is virtually the total catch of this species in the NE Arctic. In common with many other retained species, **European plaice** (which is at the northern limits of its distribution in NEA waters) is caught in trivial quantities (Tables 16 & 17) and is not subject to specific monitoring or assessment. By implication, it is assumed by all concerned that the fishery does not pose a specific threat and that the stock is with safe biological limits.		
b	**Guidepost**			Target reference points are defined for retained species.
	Met?			N

[131] $ACOM_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10

PI 2.1.1		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		
	Justification	Target reference points have been defined for both NEA haddock, NEA saithe, northern hake: (see table below) Two reference points are defined for beaked redfish *S. mentella*: F_{target} = 0.039 and $B_{trigger}$ 16 000 t At present there are no target reference points for other retained species		

		Haddock	Saithe	Hake
Management plan	SSB_{MP}	80 000 t	220 000 t	
	F_{MP}	0.35	0.32	
MSY approach	MSY $B_{trigger}$	80 000 t	Not defined	46 200 t
	F_{MSY}	0.35	Not defined	0.27
Precautionary approach	B_{lim}	50 000 t	136 000 t	33 000 t
	B_{pa}	80 000 t	220 000 t	46 200 t
	F_{lim}	0.77	0.58	
	F_{pa}	0.47	0.35	

c	**Guidepost**	If main retained species are 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 main retained species are 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.	
	Met?	Y	Y	
	Justification	The haddock is within the limits of all defined target reference points and there is a strategy in place (management plan and HCR) aimed at maintaining that status. Although the trends-based assessment for tusk indicates an increase in abundance its exact status with respect to reference points is unknown. The stock is managed by rigidly enforced TAC and quota limits; the increasing trend in abundance indices suggests that this partial strategy is proving effective in ensuring that the fishery does not hinder stock rebuilding.		
d	**Guidepost**	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.		
	Met?	Y		

PI 2.1.1		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
	Justification	There are a wide suite of measures in place through Russian–Norwegian waters to safeguard all retained species, not only those whose status is know. There are real-time closure rules and regulations to safeguard aggregations of both juveniles of most species and aggregations of depleted species such as redfish, Greenland and Atlantic halibut. Where such species are taken as bycatch, there are stringent bycatch regulations in place to minimise the risk of cryptic targeting of the species. The regulations on which gears can be used where and under what circumstances are particularly rigorous in the fjords and coastal waters. The measures to safeguard and optimise the recovery of coastal cod are subject to frequent revision and the efficacies of such measures are reviewed annually by the AFWG.
References		ACOM$_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3. ACOM$_{neac}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Northeast Arctic cod). ICES Advice Book 3.3.2. ACOM$_{gh}$, 2014. Barents Sea and Norwegian Sea: Greenland halibut in Subareas I and II. ICES Advice Book 3.3.5. ACOM$_{ling}$, 2014. Widely distributed and migratory stocks: ling in Subareas I and II. ICES Advice Book 9.3.15.1. ACOM$_{neah}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic haddock (subareas I and II). ICES Advice Book 3.3.4. ACOM$_{neas}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic saithe (subareas I and II). ICES Advice Book 3.3.8. ACOM$_{smen}$, 2014. Ecoregion Barents Sea and Norwegian Sea: beaked redfish (*Sebastes mentella*) in subareas I and II. ICES Advice Book 3.3.6. ACOM$_{snor}$, 2014. Ecoregion Barents Sea and Norwegian Sea: golden redfish (*Sebastes marinus*) in subareas I and II. ICES Advice Book 3.3.7. ACOM$_{tusk}$, 2014. Widely distributed and migratory stocks: tusk in Subareas I and II. ICES Advice Book 9.3.29.1. AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. WGDEEP, 2014. Report of the Working Group on Biology and Assessment of Deep-sea Fisheries Resources. ICES CM 2014/ACOM:17 Gullestad, P., 2013. The "Discard Ban Package" – Norwegian experiences in efforts to improve fisheries exploitation patterns. http://www.fisheries.no/PageFiles/21748/HSM/pdf_vedlegg/Norwegian%20discard%20policy.pdf Minimum sizes: http://www.fisheries.no/PageFiles/371353/minstemalstabell-eng-04022011_1_.pdf Directorate of Fisheries: http://www.fiskeridir.no/english/fisheries JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea ACOM$_{monk}$, 2014. Celtic Sea and West of Scotland + North Sea – Anglerfish (*Lophius piscatorius* and *L. budegassa*) in Division IIIa, and Subareas IV and VI. ICES Advice Book 5.3.2. ACOM$_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10 WGDEEP, 2014. Report of the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources. ICES CM 2014/ACOM:17. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P.,

PI 2.1.1	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
	Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.
OVERALL PERFORMANCE INDICATOR SCORE:	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.1.2: Norway NEA cod - trawl, Danish seine, jiggers, gillnet

PI 2.1.2		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures 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.	There is a partial strategy 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.	There is a strategy in place for managing retained species.
	Met?	Y	Y	Y
	Justification	The overarching strategy for safeguarding the exploited fish stocks of the NE Arctic is enshrined in the Joint Russian–Norwegian Fisheries Convention and the Norwegian management plans for the Barents Sea and Norwegian Sea. The generic strategy for the conservation and sustainable exploitation of fish stocks is supported by ongoing research into the distribution and abundance of all fishes in the NE Arctic. The CRISP programme undertakes research into potential improvements in target identification and gear selectivity There is a comprehensive strategy in place for the main retained species of haddock and saithe that is stated explicitly in the stock management plan and HCRs. ICES has evaluated the management plans and concluded they are in accordance with the precautionary approach and, for haddock, not in contradiction to the maximum sustainable yield (MSY) approach. A recovery programme, with associated stringent gear and area restrictions, is in place for coastal cod, which ICES has judged as being appropriate for stock conservation and recovery. For all other retained species it is the generic strategy covering all fish stocks under the aegis of the JNRFC. This strategy is implemented through a broad range of fishery management regulations aimed at safeguarding juvenile fish and vulnerable species; *e.g.* real-time closures in areas where vulnerable species such as redfish or juvenile fish of any species exceed threshold levels in individual catches. Where deemed appropriate, the strategy has included a ban on targeted fishing for vulnerable species such as redfish (which are red-list species and are given detailed consideration as ETP species) other than in specifc seasonal licensed longline and gillnet fisheries. This has also been done for Greenland halibut in the past but in response to improving abundance indices, the restriction has been eased and targeted fishing is now permitted with a specific quota (licence) for (some) longliners. Halibut <80 cm must be returned to sea alive.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (*e.g.*, general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	Y	N

PI 2.1.2		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		
	Justification	For main retained species, the haddock and saithe management plans are scrutinised annually as part of the annual stock assessment exercise and are subject to more detailed examination as part of the periodic JNRFC management plan reviews and ICES benchmarking of methods, parameters and assumptions. Direct testing of these plans during the benchmarking processes, and comparison with comparable plans on other stocks in the NE Arctic and elsewhere, promotes high confidence that the strategy for the main retained species will work. Even in the absence of explicit species specific management plans there is evidence that the generic strategy for safeguarding the exploited fish stocks will work. Positive trends in abundance indices has resulted in an easing of earlier restrictions affecting fishing for Greenland halibut and there are similar positive trends in the abundance indices for other species, *e.g.* ling, tusk and beaked redfish, provide an objective basis for confidence that the generic strategy is working, although the strategy with respect to these species has not been subject to explicit testing. Although a comparable strategy applies to golden redfish, the strategy of protection measures with respect to cod and haddock fisheries are confounded by the licensed seasonal directed longline fisheries. ICES has endorsed the coastal cod recovery plan as been an appropriate basis for stock recovery but, in the absence of stronger recruitment, there is no sign of recovery yet.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y
	Justification	The strategy is based on a rigorous management and enforcement regime in which all discarding of commercial fish species is prohibited and detailed records of all fishing activity and catches must be kept at all times. This is backed p with a very broad range of technical (eg mesh size and sorting grids) and biological (*e.g.* minimum sizes, permanent, seasonal and real-time closures) measures aimed at protecting juvenile fish and vulnerable species. The clearest evidence that the strategy is being implemented successfully is in the stock assessments where NEA cod, haddock and saithe have been at or well in excess of previously known levels and less abundant species such as Greenland halibut, beaked redfish, ling and tusk are all showing positive trends in abundance since a more coherent, more integrated NE Arctic management strategy has been developed and implemented. Although the strategy *per se* is being implemented successfully with respect to golden redfish within the context of the cod fishery, it is being confounded by the licensed seasonal directed longline fisheries. Since the coastal cod recovery plan was put in place the stock has stabilised and there is a suite of fishery management measures in place aimed at optimising stock recovery once there is an improvement in recruitment.		
d	**Guidepost**			There is some evidence that the strategy is achieving its overall objective.
	Met?			Y

PI 2.1.2		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		
	Justification	The evidence that the strategy is achieving its overall objective is in the state of the stocks since a more integrated approach to managing NEA resources has been developed and implemented. NEA cod, haddock and saithe have been at or well in excess of previously known levels and less abundant species such as Greenland halibut, beaked redfish, ling and tusk are all showing positive trends in abundance. The relative stability in the status of the coastal cod stock in recent year (i.e. it has ceased to decline) provides some evidence that the suite of measures in place to aid this stocks recovery are achieving their objectives, even if actual stock recovery is unlikely in the absence of stronger recruitment.		
e	**Guidepost**	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification			
References		ACOM$_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3. ACOM$_{neac}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Northeast Arctic cod). ICES Advice Book 3.3.2. ACOM$_{gh}$, 2014. Barents Sea and Norwegian Sea: Greenland halibut in Subareas I and II. ICES Advice Book 3.3.5. ACOM$_{ling}$, 2014. Widely distributed and migratory stocks: ling in Subareas I and II. ICES Advice Book 9.3.15.1. ACOM$_{neah}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic haddock (subareas I and II). ICES Advice Book 3.3.4. ACOM$_{neas}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic saithe (subareas I and II). ICES Advice Book 3.3.8. ACOM$_{smen}$, 2014. Ecoregion Barents Sea and Norwegian Sea: beaked redfish (*Sebastes mentella*) in subareas I and II. ICES Advice Book 3.3.6. ACOM$_{tusk}$, 2014. Widely distributed and migratory stocks: tusk in Subareas I and II. ICES Advice Book 9.3.29.1. AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. BSMP, 2006. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report No. 8 to the Storting. Norwegian Ministry of the Environment. WGDEEP, 2014. Report of the Working Group on Biology and Assessment of Deep-sea Fisheries Resources. ICES CM 2014/ACOM:17 Gullestad, P., 2013. The "Discard Ban Package" – Norwegian experiences in efforts to improve fisheries exploitation patterns. http://www.fisheries.no/PageFiles/21748/HSM/pdf_vedlegg/Norwegian%20discard%20policy.pdf JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries NSMP, 2009. Integrated Management of the Marine Environment of the Norwegian Sea. Report No. 37 to the Storting. Norwegian Ministry of the Environment		

PI 2.1.2	**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**
	Minimum sizes: http://www.fisheries.no/PageFiles/371353/minstemalstabell-eng-04022011_1_.pdf Directorate of Fisheries: http://www.fiskeridir.no/english/fisheries JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013. CRISP, 2013. CRISP Annual Report 2012. Institute of Marine Research, Bergen. http://www.imr.no/filarkiv/2013/04/crisp_annual_report_2012_screen.pdf/en $ACOM_{monk}$, 2014. Celtic Sea and West of Scotland + North Sea – Anglerfish (*Lophius piscatorius* and *L. budegassa*) in Division IIIa, and Subareas IV and VI. ICES Advice Book 5.3.2. $ACOM_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10 WGDEEP, 2014. Report of the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources. ICES CM 2014/ACOM:17. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.

OVERALL PERFORMANCE INDICATOR SCORE:	**95**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.1.2: Norway NEA cod - Longline

PI 2.1.2		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures 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.	There is a partial strategy 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.	There is a strategy in place for managing retained species.
	Met?	Y	Y	N
	Justification	The overarching strategy for safeguarding the exploited fish stocks of the NE Arctic is enshrined in the Joint Russian–Norwegian Fisheries Convention and the Norwegian management plans for the Barents Sea and Norwegian Sea. The generic strategy for the conservation and sustainable exploitation of fish stocks is supported by ongoing research into the distribution and abundance of all fishes in the NE Arctic. The CRISP programme undertakes research into potential improvements in target identification and gear selectivity There is a comprehensive strategy in place for one main retained species, haddock, that is stated explicitly in the stock management plan and HCRs. ICES has evaluated the management plans and concluded it is in accordance with the precautionary approach and not in contradiction to the maximum sustainable yield (MSY) approach. For tusk, there is a partial strategy insofar as it is covered by the generic strategy for all NE Arctic fish stocks, backed up by annual quota to limit total catch. This approach does appear to be having positive effects as population indices have shown positive trends over the past decade. This provides some evidence that the fishery is not hindering stock recovery but its status with respect to biologically based limits remains unknown. A recovery programme, with associated stringent gear and area restrictions, is in place for coastal cod, which ICES has judged as being appropriate for stock conservation and recovery. For all other retained species it is the generic strategy covering all fish stocks under the aegis of the JNRFC. This strategy is implemented through a broad range of fishery management regulations aimed at safeguarding juvenile fish and vulnerable species; *e.g.* real-time closures in areas where vulnerable species such as redfish or juvenile fish of any species exceed threshold levels in individual catches. Where deemed appropriate, the strategy has included a ban on targeted fishing for vulnerable species such as redfish (which are given detailed consideration as ETP species) other than in specifc seasonal licensed fisheries. This has also been done for Greenland halibut in the past but in response to improving abundance indices, the restriction has been eased and targeted fishing is now permitted with a specific quota (licence) for (some) longliners. Atlantic halibut <80 cm must be returned to sea alive.		

PI 2.1.2		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		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (*e.g.*, general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	Y	N
	Justification	The haddock management plan is scrutinised annually as part of the annual stock assessment exercise and is subject to more detailed examination as part of the periodic JNRFC management plan reviews and ICES benchmarking of methods, parameters and assumptions. Direct testing of these plans during the benchmarking process and comparison with comparable plans on other stocks in the NE Arctic and elsewhere, promotes high confidence that the strategy will work for haddock. Even in the absence of explicit species specific management plans there is evidence that the generic strategy and quota management of tusk is having a positive effect as there has been a positive trend in stock indices for the past decade. Similarly, positive trends in abundance indices have resulted in an easing of earlier restrictions affecting fishing for Greenland halibut and there are also positive trends in the abundance indices for other species, *e.g.* ling and beaked redfish. These provide an objective basis for confidence that the generic strategy is working, although the strategy with respect to these species has not been subject to explicit testing. Although a comparable strategy applies to golden redfish, the strategy of protection measures with respect to cod and haddock fisheries are confounded by the licensed seasonal directed longline fisheries. ICES has endorsed the coastal cod recovery plan as been an appropriate basis for stock recovery but, in the absence of stronger recruitment, there is no sign of recovery yet.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y
	Justification	The strategy is based on a rigorous management and enforcement regime in which all discarding of commercial fish species is prohibited and detailed records of all fishing activity and catches must be kept at all times. This is backed p with a very broad range of technical (eg mesh size and sorting grids) and biological (*e.g.* minimum sizes, permanent, seasonal and real-time closures) measures aimed at protecting juvenile fish and vulnerable species. The clearest evidence that the strategy is being implemented successfully is in the stock assessments where NEA cod, haddock and saithe have been at or well in excess of previously known levels and less abundant species such as tusk, Greenland halibut, beaked redfish and ling are all showing positive trends in abundance since a more coherent, more integrated NE Arctic management strategy has been developed and implemented. Although the strategy *per se* is being implemented successfully with respect to golden redfish within the context of the cod fishery, it is being confounded by the licensed seasonal directed longline fisheries. Since the coastal cod recovery plan was put in place the stock has stabilised and there is a suite of fishery management measures in place aimed at optimising stock recovery once there is an improvement in recruitment.		

PI 2.1.2		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		
d	Guidepost			There is some evidence that the strategy is achieving its overall objective.
	Met?			Y
	Justification	The evidence that the strategy is achieving its overall objective is in the state of the stocks since a more integrated approach to managing NEA resources has been developed and implemented. NEA cod, haddock and saithe have been at or well in excess of previously known levels and less abundant species such as tusk, Greenland halibut, beaked redfish and ling are all showing positive trends in abundance. The relative stability in the status of the coastal cod stock in recent year (i.e. it has ceased to decline) provides some evidence that the suite of measures in place to aid this stocks recovery are achieving their objectives, even if actual stock recovery is unlikely in the absence of stronger recruitment.		
e	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification			
References		ACOM$_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3. ACOM$_{neac}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Northeast Arctic cod). ICES Advice Book 3.3.2. ACOM$_{gh}$, 2014. Barents Sea and Norwegian Sea: Greenland halibut in Subareas I and II. ICES Advice Book 3.3.5. ACOM$_{ling}$, 2014. Widely distributed and migratory stocks: ling in Subareas I and II. ICES Advice Book 9.3.15.1. ACOM$_{neah}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic haddock (subareas I and II). ICES Advice Book 3.3.4. ACOM$_{neas}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic saithe (subareas I and II). ICES Advice Book 3.3.8. ACOM$_{smen}$, 2014. Ecoregion Barents Sea and Norwegian Sea: beaked redfish (*Sebastes mentella*) in subareas I and II. ICES Advice Book 3.3.6. ACOM$_{tusk}$, 2014. Widely distributed and migratory stocks: tusk in Subareas I and II. ICES Advice Book 9.3.29.1. AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. BSMP, 2006. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report No. 8 to the Storting. Norwegian Ministry of the Environment. WGDEEP, 2014. Report of the Working Group on Biology and Assessment of Deep-sea Fisheries Resources. ICES CM 2014/ACOM:17 Gullestad, P., 2013. The "Discard Ban Package" – Norwegian experiences in		

PI 2.1.2	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
	efforts to improve fisheries exploitation patterns. http://www.fisheries.no/PageFiles/21748/HSM/pdf_vedlegg/Norwegian%20discard%20policy.pdf JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries NSMP, 2009. Integrated Management of the Marine Environment of the Norwegian Sea. Report No. 37 to the Storting. Norwegian Ministry of the Environment Minimum sizes: http://www.fisheries.no/PageFiles/371353/minstemalstabell-eng-04022011_1_.pdf Directorate of Fisheries: http://www.fiskeridir.no/english/fisheries JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013. CRISP, 2013. CRISP Annual Report 2012. Institute of Marine Research, Bergen. http://www.imr.no/filarkiv/2013/04/crisp_annual_report_2012_screen.pdf/en $ACOM_{monk}$, 2014. Celtic Sea and West of Scotland + North Sea – Anglerfish (*Lophius piscatorius* and *L. budegassa*) in Division IIIa, and Subareas IV and VI. ICES Advice Book 5.3.2. $ACOM_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10 WGDEEP, 2014. Report of the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources. ICES CM 2014/ACOM:17. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.
OVERALL PERFORMANCE INDICATOR SCORE:	**90**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.1.3: Norway NEA cod - All gears

PI 2.1.3		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Qualitative information is available on the amount of main retained species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.
	Met?	Y	Y	N
	Justification	There is a no-discard management regime throughout the NE Arctic; all commercial species must be retained, recorded and landed. Thus, accurate and verifiable (by on-board observers in the Russian sector and inspection at sea by the Norwegian Coastguard) information is available on the catch of all species. The quality of these data and the monitoring, surveillance and compliance have been assessed by FAO and found to be high. The consequences for the status of the commercially more important retained species, haddock, saithe, tusk, Greenland halibut, ling, redfishes, hake and angler are assessed annually during the annual stock assessment exercise. For other stocks, all that can be said that if there is a sudden increase in catches, it is likely to have an adverse effect whereas *status quo* or reduced catches are less likely to have adverse effects.		
b	**Guidepost**	Information is adequate to qualitatively assess outcome status with respect to biologically based limits.	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.
	Met?	Y	Y	Y
	Justification	Catches of all commercial species are monitored with equal rigour and data passed to the appropriate coastal state and stock monitoring agencies (JNRFC, ICES). The information gathered is demonstrably sufficient to estimate quantitatively the outcome status for cod, haddock and saithe with a high degree of certainty. Albeit with less certainty, data are sufficient to support trends based assessments for other key species (tusk, Greenland halibut, redfishes, ling) that show positive trends. For the lesser species, it can be inferred, therefore, that the same is true, the difference being that there are not the resources (manpower and time) to justify the same assessment effort for species caught in relatively small quantities. This latter shortcoming is mitigated, however, by the annual IMR–PINRO trawl surveys that monitor the distribution and relative abundance year on year of all commercial species throughout the NE Arctic.		
c	**Guidepost**	Information is adequate to support measures to manage main retained species.	Information is adequate to support a partial strategy to manage main retained species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	N

PI 2.1.3		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		
	Justification	The overarching strategy for safeguarding the exploited fish stocks of the NE Arctic is enshrined in the Joint Russian – Norwegian Fisheries Convention and the Norwegian management plans for the Barents Sea and Norwegian Sea. The standard of catch data collection throughout the NE Arctic is demonstrably adequate to support this strategy and the management of all retained species. For the principal exploited species in the NE Arctic – cod, haddock and saithe – there are also sufficient scientific data to complement the catch data to the extent that full analytical age-based assessments are undertaken each year for each of these species. From these assessments it is possible to evaluate with a high degree of certainty that the strategy is achieving its objectives. While there is some scientific data to enable trends-based assessments of tusk, Greenland halibut, beaked redfish and ling) these are insufficient to provide the same high degree of certainty. For other retained species the relative abundance year on year is monitored through the annual IMR–PINRO trawl surveys that provide a broad range of data in support of the strategy.		
d	Guidepost		Sufficient data continue to be collected to detect any increase in risk level (*e.g.* due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)	Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.
	Met?		Y	N
	Justification	Monitoring, surveillance and compliance in Norwegian fisheries has been reviewed by FAO and found to be of a high standard. There is a universal ban on discarding throughout the NE Arctic; all commercial fish caught must be retained, recorded and landed. These standards are enforced by on-board observers in the Russian sector and through *ad hoc* and scheduled inspections by the Norwegian Coastguard. The monitoring of the principal species, both in terms of catch data and biological sampling, is in sufficient detail to assess ongoing mortalities to primary retained species. While the catch data for the less important retained species are no less than for the primary species, there is greater dependence on the relative abundance indices gathered in the course of the annual IMR–PINRO trawl surveys.		
References		AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. BSMP, 2006. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report No. 8 to the Storting. Ministry of the Environment, Oslo. Directorate of Fisheries: http://www.fiskeridir.no/english/fisheries Gullestad, P., 2013. The "Discard Ban Package" – Norwegian experiences in efforts to improve fisheries exploitation patterns. http://www.fisheries.no/PageFiles/21748/HSM/pdf_vedlegg/Norwegian%20discard%20policy.pdf JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea Minimum sizes: http://www.fisheries.no/PageFiles/371353/minstemalstabell-eng-04022011_1_.pdf NSMP. 2010. Integrated Management of the Marine Environment of the		

PI 2.1.3	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
	Norwegian Sea. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Skaret, G. & Pitcher , T. J., 2006. An estimation of compliance of the fisheries of Norway with Article 7. (Fisheries Management) of the UN Code of Conduct for Responsible Fishing. FAO, Rome. WGDEEP, 2014. Report of the Working Group on Biology and Assessment of Deep-sea Fisheries Resources. ICES CM 2014/ACOM:17 Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.
OVERALL PERFORMANCE INDICATOR SCORE:	**85**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.1.1: Norway NEA haddock - trawl, Danish seine, jiggers

PI 2.1.1		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).	Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).	There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.
	Met?	Y	Y	N

PI 2.1.1	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
Justification	All commercial species of fish must be retained, recorded and landed; hence, all commercial demersal species qualify as retained species. The weights of each species caught are shown in Table 17 and Table 18 above, which shows that across the fishery cod, haddock and saithe account for 90% the total catch and it is their status that is used to bias the assessment but without ignoring other species where appropriate. Many are caught in such small quantities relative to the total that only those contributing >0.1% the total catch of demersal species are identified and discussed specifically; for those species where the catch is <0.1% of the total it is assumed that the fishery will not have any adverse effect with respect to biological limits or stock rebuilding. The three-year (2011–13) mean catch of all demersal species was 707 149 t of which cod contributed 382 457 t (54% of the total catch), including coastal cod. Coastal cod are an inseparable stock treated here as a retained species. Only cod and saithe meet the criterion for main retained species. Other retained species comprise: tusk, ling, Greenland halibut, three species of wolffish (assumed to be caught in equal quantities), two species of redfish (but assumed to be predominantly beaked redfish (*Sebastes mentella*), anglerfish, Atlantic halibut, lumpfish, pollack, European hake and European plaice. The fishery is subject to robust monitoring by regulatory authorities and comprehensive catch and biological sampling data are collected. These data are used to make an extended survivor analysis (XSA) assessment of the **NEA cod** stock. Indices of recruitment gathered annually in the course of Joint Russian–Norwegian Fishery Commission (JNRFC) coordinated trawl surveys undertaken by IMR and PINRO. For more than 5 years the NE Arctic cod stock has been at a higher level than at any other time for which records are available (almost 70 years). Although recruitment has varied between very high and very low over this seventy-year period, cod recruitment has been relatively stable for the past thirty years with no extremes of high or low recruitment. Thus, all the indicators support a high degree of certainty that the NE Arctic cod stock is above the point where recruitment would be impaired and ICES concludes that the stock retains full reproductive capacity. The current state of the **NEA saithe** stock is subject to a state–space assessment model SAM, using data from a Norwegian scientific acoustic survey to refine and validate the stock analysis. There is a species management plan and harvest control rules that ICES considers to be consistent with the precautionary approach. The assessment is less robust than is either the cod or haddock but it is highly likely that SSB is within biological limits: SSB is $>B_{pa}$ and fishing mortality is $\approx F_{pa}$. The stock retains full reproductive capacity and is above the management plan $B_{trigger}$. **Coastal cod** are subject to a scientific research vessel survey trends based assessment; there are no stock-specific reference points. The survey indicates that the SSB is close to its lowest value. Recruitment has remained low in recent years and F appears variable without a clear trend since 2000. A stock rebuilding plan defined by the Norwegian authorities was provisionally endorsed by ICES in 2010 as being consistent with the precautionary approach ($ACOM_{coast}$, 2014).[132]. The three-year mean estimate (2011–13) of commercial catch of coastal cod *c.* 28 000 (AFWG, 2014; *i.e. c.* 4% of total demersal fish catch), but the AFWG makes the explicit point that this is probably an over estimate owing to inherent sampling bias. By definition, it is probable that the pre cent coastal cod in the catches of inshore (static gear and jigger) vessels is greater than 4% (i.e. >5%, hence, a main retained species) but there are no data to confirm that this is the case. The fishing mortality rate for **beaked redfish** (*Sebastes mentella*) is deemed to be "below any relevant reference point" but the status of **golden redfish** (*S. norvegicus*, previously *S. marinus*) is that the stock is depleted and there should be no directed fishing. There are species-specific management measures in place to minimise capture of redfishes.

[132] $ACOM_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3.

PI 2.1.1		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
		These include a ban on directed fishing other by licensed longline and gillnet vessels taking part in specific, designated seasonal fisheries and move-on rules where individual bycatch exceeds minimal permitted thresholds. (NB as both species appear on the Norwegian redlist they are given further consideration as ETP species.) The combined annual catch of redfish by all fleets is *c.* 6000 t. International landings of **Greenland halibut** have been relatively stable for almost twenty years. The stock is subject to a CPUE trends-based assessment, which has shown a stable–positive trend since the mid 1990s, from which it might be inferred that recruitment is not impaired. It is anticipated that the stock will be subject to an analytical assessment from 2015. There are species-specific management measures in place to minimise capture of Greenland halibut. As with Greenland halibut**, ling** is subject to a CPUE trends-based assessment that has shown a strong positive trend since 2000, from which it might be inferred that recruitment is not impaired. The same data set is used for **tusk** with a similar picture and conclusions. **Wolffish** are not subject to ICES assessment but their distribution and abundance is monitored as part of the annual JNRFC Barents Sea (and Norwegian coastal) trawl surveys. The frequent presence of juveniles in the Barents Sea surveys, with higher abundance indices in 2013 than 2012, suggests that there is not a problem with recruitment. Russian estimates of biomass in the Barents Sea have indicated an increasing trend in recent years. **Anglerfish**, in Norway, are taken almost exclusively in a large-meshed gillnet fishery targeting fish over 60 cm. Catches of anglerfish from the NE Arctic are assumed to be part of a wider NE Atlantic stock; there is neither assessment nor advice specific to the Norwegian or Barents Seas. The stock west of Scotland is subject to a trends-based assessment using abundance indices from directed Irish and Scottish anglerfish surveys that show a positive trend in abundance and relatively stable biomass. There are no management plans or specific objectives for this fishery. Two very strong year classes 2007–08 helped boost the **European hake** stock to twice is previous highest observed level and this should be helped by another two very stong incoming year classes (2012 – 13). Although fishing mortality rate is still (slightly) above target, F has fallen from a peak in the 1990s (F = ~1.1) to little more than F_{MSY} (0.27). The stock is subject to an E.U. recovery plan that incorporates HCR based on a suite of defined biological reference points. The plan has been reviewed by ICES and although the stock retains full reproductive capacity and is above MSY $B_{trigger}$, it has expressed the view that the reference points are no longer appropriate. The assessment methodology, protocols and reference points will be subject to a benchmark review during 2014 ($ACOM_{hake}$, 2014).[133] **Blue ling** is a deep-water species found along the shelf edge from the SW Barents Sea, southwards past the west of the British Isles. It is subject to a trends based assessment but there are no biological reference points, management plans or HCRs. ICES advice is that "there should be no directed fisheries for blue ling, and a reduction in bycatches should be considered until the scientific information is sufficient to prove the fishery sustainable. Measures should be implemented to minimize the bycatch. Closed areas to protect spawning aggregations should be maintained and expanded where appropriate". At present there are no closed areas for this species in Norwegian waters; the total quantity caught by Norwegian vessels (138 t, three-year average 2011–13) may appear trivial, and is within the annual quota limit of 150 t, but it is virtually the total catch of this species in the NE Arctic. In common with many other retained species, **European plaice** (which is at the northern limits of its distribution in NEA waters) is caught in trivial quantities (Tables 16 & 17) and is not subject to specific monitoring or assessment. By implication, it is assumed by all concerned that the fishery does not pose a specific threat and that the stock is with safe biological limits.

[133] $ACOM_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10

PI 2.1.1		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		
b	Guidepost			Target reference points are defined for retained species.
	Met?			N
	Justification	Target reference points have been defined for both NEA cod, NEA saithe, northern hake:		

		Cod	Saithe	Hake
Management plan	SSB_{MP}	460 000 t	220 000 t	
	F_{MP}	0.40	0.32	
MSY approach	MSY $B_{trigger}$	460 000 t	Not defined	46 200 t
	F_{MSY}	0.40	Not defined	0.27
Precautionary approach	B_{lim}	220 000 t	136 000 t	33 000 t
	B_{pa}	460 000 t	220 000 t	46 200 t
	F_{lim}	0.74	0.58	
	F_{pa}	0.40	0.35	

Two reference points are defined for beaked redfish *S. mentella*: F_{target} = 0.039 and $B_{trigger}$ 16 000 t

At present there are no target reference points for other retained species

c	Guidepost	If main retained species are 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 main retained species are 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.	
	Met?	Y	Y	
	Justification	The main retained species, cod and saithe, are within the limits of all defined target reference points and there is a strategy in place (management plan and HCR) aimed at maintaining that status.		
d	Guidepost	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.		
	Met?	Y		

PI 2.1.1	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
Justification	There are a wide suite of measures in place throughout Russian–Norwegian waters to safeguard all retained species, not only those whose status is know. There are real-time closure rules and regulations to safeguard aggregations of both juveniles of most species and aggregations of depleted species such as redfish, Greenland and Atlantic halibut. Where such species are taken as bycatch, there are stringent bycatch regulations in place to minimise the risk of cryptic targeting of the species. The regulations on which gears can be used where and under what circumstances are particularly rigorous in the fjords and coastal waters. The measures to safeguard and optimise the recovery of coastal cod are subject to frequent revision and the efficacies of such measures are reviewed annually by the AFWG.
References	$ACOM_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3. $ACOM_{neac}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Northeast Arctic cod). ICES Advice Book 3.3.2. $ACOM_{gh}$, 2014. Barents Sea and Norwegian Sea: Greenland halibut in Subareas I and II. ICES Advice Book 3.3.5. $ACOM_{ling}$, 2014. Widely distributed and migratory stocks: ling in Subareas I and II. ICES Advice Book 9.3.15.1. $ACOM_{neah}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic haddock (subareas I and II). ICES Advice Book 3.3.4. $ACOM_{neas}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic saithe (subareas I and II). ICES Advice Book 3.3.8. $ACOM_{smen}$, 2014. Ecoregion Barents Sea and Norwegian Sea: beaked redfish (*Sebastes mentella*) in subareas I and II. ICES Advice Book 3.3.6. $ACOM_{snor}$, 2014. Ecoregion Barents Sea and Norwegian Sea: golden redfish (*Sebastes marinus*) in subareas I and II. ICES Advice Book 3.3.7. $ACOM_{tusk}$, 2014. Widely distributed and migratory stocks: tusk in Subareas I and II. ICES Advice Book 9.3.29.1. AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. WGDEEP, 2014. Report of the Working Group on Biology and Assessment of Deep-sea Fisheries Resources. ICES CM 2014/ACOM:17 Gullestad, P., 2013. The "Discard Ban Package" – Norwegian experiences in efforts to improve fisheries exploitation patterns. http://www.fisheries.no/PageFiles/21748/HSM/pdf_vedlegg/Norwegian%20discard%20policy.pdf Minimum sizes: http://www.fisheries.no/PageFiles/371353/minstemalstabell-eng-04022011_1_.pdf Directorate of Fisheries: http://www.fiskeridir.no/english/fisheries JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea ACOMmonk, 2014. Celtic Sea and West of Scotland + North Sea – Anglerfish (*Lophius piscatorius* and *L. budegassa*) in Division IIIa, and Subareas IV and VI. ICES Advice Book 5.3.2. $ACOM_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10 WGDEEP, 2014. Report of the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources. ICES CM 2014/ACOM:17. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.

PI 2.1.1	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
OVERALL PERFORMANCE INDICATOR SCORE:	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.1.1: Norway NEA haddock – Gillnet & Longline

PI 2.1.1		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below).	Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below).	There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points.
	Met?	Y	Y	N
	Justification	All commercial species of fish must be retained, recorded and landed; hence, all commercial demersal species qualify as retained species. The weights of each species caught are shown in Table 17 and Table 18 above, which shows that across the fishery cod, haddock and saithe account for 80% the total catch and it is their status that is used to bias the assessment but without ignoring other species, specifically tusk, where appropriate. Many are caught in such small quantities relative to the total that only those contributing >0.1% the total catch of demersal species are identified and discussed specifically; for those species where the catch is <0.1% of the total it is assumed that the fishery will not have any adverse effect with respect to biological limits or stock rebuilding. The three-year (2011–13) mean catch of all demersal species was 707 149 t of which cod contributed 382 457 t (54% of the total catch), including coastal cod. Coastal cod are an inseparable stock treated here as a retained species. Only cod meets the criterion for main retained species. Other retained species comprise: saithe, tusk, ling, Greenland halibut, three species of wolffish (assumed to be caught in equal quantities), two species of redfish (but assumed to be predominantly beaked redfish *Sebastes mentella*, anglerfish, Atlantic halibut, lumpfish, pollack, European hake and European plaice. The fishery is subject to robust monitoring by regulatory authorities and comprehensive catch and biological sampling data are collected. These data are used to make an extended survivor analysis (XSA) assessment of the **NEA cod** stock. Indices of recruitment gathered annually in the course of Joint Russian–Norwegian Fishery Commission (JNRFC) coordinated trawl surveys undertaken by IMR and PINRO. For more than 5 years the NE Arctic cod stock has been at a higher level than at any other time for which records are available (almost 70 years). Although recruitment has varied between very high and very low over this seventy-year period, cod recruitment has been relatively stable for the past thirty years with no extremes of high or low recruitment. Thus, all the indicators support a high degree of certainty that the NE Arctic cod stock is above the point where recruitment would be impaired and ICES concludes that the stock retains full reproductive capacity. The current state of the **NEA saithe** stock is subject to a state–space assessment model SAM, using data from a Norwegian scientific acoustic survey to refine and validate the stock analysis. There is a species management plan and harvest control rules that ICES considers to be consistent with the precautionary approach. The assessment is less robust than is either the cod or haddock but it is highly likely that SSB is within biological limits: SSB is $>B_{pa}$ and fishing mortality is $\approx F_{pa}$. The stock retains full reproductive capacity and is above the management plan $B_{trigger}$.		

PI 2.1.1		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
		Coastal cod are exposed to less risk by the haddock fishery as the greater part of the haddock catch is taken offshore. Coastal cod subject to a scientific research vessel survey trends based assessment; there are no stock-specific reference points. The survey indicates that the SSB is close to its lowest value. Recruitment has remained low in recent years and F appears variable without a clear trend since 2000. A stock rebuilding plan defined by the Norwegian authorities was provisionally endorsed by ICES in 2010 as being consistent with the precautionary approach ($ACOM_{coast}$, 2014).[134]. The three-year mean estimate (2011–13) of commercial catch of coastal cod *c.* 28 000 (AFWG, 2014; *i.e. c.* 4% of total demersal fish catch), but the AFWG makes the explicit point that this is probably an over estimate owing to inherent sampling bias. By definition, it is probable that the per cent coastal cod in the catches of inshore (static gear and jigger) vessels is greater than 4% (i.e. >5%, hence, a main retained species) but there are no data to confirm that this is the case. The combined annual catch of redfish by this fleet is *c.* 4 t. There are species-specific management measures in place to minimise capture of redfishes.The fishing mortality rate for **beaked redfish** (*Sebastes mentella*) is deemed to be "below any relevant reference point" and stock status is expected to improve, albeit not in the immediate future (as it will take some time for the recent strong year classes to recruit to the spawning stock). The status of **golden redfish** (*S. norvegicus*, previously *S. marinus*) is that the stock is depleted and there should be no directed fishing. These include a ban on directed fishing other by licensed longline and gillnet vessels taking part in specific, designated seasonal fisheries (*i.e.* separate from the cod fishery) that take the greater part of the total catch: *c.* 6000 t pa. In the non-target fisheries move-on rules apply where redfish bycatch exceeds minimal permitted thresholds. There are practical limits as to what might be done within the directed cod and haddock fisheries to enhance golden redfish stock rebuilding but IMR supports the ICES recommendation that directed fisheries should cease. (NB as both species appear on the Norwegian redlist they are given further consideration as ETP species.) International landings of **Greenland halibut** have been relatively stable for almost twenty years. The stock is subject to a CPUE trends-based assessment, which has shown a stable–positive trend since the mid 1990s, from which it might be inferred that recruitment is not impaired. It is anticipated that the stock will be subject to an analytical assessment from 2015. There are species-specific management measures in place to minimise capture of Greenland halibut. As with Greenland halibut**, ling** is subject to a CPUE trends-based assessment that has shown a strong positive trend since 2000, from which it might be inferred that recruitment is not impaired. The **tusk** stock is subject to a CPUE trends-based assessment, which has shown a stable–positive trend since the mid 1990s, from which it might be inferred that recruitment is not impaired. There are neither reference points nor a management plan.

[134] $ACOM_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3.

PI 2.1.1		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		
		Wolffish are not subject to ICES assessment but their distribution and abundance is monitored as part of the annual JNRFC Barents Sea (and Norwegian coastal) trawl surveys. The frequent presence of juveniles in the Barents Sea surveys, with higher abundance indices in 2013 than 2012, suggests that there is not a problem with recruitment. Russian estimates of biomass in the Barents Sea have indicated an increasing trend in recent years. **Anglerfish**, in Norway, are taken almost exclusively in a large-meshed gillnet fishery targeting fish over 60 cm. Catches of anglerfish from the NE Arctic are assumed to be part of a wider NE Atlantic stock; there is neither assessment nor advice specific to the Norwegian or Barents Seas. The stock west of Scotland is subject to a trends-based assessment using abundance indices from directed Irish and Scottish anglerfish surveys that show a positive trend in abundance and relatively stable biomass. There are no management plans or specific objectives for this fishery. Two very strong year classes 2007–08 helped boost the **European hake** stock to twice is previous highest observed level and this should be helped by another two very stong incoming year classes (2012 – 13). Although fishing mortality rate is still (slightly) above target, F has fallen from a peak in the 1990s (F = ~1.1) to little more than F_{MSY} (0.27). The stock is subject to an E.U. recovery plan that incorporates HCR based on a suite of defined biological reference points. The plan has been reviewed by ICES and although the stock retains full reproductive capacity and is above MSY $B_{trigger}$, it has expressed the view that the reference points are no longer appropriate. The assessment methodology, protocols and reference points will be subject to a benchmark review during 2014 ($ACOM_{hake}$, 2014).[135] **Blue ling** is a deep-water species found along the shelf edge from the SW Barents Sea, southwards past the west of the British Isles. It is subject to a trends based assessment but there are no biological reference points, management plans or HCRs. ICES advice is that "there should be no directed fisheries for blue ling, and a reduction in bycatches should be considered until the scientific information is sufficient to prove the fishery sustainable. Measures should be implemented to minimize the bycatch. Closed areas to protect spawning aggregations should be maintained and expanded where appropriate". At present there are no closed areas for this species in Norwegian waters; the total quantity caught by Norwegian vessels (138 t, three-year average 2011–13) may appear trivial, and is within the annual quota limit of 150 t, but it is virtually the total catch of this species in the NE Arctic. In common with many other retained species, **European plaice** (which is at the northern limits of its distribution in NEA waters) is caught in trivial quantities (Tables 16 & 17) and is not subject to specific monitoring or assessment. By implication, it is assumed by all concerned that the fishery does not pose a specific threat and that the stock is with safe biological limits.		
b	**Guidepost**			Target reference points are defined for retained species.
	Met?			N

[135] $ACOM_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10

PI 2.1.1		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		
	Justification	Target reference points have been defined for both NEA cod, NEA saithe, northern hake:		

		Cod	Saithe	Hake
Management plan	SSB_{MP}	460 000 t	220 000 t	
	F_{MP}	0.40	0.32	
MSY approach	MSY $B_{trigger}$	460 000 t	Not defined	46 200 t
	F_{MSY}	0.40	Not defined	0.27
Precautionary approach	B_{lim}	220 000 t	136 000 t	33 000 t
	B_{pa}	460 000 t	220 000 t	46 200 t
	F_{lim}	0.74	0.58	
	F_{pa}	0.40	0.35	

Two reference points are defined for beaked redfish *S. mentella*: F_{target} = 0.039 and $B_{trigger}$ 16 000 t

At present there are no target reference points for other retained species

c	Guidepost	If main retained species are 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 main retained species are 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.	
	Met?	Y	Y	
	Justification	The haddock is within the limits of all defined target reference points and there is a strategy in place (management plan and HCR) aimed at maintaining that status. Although the trends-based assessment for tusk indicates an increase in abundance its exact status with respect to reference points is unknown. The stock is managed by rigidly enforced TAC and quota limits; the increasing trend in abundance indices suggests that this partial strategy is proving effective in ensuring that the fishery does not hinder stock rebuilding		
d	Guidepost	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.		
	Met?	Y		

PI 2.1.1		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
	Justification	There are a wide suite of measures in place through Russian–Norwegian waters to safeguard all retained species, not only those whose status is know. There are real-time closure rules and regulations to safeguard aggregations of both juveniles of most species and aggregations of depleted species such as redfish, Greenland and Atlantic halibut. Where such species are taken as bycatch, there are stringent bycatch regulations in place to minimise the risk of cryptic targeting of the species. The regulations on which gears can be used where and under what circumstances are particularly rigorous in the fjords and coastal waters. The measures to safeguard and optimise the recovery of coastal cod are subject to frequent revision and the efficacies of such measures are reviewed annually by the AFWG.
References		$ACOM_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3. $ACOM_{neac}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Northeast Arctic cod). ICES Advice Book 3.3.2. $ACOM_{gh}$, 2014. Barents Sea and Norwegian Sea: Greenland halibut in Subareas I and II. ICES Advice Book 3.3.5. $ACOM_{ling}$, 2014. Widely distributed and migratory stocks: ling in Subareas I and II. ICES Advice Book 9.3.15.1. $ACOM_{neah}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic haddock (subareas I and II). ICES Advice Book 3.3.4. $ACOM_{neas}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic saithe (subareas I and II). ICES Advice Book 3.3.8. $ACOM_{smen}$, 2014. Ecoregion Barents Sea and Norwegian Sea: beaked redfish (*Sebastes mentella*) in subareas I and II. ICES Advice Book 3.3.6. $ACOM_{snor}$, 2014. Ecoregion Barents Sea and Norwegian Sea: golden redfish (*Sebastes marinus*) in subareas I and II. ICES Advice Book 3.3.7. $ACOM_{tusk}$, 2014. Widely distributed and migratory stocks: tusk in Subareas I and II. ICES Advice Book 9.3.29.1. AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. WGDEEP, 2014. Report of the Working Group on Biology and Assessment of Deep-sea Fisheries Resources. ICES CM 2014/ACOM:17 Gullestad, P., 2013. The "Discard Ban Package" – Norwegian experiences in efforts to improve fisheries exploitation patterns. http://www.fisheries.no/PageFiles/21748/HSM/pdf_vedlegg/Norwegian%20discard%20policy.pdf Minimum sizes: http://www.fisheries.no/PageFiles/371353/minstemalstabell-eng-04022011_1_.pdf Directorate of Fisheries: http://www.fiskeridir.no/english/fisheries JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea $ACOM_{monk}$, 2014. Celtic Sea and West of Scotland + North Sea – Anglerfish (*Lophius piscatorius* and *L. budegassa*) in Division IIIa, and Subareas IV and VI. ICES Advice Book 5.3.2. $ACOM_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10 WGDEEP, 2014. Report of the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources. ICES CM 2014/ACOM:17. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.

PI 2.1.1	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	
OVERALL PERFORMANCE INDICATOR SCORE:		**80**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 2.1.2: Norway NEA haddock - trawl, Danish seine, jiggers, gillnet

PI 2.1.2		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures 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.	There is a partial strategy 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.	There is a strategy in place for managing retained species.
	Met?	Y	Y	Y
	Justification	The overarching strategy for safeguarding the exploited fish stocks of the NE Arctic is enshrined in the Joint Russian–Norwegian Fisheries Convention and the Norwegian management plans for the Barents Sea and Norwegian Sea. The generic strategy for the conservation and sustainable exploitation of fish stocks is supported by ongoing research into the distribution and abundance of all fishes in the NE Arctic. The CRISP programme undertakes research into potential improvements in target identification and gear selectivity There is a comprehensive strategy in place for the main retained species of cod and saithe that is stated explicitly in the stock management plan and HCRs. ICES has evaluated the management plans and concluded they are in accordance with the precautionary approach and, for cod, not in contradiction to the maximum sustainable yield (MSY) approach. A recovery programme, with associated stringent gear and area restrictions, is in place for coastal cod, which ICES has judged as being appropriate for stock conservation and recovery. For all other retained species it is the generic strategy covering all fish stocks under the aegis of the JNRFC. This strategy is implemented through a broad range of fishery management regulations aimed at safeguarding juvenile fish and vulnerable species; *e.g.* real-time closures in areas where vulnerable species such as redfish or juvenile fish of any species exceed threshold levels in individual catches. Where deemed appropriate, the strategy has included a ban on targeted fishing for vulnerable species such as redfish other than in specific seasonal licensed fisheries. This has also been done for Greenland halibut in the past but in response to improving abundance indices, the restriction has been eased and targeted fishing is now permitted with a specific quota (licence) for (some) longliners. Halibut <80 cm must be returned to sea alive.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (*e.g.*, general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	Y	N

PI 2.1.2		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		
	Justification	For main retained species, the cod and saithe management plans are scrutinised annually as part of the annual stock assessment exercise and are subject to more detailed examination as part of the periodic JNRFC management plan reviews and ICES benchmarking of methods, parameters and assumptions. Direct testing of these plans during the benchmarking processes, and comparison with comparable plans on other stocks in the NE Arctic and elsewhere, promotes high confidence that the strategy for the main retained species will work. Even in the absence of explicit species specific management plans there is evidence that the generic strategy for safeguarding the exploited fish stocks will work. Positive trends in abundance indices has resulted in an easing of earlier restrictions affecting fishing for Greenland halibut and there are similar positive trends in the abundance indices for other species, *e.g.* ling, tusk and beaked redfish, provide an objective basis for confidence that the generic strategy is working, although the strategy with respect to these species has not been subject to explicit testing. Although a comparable strategy applies to golden redfish, the strategy of protection measures with respect to cod and haddock fisheries are confounded by the licensed seasonal directed longline fisheries. (NB as both species appear on the Norwegian redlist they are given further consideration as ETP species.) ICES has endorsed the coastal cod recovery plan as been an appropriate basis for stock recovery but, in the absence of stronger recruitment, there is no sign of recovery yet.		
c	Guidepost		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y
	Justification	The strategy is based on a rigorous management and enforcement regime in which all discarding of commercial fish species is prohibited and detailed records of all fishing activity and catches must be kept at all times. This is backed p with a very broad range of technical (eg mesh size and sorting grids) and biological (*e.g.* minimum sizes, permanent, seasonal and real-time closures) measures aimed at protecting juvenile fish and vulnerable species. The clearest evidence that the strategy is being implemented successfully is in the stock assessments where NEA cod, haddock and saithe have been at or well in excess of previously known levels and less abundant species such as Greenland halibut, beaked redfish, ling and tusk are all showing positive trends in abundance since a more coherent, more integrated NE Arctic management strategy has been developed and implemented. Although the strategy *per se* is being implemented successfully with respect to golden redfish within the context of the cod fishery, it is being confounded by the licensed seasonal directed longline fisheries. (NB as both species appear on the Norwegian redlist they are given further consideration as ETP species.) Since the coastal cod recovery plan was put in place the stock has stabilised and there is a suite of fishery management measures in place aimed at optimising stock recovery once there is an improvement in recruitment.		
d	Guidepost			There is some evidence that the strategy is achieving its overall objective.
	Met?			Y

PI 2.1.2		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		
	Justification	The evidence that the strategy is achieving its overall objective is in the state of the stocks since a more integrated approach to managing NEA resources has been developed and implemented. NEA cod, haddock and saithe have been at or well in excess of previously known levels and less abundant species such as Greenland halibut, beaked redfish, ling and tusk are all showing positive trends in abundance. The relative stability in the status of the coastal cod stock in recent year (i.e. it has ceased to decline) provides some evidence that the suite of measures in place to aid this stocks recovery are achieving their objectives, even if actual stock recovery is unlikely in the absence of stronger recruitment.		
e	**Guidepost**	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification			
References		ACOM$_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3. ACOM$_{neac}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Northeast Arctic cod). ICES Advice Book 3.3.2. ACOM$_{gh}$, 2014. Barents Sea and Norwegian Sea: Greenland halibut in Subareas I and II. ICES Advice Book 3.3.5. ACOM$_{ling}$, 2014. Widely distributed and migratory stocks: ling in Subareas I and II. ICES Advice Book 9.3.15.1. ACOM$_{neah}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic haddock (subareas I and II). ICES Advice Book 3.3.4. ACOM$_{neas}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic saithe (subareas I and II). ICES Advice Book 3.3.8. ACOM$_{smen}$, 2014. Ecoregion Barents Sea and Norwegian Sea: beaked redfish (*Sebastes mentella*) in subareas I and II. ICES Advice Book 3.3.6. ACOM$_{tusk}$, 2014. Widely distributed and migratory stocks: tusk in Subareas I and II. ICES Advice Book 9.3.29.1. AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. BSMP, 2006. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report No. 8 to the Storting. Norwegian Ministry of the Environment. WGDEEP, 2014. Report of the Working Group on Biology and Assessment of Deep-sea Fisheries Resources. ICES CM 2014/ACOM:17 Gullestad, P., 2013. The "Discard Ban Package" – Norwegian experiences in efforts to improve fisheries exploitation patterns. http://www.fisheries.no/PageFiles/21748/HSM/pdf_vedlegg/Norwegian%20discard%20policy.pdf JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries NSMP, 2009. Integrated Management of the Marine Environment of the Norwegian Sea. Report No. 37 to the Storting. Norwegian Ministry of the Environment		

PI 2.1.2	**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**
	Minimum sizes: http://www.fisheries.no/PageFiles/371353/minstemalstabell-eng-04022011_1_.pdf Directorate of Fisheries: http://www.fiskeridir.no/english/fisheries JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013. CRISP, 2013. CRISP Annual Report 2012. Institute of Marine Research, Bergen. http://www.imr.no/filarkiv/2013/04/crisp_annual_report_2012_screen.pdf/en $ACOM_{monk}$, 2014. Celtic Sea and West of Scotland + North Sea – Anglerfish (*Lophius piscatorius* and *L. budegassa*) in Division IIIa, and Subareas IV and VI. ICES Advice Book 5.3.2. $ACOM_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10 WGDEEP, 2014. Report of the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources. ICES CM 2014/ACOM:17. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.

OVERALL PERFORMANCE INDICATOR SCORE:	**95**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.1.2: Norway NEA haddock - Longline

PI 2.1.2		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures 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.	There is a partial strategy 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.	There is a strategy in place for managing retained species.
	Met?	Y	Y	N
	Justification	The overarching strategy for safeguarding the exploited fish stocks of the NE Arctic is enshrined in the Joint Russian–Norwegian Fisheries Convention and the Norwegian management plans for the Barents Sea and Norwegian Sea. The generic strategy for the conservation and sustainable exploitation of fish stocks is supported by ongoing research into the distribution and abundance of all fishes in the NE Arctic. The CRISP programme undertakes research into potential improvements in target identification and gear selectivity There is a comprehensive strategy in place for one main retained species, cod, that is stated explicitly in the stock management plan and HCRs. ICES has evaluated the management plans and concluded it is in accordance with the precautionary approach and not in contradiction to the maximum sustainable yield (MSY) approach. For tusk, there is a partial strategy insofar as it is covered by the generic strategy for all NE Arctic fish stocks, backed up by annual quota to limit total catch. This approach does appear to be having positive effects as population indices have shown positive trends over the past decade. This provides some evidence that the fishery is not hindering stock recovery but its status with respect to biologically based limits remains unknown. A recovery programme, with associated stringent gear and area restrictions, is in place for coastal cod, which ICES has judged as being appropriate for stock conservation and recovery. For all other retained species it is the generic strategy covering all fish stocks under the aegis of the JRNFC. This strategy is implemented through a broad range of fishery management regulations aimed at safeguarding juvenile fish and vulnerable species; *e.g.* real-time closures in areas where vulnerable species such as redfish or juvenile fish of any species exceed threshold levels in individual catches. Where deemed appropriate, the strategy has included a ban on targeted fishing for vulnerable species such as redfish other than in specifc seasonal licensed fisheries. This has also been done for Greenland halibut in the past but in response to improving abundance indices, the restriction has been eased and targeted fishing is now permitted with a specific quota (licence) for (some) longliners. Halibut <80 cm must be returned to sea alive.		

PI 2.1.2		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		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (*e.g.*, general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	Y	N
	Justification	The cod management plan is scrutinised annually as part of the annual stock assessment exercise and is subject to more detailed examination as part of the periodic JNRFC management plan reviews and ICES benchmarking of methods, parameters and assumptions. Direct testing of these plans during the benchmarking process and comparison with comparable plans on other stocks in the NE Arctic and elsewhere, promotes high confidence that the strategy will work for cod. Even in the absence of explicit species specific management plans there is evidence that the generic strategy and quota management of tusk is having a positive effect as there has been a positive trend in stock indices for the past decade. Similarly, positive trends in abundance indices have resulted in an easing of earlier restrictions affecting fishing for Greenland halibut and there are also positive trends in the abundance indices for other species, *e.g.* ling and beaked redfish. These provide an objective basis for confidence that the generic strategy is working, although the strategy with respect to these species has not been subject to explicit testing. Although a comparable strategy applies to golden redfish, the strategy of protection measures with respect to cod and haddock fisheries are confounded by the licensed seasonal directed longline fisheries. (NB as both species appear on the Norwegian redlist they are given further consideration as ETP species.) ICES has endorsed the coastal cod recovery plan as been an appropriate basis for stock recovery but, in the absence of stronger recruitment, there is no sign of recovery yet.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	Y

PI 2.1.2		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		
	Justification	The strategy is based on a rigorous management and enforcement regime in which all discarding of commercial fish species is prohibited and detailed records of all fishing activity and catches must be kept at all times. This is backed p with a very broad range of technical (eg mesh size and sorting grids) and biological (*e.g.* minimum sizes, permanent, seasonal and real-time closures) measures aimed at protecting juvenile fish and vulnerable species. The clearest evidence that the strategy is being implemented successfully is in the stock assessments where NEA cod, haddock and saithe have been at or well in excess of previously known levels and less abundant species such as tusk, Greenland halibut, beaked redfish and ling are all showing positive trends in abundance since a more coherent, more integrated NE Arctic management strategy has been developed and implemented. Although the strategy *per se* is being implemented successfully with respect to golden redfish within the context of the cod fishery, it is being confounded by the licensed seasonal directed longline fisheries. (NB as both species appear on the Norwegian redlist they are given further consideration as ETP species.) Since the coastal cod recovery plan was put in place the stock has stabilised and there is a suite of fishery management measures in place aimed at optimising stock recovery once there is an improvement in recruitment.		
d	Guidepost			There is some evidence that the strategy is achieving its overall objective.
	Met?			Y
	Justification	The evidence that the strategy is achieving its overall objective is in the state of the stocks since a more integrated approach to managing NEA resources has been developed and implemented. NEA cod, haddock and saithe have been at or well in excess of previously known levels and less abundant species such as tusk, Greenland halibut, beaked redfish and ling are all showing positive trends in abundance. The relative stability in the status of the coastal cod stock in recent year (i.e. it has ceased to decline) provides some evidence that the suite of measures in place to aid this stocks recovery are achieving their objectives, even if actual stock recovery is unlikely in the absence of stronger recruitment.		
e	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification			
References		$ACOM_{coast}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Norwegian coastal waters cod). ICES Advice Book 3.3.3. $ACOM_{neac}$, 2014. Barents Sea and Norwegian Sea: Cod in Subareas I and II (Northeast Arctic cod). ICES Advice Book 3.3.2.		

PI 2.1.2	**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**
	ACOM$_{gh}$, 2014. Barents Sea and Norwegian Sea: Greenland halibut in Subareas I and II. ICES Advice Book 3.3.5. ACOM$_{ling}$, 2014. Widely distributed and migratory stocks: ling in Subareas I and II. ICES Advice Book 9.3.15.1. ACOM$_{neah}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic haddock (subareas I and II). ICES Advice Book 3.3.4. ACOM$_{neas}$, 2014. Ecoregion Barents Sea and Norwegian Sea: northeast Arctic saithe (subareas I and II). ICES Advice Book 3.3.8. ACOM$_{smen}$, 2014. Ecoregion Barents Sea and Norwegian Sea: beaked redfish (*Sebastes mentella*) in subareas I and II. ICES Advice Book 3.3.6. ACOM$_{tusk}$, 2014. Widely distributed and migratory stocks: tusk in Subareas I and II. ICES Advice Book 9.3.29.1. AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. BSMP, 2006. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report No. 8 to the Storting. Norwegian Ministry of the Environment. WGDEEP, 2014. Report of the Working Group on Biology and Assessment of Deep-sea Fisheries Resources. ICES CM 2014/ACOM:17 Gullestad, P., 2013. The "Discard Ban Package" – Norwegian experiences in efforts to improve fisheries exploitation patterns. http://www.fisheries.no/PageFiles/21748/HSM/pdf_vedlegg/Norwegian%20discard%20policy.pdf JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries NSMP, 2009. Integrated Management of the Marine Environment of the Norwegian Sea. Report No. 37 to the Storting. Norwegian Ministry of the Environment Minimum sizes: http://www.fisheries.no/PageFiles/371353/minstemalstabell-eng-04022011_1_.pdf Directorate of Fisheries: http://www.fiskeridir.no/english/fisheries JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013. CRISP, 2013. CRISP Annual Report 2012. Institute of Marine Research, Bergen. http://www.imr.no/filarkiv/2013/04/crisp_annual_report_2012_screen.pdf/en ACOM$_{monk}$, 2014. Celtic Sea and West of Scotland + North Sea – Anglerfish (*Lophius piscatorius* and *L. budegassa*) in Division IIIa, and Subareas IV and VI. ICES Advice Book 5.3.2. ACOM$_{hake}$, 2014 Widely distributed and migratory stocks: Hake in Division IIIa, Subareas IV, VI, and VII, and Divisions VIIIa,b,d (Northern stock). ICES Advice Book 9.3.10 WGDEEP, 2014. Report of the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources. ICES CM 2014/ACOM:17. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O.,

PI 2.1.2	**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**
	Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.

OVERALL PERFORMANCE INDICATOR SCORE:	**90**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.1.3: Norway NEA haddock - All gears

PI 2.1.3		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Qualitative information is available on the amount of main retained species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery.	Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations.
	Met?	Y	Y	N
	Justification	There is a no-discard management regime throughout the NE Arctic; all commercial species must be retained, recorded and landed. Thus, accurate and verifiable (by on-board observers in the Russian sector and inspection at sea by the Norwegian Coastguard) information is available on the catch of all species. The quality of these data and the monitoring, surveillance and compliance have been assessed by FAO and found to be high. The consequences for the status of the commercially more important retained species, cod, saithe, tusk, Greenland halibut, ling, redfishes, hake and angler are assessed annually during the annual stock assessment exercise. For other stocks, all that can be said that if there is a sudden increase in catches, it is likely to have an adverse effect whereas *status quo* or reduced catches are less likely to have adverse effects.		
b	**Guidepost**	Information is adequate to qualitatively assess outcome status with respect to biologically based limits.	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with a high degree of certainty.
	Met?	Y	Y	Y
	Justification	Catches of all commercial species are monitored with equal rigour and data passed to the appropriate coastal state and stock monitoring agencies (JNRFC, ICES). The information gathered is demonstrably sufficient to estimate quantitatively the outcome status for cod, haddock and saithe with a high degree of certainty. Albeit with less certainty, data are sufficient to support trends based assessments for other key species (tusk, Greenland halibut, redfishes, ling) that show positive trends. For the lesser species, it can be inferred, therefore, that the same is true, the difference being that there are not the resources (manpower and time) to justify the same assessment effort for species caught in relatively small quantities. This latter shortcoming is mitigated, however, by the annual IMR–PINRO trawl surveys that monitor the distribution and relative abundance year on year of all commercial species throughout the NE Arctic.		
c	**Guidepost**	Information is adequate to support measures to manage main retained species.	Information is adequate to support a partial strategy to manage main retained species.	Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	N

PI 2.1.3		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		
	Justification	The overarching strategy for safeguarding the exploited fish stocks of the NE Arctic is enshrined in the Joint Russian – Norwegian Fisheries Convention and the Norwegian management plans for the Barents Sea and Norwegian Sea. The standard of catch data collection throughout the NE Arctic is demonstrably adequate to support this strategy and the management of all retained species. For the principal exploited species in the NE Arctic – cod, haddock and saithe – there are also sufficient scientific data to complement the catch data to the extent that full analytical age-based assessments are undertaken each year for each of these species. From these assessments it is possible to evaluate with a high degree of certainty that the strategy is achieving its objectives. While there is some scientific data to enable trends-based assessments of tusk, Greenland halibut, beaked redfish and ling) these are insufficient to provide the same high degree of certainty. For other retained species the relative abundance year on year is monitored through the annual IMR–PINRO trawl surveys that provide a broad range of data in support of the strategy.		
d	Guidepost		Sufficient data continue to be collected to detect any increase in risk level (*e.g.* due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy)	Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species.
	Met?		Y	N
	Justification	Monitoring, surveillance and compliance in Norwegian fisheries has been reviewed by FAO and found to be of a high standard. There is a universal ban on discarding throughout the NE Arctic; all commercial fish caught must be retained, recorded and landed. These standards are enforced by on-board observers in the Russian sector and through *ad hoc* and scheduled inspections by the Norwegian Coastguard. The monitoring of the principal species, both in terms of catch data and biological sampling, is in sufficient detail to assess ongoing mortalities to primary retained species. While the catch data for the less important retained species are no less than for the primary species, there is greater dependence on the relative abundance indices gathered in the course of the annual IMR–PINRO trawl surveys.		
References		AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. BSMP, 2006. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report No. 8 to the Storting. Ministry of the Environment,Oslo. Directorate of Fisheries: http://www.fiskeridir.no/english/fisheries Gullestad, P., 2013. The "Discard Ban Package" – Norwegian experiences in efforts to improve fisheries exploitation patterns. http://www.fisheries.no/PageFiles/21748/HSM/pdf_vedlegg/Norwegian%20discard%20policy.pdf JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea Minimum sizes: http://www.fisheries.no/PageFiles/371353/minstemalstabell-eng-04022011_1_.pdf NSMP. 2010. Integrated Management of the Marine Environment of the		

PI 2.1.3	**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**
	Norwegian Sea. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Skaret, G. & Pitcher , T. J., 2006. An estimation of compliance of the fisheries of Norway with Article 7. (Fisheries Management) of the UN Code of Conduct for Responsible Fishing. FAO, Rome. WGDEEP, 2014. Report of the Working Group on Biology and Assessment of Deep-sea Fisheries Resources. ICES CM 2014/ACOM:17 Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.
OVERALL PERFORMANCE INDICATOR SCORE:	**85**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.2.1: Norway NEA cod and haddock - All gears

PI 2.2.1		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below).	Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below).	There is a high degree of certainty that bycatch species are within biologically based limits.
	Met?	Y	Y	N
	Justification	More than 250 species of fish have been recorded from the Norwegian Sea and Barents sea, the vast majority of which are either pelagic, deep-water, found below depths at which these vessels fish, or so small (typically less than 30–40 cm) that they are most unlikely to be retained within a net fitted with sorting grid and 140 mm cod-end mesh. Thus, from their small size, ubiquity or widespread distribution (as seen in the annual IMR–PINRO trawl surveys), it is reasonable to assume with a high degree of certainty that, from the small numbers of invertebrates and bony fish species that may be retained, they are within (undefined) safe biological limits. Similarly, it is highly likely that stocks of non-commercial elasmobranchs such as blackmouth dogfish, cuckoo rays, lesser spotted dogfish, longnose velvet dogfish, sail ray and velvet belly that are caught in very small numbers (they are never numerous in the annual IMR–PINRO trawl surveys) as isolated individuals, are within safe biological limits, albeit with a lower degree of certainty, hence the reduced score.		
b	**Guidepost**	If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding.	If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding.	
	Met?	Y	Y	
	Justification	The NEA demersal fisheries aim to minimise catches of small fish, non-target species and discards through the use of large mesh – 140 mm rather than the statutory minimum of 130 mm. More generally, the coastal states' management regime places strict limits on the total quantity of non-target species (*i.e.* all species other than cod) is a measure that underpins all efforts to ensure that the fishery does not hinder recovery or stock rebuilding. Furthermore, on the basis of data gathered from an analysis of reference-fleet observer data, it has been estimated that discard rate of commercial species is low (<5%) and that bycatch (*i.e.* non-commercial) species are taken in very small. In contrast, the annual IMR–PINRO trawl surveys show that these (predominantly small) species are widely distributed in the NE Arctic, even if they are not particularly abundant. The continued use of large mesh and sorting grids ensure that the fishery does not hinder recovery and rebuilding in the event that non-target, non-commercial stocks need rebuilding.		

PI 2.2.1		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		
c	Guidepost	If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery.		
	Met?	Y		
	Justification	It is a truism that the exact status of virtually all non-commercial species is unknown. It is also true that the number of non-commercial fishes caught is very small, not least because of the 140 mm cod-end mesh, which is extremely large relative to these small widespread fishes. The larger non-commercial species are far less abundant (if they were abundant they would probably be commercial in some context or another) and are only taken rarely as isolated individuals. Under these circumstances, the NEA demersal trawl fisheries are not causing the bycatch species to be outside biologically limits or hindering recovery.		
References		Bowering, R., Storr-Paulsen, M., Tingley, G., Bjørkan, M., Vølstad, H. H., Gullestad, P. & Lorentsen, E. (2011). *Evaluation of the Norwegian Reference Fleet*. Institute of Marine Research, Bergen Kelleher, K., 2004. Discards in the world's marine fisheries: an update. *FAO Fisheries Technical Paper*. No. 470. Rome. FAO. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013. Directorate of Fisheries: http://www.fiskeridir.no/english/fisheries JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.2.2: Norway NEA cod and haddock - All gears

PI 2.2.2		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to maintain the main bycatch 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.	There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch 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.	There is a strategy in place for managing and minimizing bycatch.
	Met?	Y	Y	Y
	Justification	All commercial species must be retained and landed as discarding of commercial species is prohibited (although it has been estimated that across all Norwegian fisheries there is a weighted discard level of 3.9%). Non-commercial species are overwhelmingly small species that are able to pass through 140 mm mesh or the sorting grids without being retained. The strategy is to continue using large cod-end mesh and sorting grids to eliminate the risk of retaining small fishes.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (*e.g.* general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	Y	N
	Justification	The testing is the practical and operational experience of the fishing skippers who very rarely, if ever, see non-commercial species in the trawl. More detailed evidence collected in the course of the Norwegian observer programme confirms that very small numbers of non-commercial species are taken in the Barents Sea fisheries. Apart from this evidence, which provides the objective basis for confidence in the efficacy of the strategy, there has been no formal testing, as required by the SG100.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N

PI 2.2.2		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		
	Justification	The essence of the strategy is to avoid the capture of all but the target species; the principal means to achieve this objective is to optimise the conditions for non-target (bycatch) species to escape, either through the sorting grid or large-mesh cod end. The evidence that these measures are effective comes from the operational experience of the fishing skippers, supported by both IMR observers and DoF, who very rarely see non-commercial species in the trawl. Furthermore, evidence collected in a Norwegian observer programme confirms that very small numbers of non-commercial species are taken in the Barents Sea fisheries.		
d	Guidepost			There is some evidence that the strategy is achieving its overall objective.
	Met?			Y
	Justification	The overall objective is to ensure that bycatch species are not subject to overexploitation. Such species are predominantly small <30–40 cm) species that can pass readily through the sorting grid or 140 mm cod-end mesh. Analysis of data gathered by reference-fleet observers has confirmed that very small numbers of non-commercial bycatch species are caught These data provide the evidence that the strategy is achieving its overall objective.		
References		Bowering, R., Storr-Paulsen, M., Tingley, G., Bjørkan, M., Vølstad, H. H., Gullestad, P. & Lorentsen, E. (2011). *Evaluation of the Norwegian Reference Fleet*. Institute of Marine Research, Bergen Gullestad, P., 2013. The "Discard Ban Package" – Norwegian experiences in efforts to improve fisheries exploitation patterns. Directorate of Fisheries, Bergen, Norway. Kelleher, K. 2004. Discards in the world's marine fisheries: an update. FAO Fisheries Technical Paper 470. NSMP. 2010. Integrated Management of the Marine Environment of the Norwegian Sea. Report No. 37 (2008–2009) to the Storting. Ministry of the Environment, Oslo. BSMP, 2006. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report No. 8 to the Storting. Ministry of the Environment,Oslo.		
OVERALL PERFORMANCE INDICATOR SCORE:				**85**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.2.3: Norway NEA cod and haddock - All gears

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Qualitative information is available on the amount of main bycatch species taken by the fishery.	Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery.	Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations.
	Met?	Y	Y	N
	Justification	For all practical purposes the by-catch of non-target species is 0. Nevertheless, the reference-fleet observer programme shows that there is a small amount of bycatch but the quantities across the fleet can only be estimated by inference, which falls short of the SG 100 criteria.		
b	**Guidepost**	Information is adequate to broadly understand outcome status with respect to biologically based limits	Information is sufficient to estimate outcome status with respect to biologically based limits.	Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty.
	Met?	Y	Y	N
	Justification	All commercial species must be retained and landed as discarding is prohibited. Thus, any bycatch species are non-commercial for which there are no known or defined biologically based limits. In the absence of such measures but with the knowledge that bycatch is virtually zero, it is reasonable to assume that the fishery has no adverse effects or implications with respect to the inherent biological limits of these non-commercial species. For the (non-commercial) bycatch species, however, there is no prospect of anyone making quantitative estimates with respect to biologically based limits of species such as pipefish or four-bearded rockling, for example. Such assessment can only be made by inference from their ubiquity and wide distribution.		
c	**Guidepost**	Information is adequate to support measures to manage bycatch.	Information is adequate to support a partial strategy to manage main bycatch species.	Information is adequate to support a strategy to manage bycatch species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	Y
	Justification	In essence, the strategy is to minimise the catch of non-target fish, including undersize target species. The fishing gear in use is designed to minimise the capture of (predominantly small) bycatch species. The information gathered by the offshore demersal reference fleet has shown that the quantities of (non-commercial) bycatch species are sufficiently small that data available are of sufficient quantitative quality to evaluate with a high degree of certainty that the strategy is achieving its objective.		

PI 2.2.3		Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch		
d	Guidepost		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 effectively of the strategy).	Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.
	Met?		Y	N
	Justification	Monitoring of bycatch is limited to a small number of reference fleet vessels, which provide sufficient data to detect trends or cause for concern but lack the detail to assess ongoing mortalities to all bycatch species.		
References		Bowering, R., Storr-Paulsen, M., Tingley, G., Bjørkan, M., Vølstad, H. H., Gullestad, P. & Lorentsen, E. (2011). *Evaluation of the Norwegian Reference Fleet*. Institute of Marine Research, Bergen Skaret, G. & Pitcher , T. J., 2006. An estimation of compliance of the fisheries of Norway with Article 7 (Fisheries Management) of the UN Code of Conduct for Responsible Fishing. FAO, Rome. Kelleher, K. 2004. Discards in the world's marine fisheries: an update. FAO Fisheries Technical Paper 470.		
OVERALL PERFORMANCE INDICATOR SCORE:				**85**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.3.1: Norway NEA cod and haddock - Trawl, Danish seine, jiggers

PI 2.3.1		**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.	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.	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.
	Met?	Y	N for golden redfish Y for other species	N

PI 2.3.1		**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**
	Justification	The electronic logbook system requires that not only commercial fishes are recorded but also ETP species, principally seabirds and marine mammals. A particular logbook 'page' cannot be closed until the ETP boxes are completed, even if it is with a zero. As yet, these data have not been extracted from logbooks for analysis, consequently, conclusions fall short of the level required for SG 100. Skippers are also required to avoid all known coral reefs and report all catches of coral >60 kg and sponges >800 kg (but frequently report lesser quantities: Directorate, pers comm.), and move on ≥2 miles. ETP species in the NE Arctic comprise Norwegian Red List fishes (some of which have been covered under retained species, above), seabirds and marine mammals. Their distribution and abundance are all monitored in the course of annual IMR–PINRO Barents Sea and IMR Norwegian Sea ecosystem surveys. The fishes are principally large elasmobranchs: basking shark *Cetorhinus maximus*, porbeagle *Lamna nasus*; rays: starry ray *Amblyraja radiata*, blue skate *Dipturus batis* (complex), sandy ray *Leucoraja circularis*; dogfish: picked dogfish *Squalus acanthias*; plus golden redfish. There are specific measures prohibiting targeted fishing for the golden redfish, other than in licensed seasonal gillnet and longline fisheries, there are bycatch per haul and quota limits. While it is impractical for vessels to avoid any golden redfish bycatch, the bycatch limits are relatively generous and should be made more demanding as a means to reducing the catch (ICES advice is for a zero TAC) and optimisng potential for stock recovery (**Score 60**). Spur dogfish, basking shark and porbeagle; in common with the other Red List species, when caught they taken as rare individuals. Consequently, it is highly likely that, with the exception of golden redfish, the effects of the fishery on Red List fishes are within limits of national and international requirements for protection of ETP species. Seabirds and marine mammal populations are monitored in Norway, no less assiduously than the fish populations, by NINA and IMR, respectively. Although there is always concern with respect to static-gear fisheries, the ICES working group on seabird ecology (WGSE) has not identified other gears used in NE Arctic fisheries as specific cause for concern. No records of seabird capture have been made in the statutory logbooks nor have they been recorded by observers in the reference fleet. This does not mean that seabirds are never caught in trawls or seines, particularly during the hauling process when birds try to take fish caught in the meshes, but the consensus of IMR and DoF opinion is that numbers are *n* per decade rather than *N* per year. Consequently, it is highly likely that the effects of the fishery on seabirds are within limits of national and international requirements for protection of ETP species. As with seabirds, it is generally recognised that marine mammals, particularly small cetaceans and seals, are most vulnerable to capture by static gear rather than mobile gears or jigger. The problem of fishery–mammal interactions is kept under regular review by both NAMMCO and the ICES Working Group on Marine Mammal Ecology (WGMME), neither of which has identified NE Arctic trawl, Danish seine or jigger fisheries as cause for concern. No records of marine mammal capture have been made in the statutory logbooks nor have they been recorded by observers in the reference fleet; it is the consensus opinion of IMR and DoF that this is not a problem in the NE Arctic trawl fisheries. Consequently, it is highly likely that the effects of the fishery on marine mammals are within limits of national and international requirements for protection of ETP species.

PI 2.3.1		**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**		
b	**Guidepost**	Known direct effects are unlikely to create unacceptable impacts to ETP species.	Direct effects are highly unlikely to create unacceptable impacts to ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
	Met?	Y	N for golden redfish Y for other species	N
	Justification	Potentially, the direct effects are capture and mortality. Even though catches mayt be small, any catch of golden redfish is contrary to current ICES advice and the potential for stock recovery (**score 60**). All the indicators are that the capture of other Red List fishes, seabirds and mammals by trawl, Danish seine or jigger is sufficiently rare that one can conclude that it is highly unlikely that there are any significant detrimental effects of this fishery on ETP species.		
c	**Guidepost**		Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	Met?		Y	N
	Justification	The principal indirect effect is competition for prey species between the target fish (cod) and the ETP species or the removal of cod from the food web. Adult cod are known to be prey to some cetaceans and seals and seabirds quite possibly take them as inshore juveniles, so there is the potential for the fishery to be in significant competition with these predators. There are also predator–prey interactions with other fishes, notably capelin and herring, that influence not only the abundance of prey and predator but also influence the degree of cannibalism among cod. Any of these relationships could suffer negative effects if the NEA cod stock were in serious decline or depleted. For the past decade, however, the NEA cod stock has been increasing in abundance and currently stands at record high levels. This being the case, there would appear to be *prime facie* evidence that the fishery is not having a significant effect on the stock that might be detrimental to other predators even if the elevated stock is having a depressive effect on some prey species.		
References		http://www.imr.no/forskning/faggrupper/sjopattedyr/en ACOM$_{seabirds}$, 2012. Ecoregion: General advice – EcoQO for seabird populations in OSPAR regions II and III. ICES Advice Book 1.5.5.1 ACOMseabirds, 2012. Ecoregion: General advice – EcoQO for seabird populations in OSPAR regions II and III. ICES Advice Book 1.5.5.1 AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. Albert, O. T., 2012. Spiny dogfish. Institute of Marine Research, Bergen.http://www.imr.no/temasider/fisk/hai/piggha/piggha/en Anker-Nilssen T. 1992. Food supply as a determinant of reproduction and population development in Norwegian Puffins *Fratercula arctica*. Dr. scient. thesis terr. ecology, Univ. Trondheim. Barrett, B., Anker-Nilssen, T., Bustnes, J. O., Christensen-Dalsgaard,, S., Descamps, S., Erikstad, K.-E., Lorentsen, S.-H., Strøm, H. & Systad, G.H., 2012. Key-site monitoring in Norway 2011. Seapop Short Report 1–2012. Barrett, B., Anker - Nilssen, T., Bustnes, J. O., Christensen - Dalsgaard,, S., Descamps, S., Erikstad, K.-E., Lorentsen, S.-H., Strøm, H. & Systad, G.H.,		

PI 2.3.1	**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**
	2012. Key-site monitoring in Norway 2011. Seapop Short Report 1–2012. NINA, Oslo. Barth E.K. 1978. Lundetragedien på Røst. Fauna (Oslo) 31: 273-274. BirdLife Workshop on Seabird Bycatch in Gillnet Fisheries. Symposium proceedings.http://www.birdlife.org/eu/pdfs/20120703_GillnetSeabirdBycatch WorkshopREPORT.pdf Bjørge, A., Lydersen, *c.*, Skern-Mauritzen, M. & Wiig, Ø. (Eds), 2010. Marine Mammals. Fisken og havet, special edition 2–2010. Bjørge, Q. 2008. New research programme focusing on coastal and fjord ecosystems. Marine News 3–2008. http://www.imr.no/epigraph/filarkiv/hi_news_3_eng_web.pdf/nb-no Bowering, R., Storr-Paulsen, M., Tingley, G., Bjørkan, M., Vølstad, J., Gullestad, P. & Lorentsen, E., 2011. Evaluation of the Norwegian Reference Fleet. Institute of Marine Research, Bergen. Dulvy, N.K., Notarbartolo di Sciara, G., Serena, F., Tinti, F. & Ungaro, N., Mancusi, *c.* & Ellis, J. 2006. *Dipturus batis*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. Erikstad, K.E., T.K., Barrett, R.T, Vikebø, F. & SANDVIK, H., (2013). Temporal variations in fish abundance affects seabird populations: cod – guillemot interactions in the Barents Sea. Proceedings of the Annual Larval Fish Conference 2013. Miami Florida. Fangel, K., Nedreaas, K., Aas, Ø., Vølstad, J., Wold, L., Christensen-Dalsgaard, S., Anker-Nilssen, Y. & Overvik, M. 2014. Unintended bycatch of seabirds in Norwegian coastal fisheries: comparison of estimation methods. Presentation at the Second Symposium on Fishery-Dependent Information (FDI), 3-6 March 2014 in Rome, Italy. http://www.imr.no/prosjektsiter/fdi/presentations/pdfs/bycatch_of_seabirds_in_norwegian_coastal_fisheries_final.pdf/en Fowler, S. L. 2005. *Cetorhinus maximus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1 Greenstreet S.P.R., Becker P.H., Barrett R.T., Fossum P. & Leopold M.F. 1999. Consumption of pre-recruit fish by seabirds and the possible use of this as an indicator of fish stock recruitment. In: Furness R.W. & Tasker M.L. (eds) Diets of seabirds and consequences of changes in food supply: pp. 6-17. ICES Cooperative Research Report 232. Hjøllo, S.S., 2007. EcoFish WP2 workandWind, NAO and ecosystem-selected articles. IMR, Bergen. Lid., G. 1981. Reproduction of the Puffin on Røst in the Lofoten Islands in 1964-1980. Fauna Norvegica C 4: 30–39. Marine mammals: http://www.imr.no/temasider/sjopattedyr/en NAMMCO, 2014. Report of the Twentieth Meeting of the Scientific Committee of NAMMCO. Tromso. http://www.nammco.no/webcronize/images/Nammco/1001.pdfpdf NINA, Oslo. http://www.seapop.no/no/files/short-reports/2012/seapop-short-report-1-2012.pdf PGNAPES, 2009. Report of the Planning Group on Northeast Atlantic Pelagic Ecosystem Surveys (PGNAPES). ACOM ICES CM 2009/RMC:06 Red list of Norway's marine fish: http://www.fishbase.org/Country/CountryChecklist.php?c_code=578&vhabitat=threatened&csub_code= Stevens, J., Fowler, S.L., Soldo, A., McCord, M., Baum, J., Acuña, E., Domingo, A. & Francis, M. 2006. *Lamna nasus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. Vader W., Anker-Nilssen T., Bakken V., Barrett R. & Strann K.B. 1989. Regional and temporal differences in breeding success and population development of fish eating seabirds in Norway after collapses of herring and capelin stocks.

PI 2.3.1	**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**
	Trans. 19th IUGB Congress, Trond-heim 1989: 143-150. WGBYC, 2014. Report of the Working Group on Bycatch of Protected Species. ICES CM 2014/ACOM:28 WGMME, 2014. Report of the Working Group on Marine Mammal Ecology. ICES CM 2014/ACOM:27. WGSE, 2013. Report of the Working Group on Seabird Ecology. ICES CM 20131/SSGEF:19. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.
OVERALL PERFORMANCE INDICATOR SCORE:	**75**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.3.1: Norway NEA cod and haddock - Gillnet

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.	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.	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.
	Met?	Y	N for golden redfish and porpoises Y for other species	N

PI 2.3.1		**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**
	Justification	The electronic logbook system requires that not only commercial fishes are recorded but also ETP species, principally seabirds and marine mammals. A particular logbook 'page' cannot be closed until the ETP boxes are completed, even if it is with a zero. As yet, these data have not been extracted from logbooks for analysis, consequently, conclusions fall short of the level required for SG 100. Skippers are also required to avoid all known coral areas and report all catches of coral >60 kg and sponges >800 kg (but such catches are highly improbable in gill nets), and move on ≥2 miles. ETP species in the NE Arctic comprise Norwegian Red List fishes (some of which have been covered under retained species, above), seabirds and marine mammals. Their distribution and abundance are all monitored in the course of annual IMR–PINRO Barents Sea and IMR Norwegian Sea ecosystem surveys. The fishes are principally large elasmobranchs: basking shark *Cetorhinus maximus*, porbeagle *Lamna nasus*; rays: starry ray *Amblyraja radiata*, blue skate *Dipturus batis* (complex), sandy ray *Leucoraja circularis*; dogfish: picked dogfish *Squalus acanthias*. There are specific measures prohibiting targeted fishing for the dogfish, basking shark and porbeagle but if caught they should be landed. (In practice, if still alive they are more likely to be released.) Nevertheless, all have been recorded at minor levels (i.e. << 0.1% of total gillnet catch; Table 18). There are specific measures prohibiting targeted fishing for the golden redfish, other than in licensed seasonal gillnet fishery, there are bycatch per haul and quota limits. While it is impractical for vessels to avoid any golden redfish bycatch, the bycatch limits are relatively generous and should be made more demanding as a means to reducing the catch (ICES advice is for a zero TAC) and optimisng potential for stock recovery (**score 60**). (This problem is exacerbated by the licensed seasonal gillnet fishery targeting redfish, i.e. a fishery separate from the cod and haddock fishery). Other Red List species are taken as rare individuals, consequently, it is highly likely that the effects of the fishery on Red List fishes are within limits of national and international requirements for protection of ETP species. Seabirds and marine mammal populations are monitored in Norway, no less assiduously than the fish populations, by NINA and IMR, respectively, and there is always concern with respect to static-gear fisheries. To mitigate some of these concerns, there are restrictions on the use of gillnets in some inshore areas during the bird breeding season (spring). The most recent joint IMR–NINA survey and analysis of seabird captures in 2009 estimated that less than 3000 seabirds (all species combined) were taken in the cod gillnet fishery. While undesirable, these numbers are small relative to the size of the seabird populations in the NEA Arctic. The number of seabirds recorded by the Norwegian reference fleet is very few and surveys with a remote electronic monitoring system of gillnet and longline fishing (in the Baltic) found that in >1000 hours of recording during hauling operations, only 136 seabirds were captured (both gears combined) and no marine mammals. By observation and inference, therefore, these reports would tend to confirm the industry's contention that the capture of seabirds, by any method of fishing, is extremely rare. As with seabirds, it is generally recognised that marine mammals, particularly small cetaceans and seals, are most vulnerable to capture by static gear rather than mobile gears or jigger. NAMMCO has drawn attention to this with respect to harbour porpoise *Phocoena phocoena* and the Norwegian gillnet fisheries for cod and anglerfish *Lophius piscatorius.* It has been suggested that the numbers taken (possibly 6000–7000 per year) in these fisheries may be more than the population can sustain but the total population size is unknown. These concerns are sufficiently great that they have triggered a gillnet-based CRISP research programme to investigate means of reducing this undesirable catch. In addition to NAMMCO, the problem of fishery–mammal interactions is kept under regular review by the ICES Working Group on Marine Mammal Ecology (WGMME). No marine mammals were captured during the filming project (above) and their occurrence in the reference fleet is rare. Consequently, with the possible exception of the gillnet fishery and porpoises (hence **score 60**), it is highly likely that the effects of the fishery on marine mammals are within limits of national and international requirements for protection of ETP species.

PI 2.3.1		**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**		
b	**Guidepost**	Known direct effects are unlikely to create unacceptable impacts to ETP species.	Direct effects are highly unlikely to create unacceptable impacts to ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
	Met?	Y	N for golden redfish and porpoises Y for other species	N
	Justification	Potentially, the direct effects are capture and mortality. All the indicators are that, with the exception of golden redfish, the capture or Red List fishes and seabirds is sufficiently rare that one can conclude with a high degree of certainty that there are no significant detrimental effects of this fishery on these groups of ETP species. In its most recent report NAMMCO has reported, for the first time, specific concern that the number of porpoises taken in the cod and monkfish) gillnet fishery. The question has been raised as to whether or not the estimated 6000–7000 porpoises (C.V. 30%) is more that the population can sustain but, as the total population size has yet to be estimated, the question is more rhetorical than a statement of fact. As specific concerns have not been raised in this context hitherto, despite the historical widespread use of gillnets, and porpoises are self-evidently both widely distributed and numerous in the NE Arctic, it seems appropriate at this stage to raise a condition on the fishery to enhance data acquisition rather than fail the fishery on this point. Comparable concerns have not been raised with respect to other marine mammals.		
c	**Guidepost**		Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	Met?		Y	N
	Justification	The principal indirect effect is competition for prey species between the target fish (cod) and the ETP species or the removal of cod from the food web. Adult cod are known to be prey to some cetaceans and seals and seabirds quite possibly take then as inshore juveniles, so there is the potential for the fishery to be in significant competition with these predators. There are also predator–prey interactions with other fish, notably capelin and herring, that influence not only the abundance of prey and predator but also influence the degree of cannibalism among cod. Any of these relationships could suffer negative effects if the NEA cod stock were in serious decline or depleted. For the past decade, however, the NEA cod stock has been increasing in abundance and currently stands at record high levels. This being the case, there would appear to be *prime facie* evidence that the fishery is not having a significant effect on the stock that might be detrimental to other predators even if the elevated stock is having a depressive effect on some prey species.		
References		http://www.imr.no/forskning/faggrupper/sjopattedyr/en ACOM$_{seabirds}$, 2012. Ecoregion: General advice – EcoQO for seabird populations in OSPAR regions II and III. ICES Advice Book 1.5.5.1 ACOMseabirds, 2012. Ecoregion: General advice – EcoQO for seabird populations in OSPAR regions II and III. ICES Advice Book 1.5.5.1 AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05.		

PI 2.3.1	**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**
	Albert, O. T., 2012. Spiny dogfish. Institute of Marine Research, Bergen.http://www.imr.no/temasider/fisk/hai/piggha/piggha/en Anker-Nilssen T. 1992. Food supply as a determinant of reproduction and population development in Norwegian Puffins *Fratercula arctica*. Dr. scient. thesis terr. ecology, Univ. Trondheim. Barrett, B., Anker-Nilssen, T., Bustnes, J. O., Christensen-Dalsgaard,, S., Descamps, S., Erikstad, K.-E., Lorentsen, S.-H., Strøm, H. & Systad, G.H., 2012. Key-site monitoring in Norway 2011. Seapop Short Report 1–2012. Barrett, B., Anker - Nilssen, T., Bustnes, J. O., Christensen - Dalsgaard,, S., Descamps, S., Erikstad, K.-E., Lorentsen, S.-H., Strøm, H. & Systad, G.H., 2012. Key-site monitoring in Norway 2011. Seapop Short Report 1–2012. NINA, Oslo. Barth E.K. 1978. Lundetragedien på Røst. Fauna (Oslo) 31: 273-274. Bjørge, A., Skern-Mauritzen, M. and Rossman, M.C. 2013. Estimated bycatch of harbour porpoise (*Phocoena phocoena*) in two coastal gillnet fisheries in Norway, 2006–2008. Mitigation and implications for conservation. *Biological Conservation.* 161: 164–173. http://dx.doi.org/10.1016/j.biocon.2013.03.009 BirdLife Workshop on Seabird Bycatch in Gillnet Fisheries. Symposium proceedings.http://www.birdlife.org/eu/pdfs/20120703_GillnetSeabirdBycatchWorkshopREPORT.pdf Bjørge, A., Lydersen, *c.*, Skern-Mauritzen, M. & Wiig, Ø. (Eds), 2010. Marine Mammals. Fisken og havet, special edition 2–2010. Bjørge, Q. 2008. New research programme focusing on coastal and fjord ecosystems. Marine News 3–2008. http://www.imr.no/epigraph/filarkiv/hi_news_3_eng_web.pdf/nb-no Bowering, R., Storr-Paulsen, M., Tingley, G., Bjørkan, M., Vølstad, J., Gullestad, P. & Lorentsen, E., 2011. Evaluation of the Norwegian Reference Fleet. Institute of Marine Research, Bergen. Dulvy, N.K., Notarbartolo di Sciara, G., Serena, F., Tinti, F. & Ungaro, N., Mancusi, *c.* & Ellis, J. 2006. *Dipturus batis*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. Erikstad, K.E., T.K., Barrett, R.T, Vikebø, F. & SANDVIK, H., (2013). Temporal variations in fish abundance affects seabird populations: cod – guillemot interactions in the Barents Sea. Proceedings of the Annual Larval Fish Conference 2013. Miami Florida. Fangel, K., Nedreaas, K., Aas, Ø., Vølstad, J., Wold, L., Christensen-Dalsgaard, S., Anker-Nilssen, Y. & Overvik, M. 2014. Unintended bycatch of seabirds in Norwegian coastal fisheries: comparison of estimation methods. Presentation at the Second Symposium on Fishery-Dependent Information (FDI), 3-6 March 2014 in Rome, Italy. http://www.imr.no/prosjektsiter/fdi/presentations/pdfs/bycatch_of_seabirds_in_norwegian_coastal_fisheries_final.pdf/en Fowler, S. L. 2005. *Cetorhinus maximus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1 Greenstreet S.P.R., Becker P.H., Barrett R.T., Fossum P. & Leopold M.F. 1999. Consumption of pre-recruit fish by seabirds and the possible use of this as an indicator of fish stock recruitment. In: Furness R.W. & Tasker M.L. (eds) Diets of seabirds and consequences of changes in food supply: pp. 6-17. ICES Cooperative Research Report 232. Hjøllo, S.S., 2007. EcoFish WP2 workandWind, NAO and ecosystem-selected articles. IMR, Bergen. Lid., G. 1981. Reproduction of the Puffin on Røst in the Lofoten Islands in 1964-1980. Fauna Norvegica C 4: 30–39. Marine mammals: http://www.imr.no/temasider/sjopattedyr/en NAMMCO, 2014. Report of the Twentieth Meeting of the Scientific Committee of

PI 2.3.1	**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**
	NAMMCO. Tromso. http://www.nammco.no/webcronize/images/Nammco/1001.pdfpdf NINA, Oslo. http://www.seapop.no/no/files/short-reports/2012/seapop-short-report-1-2012.pdf PGNAPES, 2009. Report of the Planning Group on Northeast Atlantic Pelagic Ecosystem Surveys (PGNAPES). ACOM ICES CM 2009/RMC:06 Red list of Norway's marine fish: http://www.fishbase.org/Country/CountryChecklist.php?c_code=578&vhabitat=threatened&csub_code= Stevens, J., Fowler, S.L., Soldo, A., McCord, M., Baum, J., Acuña, E., Domingo, A. & Francis, M. 2006. *Lamna nasus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. Vader W., Anker-Nilssen T., Bakken V., Barrett R. & Strann K.B. 1989. Regional and temporal differences in breeding success and population development of fish eating seabirds in Norway after collapses of herring and capelin stocks. Trans. 19th IUGB Congress, Trond-heim 1989: 143-150. WGBYC, 2014. Report of the Working Group on Bycatch of Protected Species. ICES CM 2014/ACOM:28 WGMME, 2014. Report of the Working Group on Marine Mammal Ecology. ICES CM 2014/ACOM:27. WGSE, 2013. Report of the Working Group on Seabird Ecology. ICES CM 20131/SSGEF:19. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.
OVERALL PERFORMANCE INDICATOR SCORE:	**70**
CONDITION NUMBER (if relevant):	**3 Porpoise** **6 Golden redfish**

Evaluation Table for PI 2.3.1: Norway NEA cod and haddock - Longline

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species.	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.	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.
	Met?	Y	N for golden redfish Y for other species	N

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species		
	Justification	The electronic logbook system requires that not only commercial fishes are recorded but also ETP species, principally seabirds and marine mammals. A particular logbook 'page' cannot be closed until the ETP boxes are completed, even if it is with a zero. As yet, these data have not been extracted from logbooks for analysis, consequently, conclusions fall short of the level required for SG 100. ETP species in the NE Arctic comprise Norwegian Red List fishes (some of which have been covered under retained species, above), seabirds and marine mammals. Their distribution and abundance are all monitored in the course of annual IMR–PINRO Barents Sea and IMR Norwegian Sea ecosystem surveys. The fishes are principally large elasmobranchs: basking shark *Cetorhinus maximus*, porbeagle *Lamna nasus*; rays: starry ray *Amblyraja radiata*, blue skate *Dipturus batis* (complex), sandy ray *Leucoraja circularis*; dogfish: picked dogfish *Squalus acanthias.* There are specific measures prohibiting targeted fishing for the dogfish, basking shark and porbeagle but if caught they should be landed. (In practice, if still alive they are more likely to be released.) Nevertheless, all have been recorded at minor levels (i.e. << 0.1% of total gillnet catch; Table 18). Similarly, there are specific measures prohibiting targeted fishing for the golden redfish, other than in licensed seasonal longline fishery, there are bycatch per haul and quota limits. While it is impractical for vessels to avoid any golden redfish bycatch, the bycatch limits are relatively generous and should be made more demanding as a means to reducing the catch (ICES advice is for a zero TAC) and optimisng potential for stock recovery (**score 60**). (This problem is exacerbated by the licensed seasonal longline fishery targeting redfish, i.e. a fishery separate from the cod and haddock fishery). Other Red List species are taken as rare individuals, consequently, it is highly likely that the effects of the fishery on Red List fishes are within limits of national and international requirements for protection of ETP species. Seabirds and marine mammal populations are monitored in Norway, no less assiduously than the fish populations, by NINA and IMR, respectively. Although there is always concern with respect to static-gear fisheries, the ICES working group on seabird ecology (WGSE) has not identified other gears used in NE Arctic fisheries as specific cause for concern. No records of seabird capture have been made in the statutory logbooks but occasional captures have been recorded by observers in the reference fleet. The most recent joint IMR–NINA survey and analysis of seabird captures in 2009 estimated that less than 3000 seabirds (all species combined) were taken in the cod longline fishery. While undesirable, these numbers are small relative to the size of the seabird populations in the NEA Arctic. These findings are consistent with the ICES working group on seabird ecology, which has not identified NE Arctic fisheries as specific cause for concern. Most vessels either fly streamers or use gas canons to deter birds from taking bait and drowning. Furthermore, surveys with a remote electronic monitoring system of gillnet and longline fishing (in the Baltic), however, found that in >1000 hours of recording during hauling operations, only 136 seabirds were captured (both gears combined). By observation and inference, therefore, these reports would tend to confirm the industry's contention that the capture of seabirds, by any method of fishing, is extremely rare. In comparison with birds, marine mammals are not seen to be vulnerable to capture by longline.		
b	**Guidepost**	Known direct effects are unlikely to create unacceptable impacts to ETP species.	Direct effects are highly unlikely to create unacceptable impacts to ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species.
	Met?	Y	N for golden redfish Y for other species	N

PI 2.3.1		The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species		
	Justification	Potentially, the direct effects are capture and mortality. All the indicators are that, with the exception of golden redfish, the capture or Red List fishes and seabirds is sufficient rare that one can conclude it is highly unlikely that there are any significant detrimental effects of this fishery on ETP species.		
c	Guidepost		Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.	There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.
	Met?		Y	N
	Justification	The principal indirect effect is competition for prey species between the target fish (cod) and the ETP species or the removal of cod from the food web. Adult cod are known to be prey to some cetaceans and seals and seabirds quite possibly take then as inshore juveniles, so there is the potential for the fishery to be in significant competition with these predators. There are also predator–prey interactions with other fish, notably capelin and herring, that influence not only the abundance of prey and predator but also influence the degree of cannibalism among cod. Any of these relationships could suffer negative effects if the NEA cod stock were in serious decline or depleted. For the past decade, however, the NEA cod stock has been increasing in abundance and currently stands at record high levels. This being the case, there would appear to be *prime facie* evidence that the fishery is not having a significant effect on the stock that might be detrimental to other predators even if the elevated stock is having a depressive effect on some prey species.		
References		http://www.imr.no/forskning/faggrupper/sjopattedyr/en ACOM$_{seabirds}$, 2012. Ecoregion: General advice – EcoQO for seabird populations in OSPAR regions II and III. ICES Advice Book 1.5.5.1 ACOMseabirds, 2012. Ecoregion: General advice – EcoQO for seabird populations in OSPAR regions II and III. ICES Advice Book 1.5.5.1 AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. Albert, O. T., 2012. Spiny dogfish. Institute of Marine Research, Bergen.http://www.imr.no/temasider/fisk/hai/piggha/piggha/en Anker-Nilssen T. 1992. Food supply as a determinant of reproduction and population development in Norwegian Puffins *Fratercula arctica*. Dr. scient. thesis terr. ecology, Univ. Trondheim. Barrett, B., Anker-Nilssen, T., Bustnes, J. O., Christensen-Dalsgaard,, S., Descamps, S., Erikstad, K.-E., Lorentsen, S.-H., Strøm, H. & Systad, G.H., 2012. Key-site monitoring in Norway 2011. Seapop Short Report 1–2012. Barrett, B., Anker - Nilssen, T., Bustnes, J. O., Christensen - Dalsgaard,, S., Descamps, S., Erikstad, K.-E., Lorentsen, S.-H., Strøm, H. & Systad, G.H., 2012. Key-site monitoring in Norway 2011. Seapop Short Report 1–2012. NINA, Oslo. Barth E.K. 1978. Lundetragedien på Røst. Fauna (Oslo) 31: 273-274. BirdLife Workshop on Seabird Bycatch in Gillnet Fisheries. Symposium proceedings.http://www.birdlife.org/eu/pdfs/20120703_GillnetSeabirdBycatchWorkshopREPORT.pdf Bjørge, A., Lydersen, *c.*, Skern-Mauritzen, M. & Wiig, Ø. (Eds), 2010. Marine Mammals. Fisken og havet, special edition 2–2010.		

PI 2.3.1	**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**
	Bjørge, Q. 2008. New research programme focusing on coastal and fjord ecosystems. Marine News 3–2008. http://www.imr.no/epigraph/filarkiv/hi_news_3_eng_web.pdf/nb-no Bowering, R., Storr-Paulsen, M., Tingley, G., Bjørkan, M., Vølstad, J., Gullestad, P. & Lorentsen, E., 2011. Evaluation of the Norwegian Reference Fleet. Institute of Marine Research, Bergen. Dulvy, N.K., Notarbartolo di Sciara, G., Serena, F., Tinti, F. & Ungaro, N., Mancusi, *c.* & Ellis, J. 2006. *Dipturus batis*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. Erikstad, K.E., T.K., Barrett, R.T, Vikebø, F. & SANDVIK, H., (2013). Temporal variations in fish abundance affects seabird populations: cod – guillemot interactions in the Barents Sea. Proceedings of the Annual Larval Fish Conference 2013. Miami Florida. Fangel, K., Nedreaas, K., Aas, Ø., Vølstad, J., Wold, L., Christensen-Dalsgaard, S., Anker-Nilssen, Y. & Overvik, M. 2014. Unintended bycatch of seabirds in Norwegian coastal fisheries: comparison of estimation methods. Presentation at the Second Symposium on Fishery-Dependent Information (FDI), 3-6 March 2014 in Rome, Italy. http://www.imr.no/prosjektsiter/fdi/presentations/pdfs/bycatch_of_seabirds_in_norwegian_coastal_fisheries_final.pdf/enFowler, S. L. 2005. *Cetorhinus maximus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1 Greenstreet S.P.R., Becker P.H., Barrett R.T., Fossum P. & Leopold M.F. 1999. Consumption of pre-recruit fish by seabirds and the possible use of this as an indicator of fish stock recruitment. In: Furness R.W. & Tasker M.L. (eds) Diets of seabirds and consequences of changes in food supply: pp. 6-17. ICES Cooperative Research Report 232. Hjøllo, S.S., 2007. EcoFish WP2 workandWind, NAO and ecosystem-selected articles. IMR, Bergen. Lid., G. 1981. Reproduction of the Puffin on Røst in the Lofoten Islands in 1964-1980. Fauna Norvegica C 4: 30–39. Marine mammals: http://www.imr.no/temasider/sjopattedyr/en NAMMCO, 2014. Report of the Twentieth Meeting of the Scientific Committee of NAMMCO. Tromso. http://www.nammco.no/webcronize/images/Nammco/1001.pdfpdf NINA, Oslo. http://www.seapop.no/no/files/short-reports/2012/seapop-short-report-1-2012.pdf PGNAPES, 2009. Report of the Planning Group on Northeast Atlantic Pelagic Ecosystem Surveys (PGNAPES). ACOM ICES CM 2009/RMC:06 Red list of Norway's marine fish: http://www.fishbase.org/Country/CountryChecklist.php?c_code=578&vhabitat=threatened&csub_code= Stevens, J., Fowler, S.L., Soldo, A., McCord, M., Baum, J., Acuña, E., Domingo, A. & Francis, M. 2006. *Lamna nasus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. Vader W., Anker-Nilssen T., Bakken V., Barrett R. & Strann K.B. 1989. Regional and temporal differences in breeding success and population development of fish eating seabirds in Norway after collapses of herring and capelin stocks. Trans. 19th IUGB Congress, Trond-heim 1989: 143-150. WGBYC, 2014. Report of the Working Group on Bycatch of Protected Species. ICES CM 2014/ACOM:28 WGMME, 2014. Report of the Working Group on Marine Mammal Ecology. ICES CM 2014/ACOM:27. WGSE, 2013. Report of the Working Group on Seabird Ecology. ICES CM 20131/SSGEF:19. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P.,

PI 2.3.1	**The fishery meets national and international requirements for the protection of ETP species** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**
	Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.

OVERALL PERFORMANCE INDICATOR SCORE:	**75**
CONDITION NUMBER (if relevant):	**6 - Golden redfish**

Evaluation Table for PI 2.3.2: Norway NEA cod and haddock - Trawl, Danish seine, jigger

PI 2.3.2		The fishery has in place precautionary management strategies designed to: • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	Y	Y	N
	Justification	The strategy is set out in the Norwegian Marine Resources Act, in the protocol for the JRNFC and the Norwegian seas management plans, which explicitly requires an ecosystem approach to marine environmental management. The act also requires that all commercial fish species are retained, recorded and landed and that vessels equipped with elogbooks must record interactions with seabirds and marine mammals. (Paper logbooks are still required in the Russian zone.) Primarily, measures are designed to minimise contact with ETP species, including RL fish. Marine mammal and seabird stock monitoring and abundance estimates are made by IMR and NINA and records of all biota are made during annual IMR–PINRO trawl surveys undertaken under the auspices of JRNFC. The absence of any specific concerns with respect to these populations and the bottom-contact gear fisheries is clear evidence that the strategy is being implemented successfully. Where there is deemed to be cause for concern, *e.g.* relatively high catches of redfishes or spurdogs, specific measures are implemented, *e.g.* move-on and real-time closures. There are permanent and seasonal closures of inshore waters in the vicinity of key seabird nesting sites. All of the measures and practices enshrined or implied within the national strategy are aimed at ensuring they meet international and, by definition, national "requirements" but it is difficult to envisage how a national strategy can exceed national requirement when they are the same thing.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (*e.g.*, general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	Y	Y	N

PI 2.3.2		**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**		
	Justification	Coastal states' agencies (IMR, NINA, PINRO) monitor the status of fish, seabird and marine mammal populations and pay close regard to the potential for adverse interactions of these populations with fisheries. It is part of the role of these agencies to ensure that the national an internationally agreed (JNRFC) strategies are met and that there are no unacceptable effects on the populations. Where specific problems are identified, they are modelled and subject to quantitative analysis (*e.g.* inshore gillnet fisheries and harbour porpoise), more generally, reliance is place on broader ecosystem modelling. Nevertheless, the confidence in the strategy is probably based more on inference than on overall quantitative analysis. Insofar as there are particular concerns they are with respect to the golden redfish. Experience with the beaked redfish indicates that measures in place are appropriate, and evidence from the beaked redfish indicates that they should work, but the process is being confounded by an <u>unrelated</u> licensed fishery for the species.		
c	**Guidepost**		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N
	Justification	In addition to the national agencies (IMR, NINA, PINRO) that monitor ETP populations and advise on targeted conservation measures as and when deemed necessary, the status of ETP species in the NE Arctic are kept under review by international bodies (ICES, OSPAR and NAMMCO) and their respective specialist working groups. None of these bodies has identified specific cause for concern relating to the offshore fisheries in the NE Arctic (other than specific issues relating to gillnet and longline) but this falls short of the 'clear evidence' criterion. The Directorate of Fisheries and Coastguard have primary responsibilities for ensuring that the national strategy is met through its monitoring, surveillance and enforcement programme. The DoF is satisfied that there is a high degree of compliance.		
d	**Guidepost**			There is evidence that the strategy is achieving its objective.
	Met?			Y

PI 2.3.2		**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**
	Justification	All commercial fish, seabird and marine mammal populations are monitored as part of the national strategy for conservation and sustainable use of the marine environment. Where and when necessary, the agency responsible (IMR, NINA) propose appropriate conservation action (e.g. seasonal, permanent, closed areas, threshold catch levels) and when adopted, the measures are enforced through the Directorate of Fisheries and the Coastguard. It is recognised, not least through the independent review undertaken on behalf of FAO, that there is a consistently high level of compliance in Norwegian waters. Although there are current concerns for porpoise, this has prompted a species specific trial of deterrent pingers, which is evidence of the strategy in action. All of these measures backed-up by the ongoing MAREANO programme and annual ecosystem surveys that demonstrate the positive trends with many fish stocks, provide evidence that the strategy is achieving its objective.
References		ACOMseabirds, 2012. Ecoregion: General advice – EcoQO for seabird populations in OSPAR regions II and III. ICES Advice Book 1.5.5.1 Barrett, B., Anker - Nilssen, T., Bustnes, J. O., Christensen - Dalsgaard,, S., Descamps, S., Erikstad, K.-E., Lorentsen, S.-H., Strøm, H. & Systad, G.H., 2012. Key-site monitoring in Norway 2011. Seapop Short Report 1–2012. NINA, Oslo. Bjørge, A., Lydersen, *c.*, Skern-Mauritzen, M. & Wiig, Ø. (Eds), 2010. Marine Mammals. Fisken og havet, special edition 2–2010. Bowering, R., Storr-Paulsen, M., Tingley, G., Bjørkan, M., Vølstad, J., Gullestad, P. & Lorentsen, E., 2011. Evaluation of the Norwegian Reference Fleet. Institute of Marine Research, Bergen. Dulvy, N.K., Notarbartolo di Sciara, G., Serena, F., Tinti, F. & Ungaro, N., Mancusi, *c.* & Ellis, J. 2006. *Dipturus batis*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. Erikstad, K.E., T.K., Barrett, R.T, Vikebø, F. & Sandvik, H., (2013). Temporal variations in fish abundance affects seabird populations: cod – guillemot interactions in the Barents Sea. Proceedings of the Annual Larval Fish Conference 2013. Miami Florida. Fangel, K., Nedreaas, K., Aas, Ø., Vølstad, J., Wold, L., Christensen-Dalsgaard, S., Anker-Nilssen, Y. & Overvik, M. 2014. Unintended bycatch of seabirds in Norwegian coastal fisheries: comparison of estimation methods. Presentation at the Second Symposium on Fishery-Dependent Information (FDI), 3-6 March 2014 in Rome, Italy. http://www.imr.no/prosjektsiter/fdi/presentations/pdfs/bycatch_of_seabirds_in_norwegian_coastal_fisheries_final.pdf/en Fowler, S. L. 2005. *Cetorhinus maximus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1 Lid., G. 1981. Reproduction of the Puffin on Røst in the Lofoten Islands in 1964-1980. Fauna Norvegica C 4: 30–39. Hjøllo, S.S., 2007. EcoFish WP2 workandWind, NAO and ecosystem-selected articles. IMR, Bergen. NAMMCO, 2014. Report of the Twentieth Meeting of the Scientific Committee of NAMMCO. Tromso. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Skaret, G. & Pitcher , T. J., 2006. An estimation of compliance of the fisheries of Norway with Article 7 (Fisheries Management) of the UN Code of Conduct for Responsible Fishing. FAO, Rome. Vader W., Anker-Nilssen T., Bakken V., Barrett R. & Strann K.B. 1989. Regional and temporal differences in breeding success and population development of

PI 2.3.2	**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**
	fish eating seabirds in Norway after collapses of herring and capelin stocks. Trans. 19th IUGB Congress, Trond-heim 1989: 143-150. WGBYC, 2014. Report of the Working Group on Bycatch of Protected Species. ICES CM 2014/ACOM:28 WGMME, 2014. Report of the Working Group on Marine Mammal Ecology. ICES CM 2014/ACOM:27. WGSE, 2013. Report of the Working Group on Seabird Ecology. ICES CM 20131/SSGEF:19. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.
OVERALL PERFORMANCE INDICATOR SCORE:	**85**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.3.2: Norway NEA cod and haddock - Gillnet

PI 2.3.2		The fishery has in place precautionary management strategies designed to: • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	Y	N	N
	Justification	The strategy is set out in the Norwegian Marine Resources Act, in the protocol for the JNRFC and the Norwegian seas management plans, which explicitly requires an ecosystem approach to marine environmental management. The act also requires that all commercial fish species are retained, recorded and landed and that vessels equipped with elogbooks must record interactions with seabirds and marine mammals. (Paper logbooks are still required in the Russia zone.) Primarily, measures are designed to minimise contact with ETP species, including RL fish. Marine mammal and seabird stock monitoring and abundance estimates are made by IMR and NINA and records of all biota are made during annual IMR–PINRO trawl surveys undertaken under the auspices of JNRFC. There are permanent and seasonal closures of inshore waters in the vicinity of key seabird nesting sites. The results from the most recent surveys indicate that c. 3000 seabirds may be captured and drowned in the Norwegian gillnet fisheries. Whilst undesirable, these numbers are not sufficiently great to raise demands for action as they are relatively small both in relation to the quantity of gillnet fished and the number of seabirds throughout the NE Arctic. In contrast, concern has been raised that the number of porpoises being killed each year may be unsustainable. Through the CRISP programme, which is a manifestation of the national strategy, deterrent pingers are being tested in the Vestfjord fishery as a means to minimise adverse fishery interactions but theire utility has yet to be assessed and decisions on practical application are yet to be made. Thus, some measures are in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species but others are still at the developmental stage implied within the strategy are aimed at ensuring they meet international and, by definition, national "requirements" but it is difficult to envisage how a national strategy can exceed national requirement when they are the same thing.		

PI 2.3.2		The fishery has in place precautionary management strategies designed to: • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (*e.g.*, general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	Y	Y	N
	Justification	Coastal states' agencies (IMR, NINA, PINRO) monitor the status of fish, seabird and marine mammal populations and pay close regard to the potential for adverse interactions of these populations with fisheries. It is part of the role of these agencies to ensure that the national an internationally agreed (JNRFC) strategies are met and that there are no unacceptable effects on the populations. Where specific problems are identified, they are modelled and subject to quantitative analysis (*e.g.* inshore gillnet fisheries and harbour porpoise) and where appropriate, specific conservation measures put in place (e.g seasonal closed areas in the vicinity of seabird nesting sites in breeding season; designated MPA for sensitive marine habitats). More generally, reliance is place on broader ecosystem modelling. Nevertheless, the confidence in the strategy is probably based more on inference than on overall quantitative analysis across the full complexity of the marine environment and the species that live in and rely on it. Insofar as there are particular concerns they are with respect to the golden redfish. Experience with the beaked redfish indicates that measures in place are appropriate, and evidence from the beaked redfish indicates that they should work, but the process is being confounded by an <u>unrelated</u> licensed fishery for the species.		
c	**Guidepost**		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N
	Justification	In addition to the national agencies (IMR, NINA, PINRO) that monitor ETP populations and advise on targeted conservation measures as and when deemed necessary, the status of ETP species in the NE Arctic are kept under review by international bodies (ICES, OSPAR and NAMMCO) and their respective specialist working groups. None of these bodies has identified specific cause for concern relating to the offshore fisheries in the NE Arctic (other than the specific issue of gillnet–porpoise interaction already described) but this falls short of the 'clear evidence' criterion. The Directorate of Fisheries and Coastguard have primary responsibilities for ensuring that the national strategy is met through its monitoring, surveillance and enforcement programme. The DoF is satisfied that there is a high degree of compliance.		

PI 2.3.2		**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**		
d	**Guidepost**			There is evidence that the strategy is achieving its objective.
	Met?			Y
	Justification	All commercial fish, seabird and marine mammal populations are monitored as part of the national strategy for conservation and sustainable use of the marine environment. Where and when necessary, the agency responsible (IMR, NINA) propose appropriate conservation action (e.g. seasonal, permanent, closed areas, threshold catch levels) and when adopted, the measures are enforced through the Directorate of Fisheries and the Coastguard. It is recognised, not least through the independent review undertaken on behalf of FAO, that there is a consistently high level of compliance in Norwegian waters. Although there are current concerns for porpoise, this has prompted a species specific trial of deterrent pingers, which is evidence of the strategy in action. All of these measures backed-up by the ongoing MAREANO programme and annual ecosystem surveys that demonstrate the positive trends with many fish stocks, provide evidence that the strategy is achieving its objective.		
References		ACOMseabirds, 2012. Ecoregion: General advice – EcoQO for seabird populations in OSPAR regions II and III. ICES Advice Book 1.5.5.1 Barrett, B., Anker - Nilssen, T., Bustnes, J. O., Christensen - Dalsgaard,, S., Descamps, S., Erikstad, K.-E., Lorentsen, S.-H., Strøm, H. & Systad, G.H., 2012. Key-site monitoring in Norway 2011. Seapop Short Report 1–2012. NINA, Oslo. Bjørge, A., Lydersen, *c.*, Skern-Mauritzen, M. & Wiig, Ø. (Eds), 2010. Marine Mammals. Fisken og havet, special edition 2–2010. Bowering, R., Storr-Paulsen, M., Tingley, G., Bjørkan, M., Vølstad, J., Gullestad, P. & Lorentsen, E., 2011. Evaluation of the Norwegian Reference Fleet. Institute of Marine Research, Bergen. Dulvy, N.K., Notarbartolo di Sciara, G., Serena, F., Tinti, F. & Ungaro, N., Mancusi, *c.* & Ellis, J. 2006. *Dipturus batis*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. Erikstad, K.E., T.K., Barrett, R.T, Vikebø, F. & Sandvik, H., (2013). Temporal variations in fish abundance affects seabird populations: cod – guillemot interactions in the Barents Sea. Proceedings of the Annual Larval Fish Conference 2013. Miami Florida. Fowler, S. L. 2005. *Cetorhinus maximus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1 Lid., G. 1981. Reproduction of the Puffin on Røst in the Lofoten Islands in 1964-1980. Fauna Norvegica C 4: 30–39. Hjøllo, S.S., 2007. EcoFish WP2 workandWind, NAO and ecosystem-selected articles. IMR, Bergen. NAMMCO, 2014. Report of the Twentieth Meeting of the Scientific Committee of NAMMCO. Tromso. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Skaret, G. & Pitcher , T. J., 2006. An estimation of compliance of the fisheries of Norway with Article 7 (Fisheries Management) of the UN Code of Conduct for Responsible Fishing. FAO, Rome. Vader W., Anker-Nilssen T., Bakken V., Barrett R. & Strann K.B. 1989. Regional		

PI 2.3.2	**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**
	and temporal differences in breeding success and population development of fish eating seabirds in Norway after collapses of herring and capelin stocks. Trans. 19th IUGB Congress, Trond-heim 1989: 143-150. WGBYC, 2014. Report of the Working Group on Bycatch of Protected Species. ICES CM 2014/ACOM:28 WGMME, 2014. Report of the Working Group on Marine Mammal Ecology. ICES CM 2014/ACOM:27. WGSE, 2013. Report of the Working Group on Seabird Ecology. ICES CM 20131/SSGEF:19. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.
OVERALL PERFORMANCE INDICATOR SCORE:	**70**
CONDITION NUMBER (if relevant):	**4 - Porpoise**

Evaluation Table for PI 2.3.2: Norway NEA cod and haddock - Longline

PI 2.3.2		The fishery has in place precautionary management strategies designed to: • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place that minimise mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.	There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.
	Met?	Y	Y	N
	Justification	The strategy is set out in the Norwegian Marine Resources Act, in the protocol for the JNRFC and the Norwegian seas management plans, which explicitly requires an ecosystem approach to marine environmental management. The act also requires that all commercial fish species are retained, recorded and landed and that vessels equipped with elogbooks must record interactions with seabirds and marine mammals. (Paper logbooks are still required in the Russia zone.) Primarily, measures are designed to minimise contact with ETP species, including RL fish. Marine mammal and seabird stock monitoring and abundance estimates are made by IMR and NINA and records of all biota are made during annual IMR–PINRO trawl surveys undertaken under the auspices of JNRFC. The absence of any specific concerns with respect to these populations and the offshore trawl fishery is clear evidence that the strategy is being implemented successfully. Where there is deemed to be cause for concern, *e.g.* relatively high catches of redfishes or spurdogs, specific measures are implemented, *e.g.* move-on and real-time closures. There are permanent and seasonal closures of inshore waters in the vicinity of key seabird nesting sites. All of the measures and practices enshrined or implied within the strategy are aimed at ensuring they meet international and, by definition, national "requirements" but it is difficult to envisage how a national strategy can exceed national requirement when they are the same thing.		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (*e.g.*, general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved.	The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work.
	Met?	Y	Y	N

PI 2.3.2		**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**		
	Justification	Coastal states' agencies (IMR, NINA, PINRO) monitor the status of fish, seabird and marine mammal populations and pay close regard to the potential for adverse interactions of these populations with fisheries. It is part of the role of these agencies to ensure that the national an internationally agreed (JNRFC) strategies are met and that there are no unacceptable effects on the populations. Where specific problems are identified, they are modelled and subject to quantitative analysis (*e.g.* capture of seabirds by longline), more generally, reliance is place on broader ecosystem modelling. Nevertheless, the confidence in the strategy is probably based more on inference than on overall quantitative analysis across the full complexity of the marine environment and the species that live in and rely on it. Insofar as there are particular concerns they are with respect to the golden redfish. Experience with the beaked redfish indicates that measures in place are appropriate, and evidence from the beaked redfish indicates that they should work, but the process is being confounded by an <u>unrelated</u> licensed fishery for the species.		
c	**Guidepost**		There is evidence that the strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N
	Justification	In addition to the national agencies (IMR, NINA, PINRO) that monitor ETP populations and advise on targeted conservation measures as and when deemed necessary, the status of ETP species in the NE Arctic are kept under review by international bodies (ICES, OSPAR and NAMMCO) and their respective specialist working groups. None of these bodies has identified specific cause for concern relating to the offshore fisheries in the NE Arctic, although there is always the generic concern with respect to longline and seabird interactions, which are kept under annual review, both nationally and internationally. This, however, falls short of the 'clear evidence' criterion. The Directorate of Fisheries and Coastguard have primary responsibilities for ensuring that the national strategy is met through its monitoring, surveillance and enforcement programme. The DoF is satisfied that there is a high degree of compliance.		
d	**Guidepost**			There is evidence that the strategy is achieving its objective.
	Met?			Y

PI 2.3.2		**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**
	Justification	All commercial fish, seabird and marine mammal populations are monitored as part of the national strategy for conservation and sustainable use of the marine environment. Where and when necessary, the agency responsible (IMR, NINA) propose appropriate conservation action (e.g. seasonal, permanent, closed areas, threshold catch levels) and when adopted, the measures are enforced through the Directorate of Fisheries and the Coastguard. It is recognised, not least through the independent review undertaken on behalf of FAO, that there is a consistently high level of compliance in Norwegian waters. Although there is always concern with respect to longline and seabirds, risks are minimised by use of streamers and gas cannons. All of these measures backed-up by the ongoing MAREANO programme and annual ecosystem surveys that demonstrate the positive trends with many fish stocks, provide evidence that the strategy is achieving its objective.
References		ACOMseabirds, 2012. Ecoregion: General advice – EcoQO for seabird populations in OSPAR regions II and III. ICES Advice Book 1.5.5.1 Barrett, B., Anker - Nilssen, T., Bustnes, J. O., Christensen - Dalsgaard,, S., Descamps, S., Erikstad, K.-E., Lorentsen, S.-H., Strøm, H. & Systad, G.H., 2012. Key-site monitoring in Norway 2011. Seapop Short Report 1–2012. NINA, Oslo. Bjørge, A., Lydersen, *c.*, Skern-Mauritzen, M. & Wiig, Ø. (Eds), 2010. Marine Mammals. Fisken og havet, special edition 2–2010. Bowering, R., Storr-Paulsen, M., Tingley, G., Bjørkan, M., Vølstad, J., Gullestad, P. & Lorentsen, E., 2011. Evaluation of the Norwegian Reference Fleet. Institute of Marine Research, Bergen. Dulvy, N.K., Notarbartolo di Sciara, G., Serena, F., Tinti, F. & Ungaro, N., Mancusi, *c.* & Ellis, J. 2006. *Dipturus batis*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1. Erikstad, K.E., T.K., Barrett, R.T, Vikebø, F. & Sandvik, H., (2013). Temporal variations in fish abundance affects seabird populations: cod – guillemot interactions in the Barents Sea. Proceedings of the Annual Larval Fish Conference 2013. Miami Florida. Fowler, S. L. 2005. *Cetorhinus maximus*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.1 Lid., G. 1981. Reproduction of the Puffin on Røst in the Lofoten Islands in 1964-1980. Fauna Norvegica C 4: 30–39. Hjøllo, S.S., 2007. EcoFish WP2 workandWind, NAO and ecosystem-selected articles. IMR, Bergen. NAMMCO, 2014. Report of the Twentieth Meeting of the Scientific Committee of NAMMCO. Tromso. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Skaret, G. & Pitcher , T. J., 2006. An estimation of compliance of the fisheries of Norway with Article 7 (Fisheries Management) of the UN Code of Conduct for Responsible Fishing. FAO, Rome. Vader W., Anker-Nilssen T., Bakken V., Barrett R. & Strann K.B. 1989. Regional and temporal differences in breeding success and population development of fish eating seabirds in Norway after collapses of herring and capelin stocks. Trans. 19th IUGB Congress, Trond-heim 1989: 143-150. WGBYC, 2014. Report of the Working Group on Bycatch of Protected Species. ICES CM 2014/ACOM:28 WGMME, 2014. Report of the Working Group on Marine Mammal Ecology. ICES CM 2014/ACOM:27. WGSE, 2013. Report of the Working Group on Seabird Ecology. ICES CM

PI 2.3.2	**The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.**
	20131/SSGEF:19. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.

OVERALL PERFORMANCE INDICATOR SCORE:	**85**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.3.3: Norway NEA cod and haddock - All gears

PI 2.3.3		**Relevant information is collected to support the management of fishery impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Information is sufficient to qualitatively estimate the fishery related mortality of ETP species.	Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species.	Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty.
	Met?	Y	Y	N
	Justification	Joint IMR–PINRO and IMR surveys of the Barents Sea and Norwegian Sea ecosystems, and NINA bird surveys give a good overview of the ETP species' spatial and temporal distribution. There is a long history of marine mammal survey work informing abundance estimates throughout the NE Arctic, using several different surveys from mark–recapture experiments, breeding surveys and more recently transect surveys either by ship for large or spotter planes for small cetaceans. In part, the necessity for these surveys derives from ICES advice, which states that any the quotas for harvesting marine mammal species commercially must be based on estimates that are less than 5-years old. Not all species receive the same level of monitoring and inevitably those that are most threatened or those with commercial value receive most attention. Annual vessel monitoring surveys undertaken by IMR target minke whales and other large baleen whales and provide abundance estimates every 6 years. Since 2002 the distribution patterns of marine mammals in the Barents Sea have also been observed from research vessels during the Joint IMR–PINRO ecosystem surveys, further enhanced by aircraft observations and observations from fishing and coastguard vessels. In addition to the observers aboard all third-party vessels fishing in the Russian zone, the Norwegians have observers and gather more detailed information from their reference fleet. NINA has identified inshore static-gear fisheries as the principal threat to seabird populations with little indication of significant interactions with other methods of fishing. Estimates of seabird – static gear interactions, based on reference-fleet data have shown that bird mortality is light relative to total fishing effort and the population sizes. The reference-fleet data have identified a potential problem with respect to gillnets and porpoises that would benefit from greater sample size. There is a requirement to log interactions with ETP species when fishing in the Norwegian zone but as yet analysis of these data has not begun and analysis of the reference-fleet records has been sporadic hitherto. Demonstrably, there are quantitative data and they are being used to assess fishery related mortality but currently, this falls short of a 'high degree of certainty.		
b	**Guidepost**	Information is adequate to broadly understand the impact of the fishery on ETP species.	Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species.	Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species.
	Met?	Y	Y	N

PI 2.3.3		**Relevant information is collected to support the management of fishery impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**		
	Justification	The synthesis of the information gathered by numerous surveys and data collection by the principal scientific agencies (IMR, NINA, PINRO) all point to the same conclusion: the NE Arctic fisheries do not pose a significant risk for ETP species, with the notable exception of porpoise. The fact that the evidence that there may be a fishery related threat to porpoise is itself evidence that information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. Nevertheless, it has to be recognised that these conclusion are based relatively small (reference-fleet) sample size, consequently they fall short of 'accurate and verifiable'.		
c	**Guidepost**	Information is adequate to support measures to manage the impacts on ETP species.	Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy 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.
	Met?	Y	Y	N
	Justification	The range of surveys by IMR, PINRO, NINA, MREANO have proven sufficient to monitor trends in support of the strategies represented by the JNRFC, NAMMCO and OSPAR protocols and the Norwegian seas management plans. Demonstrably, the data gathered have shown that the fishery may be a threat to protection and recovery of ETP species through the estimates of bird and porpoise mortalities. Nevertheless, it probably requires greater targeted sampling effort on these critical groups to ensure that the 'accurate and veriable' criteria are met.		
References		Anker-Nilssen, T. (ed.), Barrett, R.T., Bustnes, J.O., Christensen-Dalsgaard, S., Erikstad, K.E., Fauchald, P., Lorentsen, S.-H., Steen, H., Strøm, H., Systad, G.H. & Tveraa, T. 2008. SEAPOP studies in the Barents and Norwegian Seas in 2007. NINA Rapport 363 Anker-Nilssen, T., Barrett, R.T., Bustnes, J.O., Erikstad, K.E., Fauchald, P., Lorentsen, S.-H., Steen, H., Strøm, H., Systad, G.H. & Tveraa, T. 2007. SEAPOP studies in the Lofoten and Barents Sea area in 2006. NINA Report 249. Anker-Nilssen, T., Barrett, R.T., Bustnes, J.O., Erikstad, K.E., Fauchald, P., Lorentsen, S.-H., Steen, H., Strøm, H., Systad, G.H. & Tveraa, T. 2006. SEAPOP studies in the Lofoten and Barents Sea area in 2005. NINA Report 127, Bowering, R., Storr-Paulsen, M., Tingley, G., Bjørkan, M., Vølstad, H. H., Gullestad, P. & Lorentsen, E. (2011). *Evaluation of the Norwegian Reference Fleet*. Institute of Marine Research, Bergen BSMP, 2006. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report No. 8 to the Storting. Ministry of the Environment,Oslo. Christensen-Dalsgaard, S., Bustnes, J., Follestad, A., Systad G., Eriksen, J., Lorentsen S. & Anker-Nilssen, T. 2008. Intersectoral Assessment of Impacts on Seabirds. Baseline Report for a Comprehensive Environmental Management Plan for the Norwegian Sea. NINA Rapport 338. Fachald, P., Erikstad, K. E. & Skarsfjord, H. 1996. Physical and biological environmental properties as predictors of the broad scale spatial distribution of pelagic seabirds. - NINA.NIKU Project Report 06: 1-20 JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea NAMMCO, 2014. Report of the Twentieth Meeting of the Scientific Committee of NAMMCO. Tromso.		

PI 2.3.3	**Relevant information is collected to support the management of fishery impacts on ETP species, including:** • **Information for the development of the management strategy;** • **Information to assess the effectiveness of the management strategy; and** • **Information to determine the outcome status of ETP species.**
	http://www.nammco.no/webcronize/images/Nammco/1001.pdfpdf NSMP. 2010. Integrated Management of the Marine Environment of the Norwegian Sea. Report No. 37 (2008–2009) to the Storting. Ministry of the Environment, Oslo. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. SEAPOP: http://www.seapop.no/en/about/index.html WGBYC, 2014. Report of the Working Group on Bycatch of Protected Species. ICES CM 2014/ACOM:28 WGMME, 2014. Report of the Working Group on Marine Mammal Ecology. ICES CM 2014/ACOM:27. WGSE, 2013. Report of the Working Group on Seabird Ecology. ICES CM 20131/SSGEF:19. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.
OVERALL PERFORMANCE INDICATOR SCORE:	**80**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.4.1: Norway NEA cod and haddock – Trawls

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
	Met?	Y	N	N
	Justification	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. Many of the trawls used are rock-hopper trawls that are designed to ride over seabed irregularities but still have have the capacity to affect habitat structure and function through surface abrasion and boulder turning. Compared with earlier trawls, however, they have a lighter environmental footprint in that polyvalent slotted doors sit less heavily on the seabed than earlier dreadnought-type doors and the belly of the net tends to float clear of the seabed as the net is of buoyant man-made material rather than water-logged natural fibres. Modern navigation systems and ground-discrimination echo sounders enable vessels to be navigated with a high degree of precision and avoid MSHs. The degree to which the effect of trawl gear on habitats can be regarded as 'serious or irreversible' is dependent on the nature and function of the habitats and a determination of an acceptable rate of recovery in event of trawl operations ceasing. Irreversibility may imply regime change, loss or extinction of key habitat species (*i.e.* recovery would never occur), whereas serious may imply major change in the structure and diversity of species assemblages. Benthic biodiversity studies in the Barents Sea show that in general, although biomass was shown to decrease from the 1920s to the 1960s (attributed in part to both climatic factors and intensive fishing activity with the heavier ground gear), recent years have seen a steady increase in benthic biomass since 2005–2007 across the Barents sea. It is not inconceivable, however, that this positive trend could reverse in response to the unprecendented high cod and haddock stock levels. Throughout the NE Arctic, benthic species that are potentially vulnerable to trawling remain well represented in both IMR–PINRO and MAREANO survey data and there is no indication of benthic species being threatened with local extinction. There is considerable natural variation in the distribution of benthic habitat forming species, due to factors such as productivity, substratum type and sedimentary environment. As a result, in some areas of fishing activity, benthic communities are likely to be more dynamic and less vulnerable to disturbance, e.g. relatively shallow sedimentary environments. In these areas it could be strongly argued that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. Nevertheless, fishing activity does have the ability to further influence the natural variation in benthic community assemblages. For example, it has been suggested that it is high intensity of fishing in the southern part of the Barents Sea that is the reason for low indicators of biodiversity and zoobenthos bycatch biomass. By contrast, the north-east part of the Barents Sea with less trawl intensity can be characterized by higher levels of biodiversity and macrobenthos biomass. In terms of recovery of habitat species, if left in an undisturbed state, studies of long-term dynamics of bottom communities in the Barents Sea showed that significant increases in benthic biomass were observed during periods of reduced fishing intensity during the Second World War. Subsequently, following the peak in fishing intensity in the post war years through to the 1960s and 70s, recovery of areas and bioresources of the most common species, large taxons and trophic groups of zoobenthos was again		

PI 2.4.1	The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
	observed. Rate of recovery is dependent on a number of issues – frequency of disturbance (natural and anthropogenic), productivity, substratum type and species. Benthic recovery rates following trawling are typically in the range of 2.5 to 6 years with the fastest recovery being observed in mud habitats. In the NE Arctic, although the majority of the habitats may fall within the more dynamic and sedimentary range (hence quicker recovery), it is notable that some of the species composition and the substratum types on the shelf edge may show far slower recovery characteristics. Reef forming, cold-water coral species on hard substrata have the slowest recovery rate (potentially well beyond the 2.5–6 year range noted above) for large reef-forming species but when undisturbed they do become established and show relatively rapid growth (~5 mm year^{-1}). The main species of coral (eg. *Lophelia* sp), which would be particularly vulnerable to trawl impact (potentially qualifying as a serious or irreversible effect), are located in Norwegian coastal waters – largely within 12 miles and therefore beyond the area fished by most trawlers most of the time. Furthermore, the Norwegian authorities have designated several of these areas marine protected areas (MPA) within which fishing is prohibited and, more recently have prohibited fishing by any ground-contact gear within any known (*i.e.* shown by MAREANO mapping) coral-reefs. (This regulation is monitored by VMS as well as surveillance at sea.) Furthermore, if vessels find ≥60 kg live coral in the trawl , they are expected to report it to the Directorate of Fisheries and move a minimum of 2 miles before shooting the gear once more. The principal areas of potential risk are on vulnerable sessile species along the shelf edge and in waters around Svalbard, in particular sponge species but also some coral species. For now, there is no dedicated protection for sponges apart from the inshore exclusion zones and around Svalbard and Bear Island. Skippers avoid known areas of dense sponge communities, however, as a cod-end full of sponges ruins the catch by crushing and can burst the trawl, which is expensive in time to repair or replace. This operational imperative is now underwritten by regulation that requires skippers to avoid such areas and move a minimum of 2 miles if they have the misfortune to take ≥800 kg in a haul. Even where there has been fishing on these habitats it is likely that a cessation in fishing activity would result in gradual recovery of these habitats. It is therefore highly unlikely that the certified fishery would reduce habitat structure and function to the point where there would be serious or irreversible harm but clear evidence to this effect is absent, hence, reduced score. **Norway SMHs** • **Coral**: Principle areas of coral have been mapped and others are known. Evidence gathered by the assessment team during the re-assessment process and extensive stakeholder consultancy indicates that impacts of bottom trawl gear in cod and haddock fisheries on VMEs such as corals are considered to be low due to higher risk of gear loss and gear damage in these areas and their complete avoidance by trawler skippers. There are precise GPS navigation and ground discrimination echo sounders that enable vessles to avoid known areas of coral with a high degree of reliability. In some unfished areas there are also signs of regrowth of coral. Fishing for cod and haddock is most concentrated in areas that are known to be "clean ground" or have already been cleared of obstructions. Hence vessels in the UoC tend to fish the same ground repeatedly rather than stray into new areas. This approach and the environmental safeguards it represents (along with advisory and statutory protection measures) have been recognised, described and referred to both implicitly and explicitly in the MSC assessment reports on NE Arctic trawl fisheries. This evidence is supported by data from enforcement authorities confirming that there are no systematic non-compliances in regards to regulations applicable to coral habitats (e.g. reporting of by-catches of corals and respecting move on rules, marine protected areas and 12 nm ban on trawling of the baseline, where the most of coral

PI 2.4.1	The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
	habitats are located) by cod and haddock fishing vessels in the UoC. **Score 80**. • **Sponges**: Principal areas of sponge communities have been mapped and others are known. There are regulations to protect sponge communities and precise GPS navigation and ground-discrimination echo sounders enable vessels to avoid known areas of sponge with a high decree of reliability and compliance (Directorate of Fisheries). Directorate is satisfied that there is a high degree of compliance with protection measures. **Score 80**. • **Burrowing megafauna**: Most burrowing fauna, indeed, most epibenthic fauna are not subject to direct effects of rock-hopper trawls. The principal possible exceptions are the (flexible) upright Pennatulacea – sea pens. Their distribution is known in the MAREANO mapping area, and they are widely, albeit sparsely, distributed throughout the Barents Sea, which suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60.** **Russia SMHs** • **Coral**: Although there is not the same level as information as is being gathered in the MAREANO programme, coral areas are known (principally inshore) and key habitats and macrospecies are recorded in the annual IMR–PINRO ecosystem survey. Precise GPS navigation and ground-discrimination echo sounders enable vessels to avoid known areas of coral with a high decree of reliability (for operational if not regulatory reasons). Corals have a limited distribution in the Russian zone and it is highly unlikely that the current fishery will reduce habitat structure and function to a point where there would be serious or irreversible harm. **Score 80**. • **Sponges**: Although there is not the same level as information as is being gathered in the MAREANO programme, sponge areas are known and such habitats are recorded, their abundance and distribution polotted in the annual IMR–PINRO ecosystem survey (predominantly in the far NE, against and under the ice field). Precise GPS navigation and ground-discrimination echo sounders enable to avoid known areas of coral with a high decree of reliability (for operational if not regulatory reasons). Overall, sponges have a limited distribution in the Russian zone and it is highly unlikely that the current fishery will reduce habitat structure and function to a point where there would be serious or irreversible harm. **Score 80**. • **Burrowing megafauna**: Most burrowing fauna, indeed, most epibenthic fauna are not subject to direct effects of rock-hopper trawls. The principal possible exceptions are the (flexible) upright Pennatulacea – sea pens. Their distribution is sparse but recorded in the annual IMR–PINRO ecosystem survey. Their continued presence and sparse distribution suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60.** **TRW comment why the score is 60?**
References	MAREANO Seabed mapping project: http://www.mareano.no/english/news/seabed_to_be_mapped http://www.mareano.no/english/topics/coral_reefs http://www.mareano.no/kart/viewer.php?language=en&bbox=592707.1,7846700.0,802279.9,7952140.0&KARTBILDE_ID=115 http://www.mareano.no/kart/viewer.php?language=en&bbox=-036028.8,6550180.0,1748198.3,7854310.0&KARTBILDE_ID=122 Buhl-Mortensen, L., Aglen, A., Breen, M., Buhl-Mortensen, P., Ervik, A., Vivian Husa, V., Løkkeborg, S., Røttingen, I. & and Hagen Stockhausen, H. (2013).

PI 2.4.1	The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
	Impacts of fisheries and aquaculture on sediments and benthic fauna: suggestions for new management approaches. Fisken og Havet 2-2013. Bergen: IMR. Bruntse, G. & Tendel, O.S. (2001) *Lophelia pertusa* and other cold water corals in the Faroe area. In *Marine biological investigations and assemblages of benthic invertebrates from the Faroe Islands* (Bruntse, G. & Tendel, O.S. eds) pp 22–32. Kaldbak Marine Biological Laboratory, The Faroe Islands. Coral reef regualtions: http://www.fiskeridir.no/content/download/34340/301378/version/1/file/J-151-2014.pdf Denisenko N.V., Denisenko S.G. 1991. On impact of bottom trawling on benthos in the Barents Sea: Environmental situation and protection of flora and fauna of the Barents Sea. Apatity, published by Kola Science Centre of USSR Academy of Science. S. 158-164. Denisenko S.G. 2007. Zoobenthos of the Barents Sea under conditions of changing climate and human intervention. S. 418-511- In : Dynamics of marine ecosystems and contemporary problems of protection of biological potential of Russian seas. Vladivostok: Dalnauka. Denisenko S.G., 2008. Macrozoobenthos of the Barents Sea under conditions of changing climate and human intervention. Synopsis of Doctor of Science Thesis (biology). SPb: ZIN RAN. 45 s. Freese, J.L. 2001. Trawl-induced damage to sponges observed from a research submersible. Marine Fisheries Review 63: 7–13. Freese, J.L., Auster, P., Heifetz, J., Wing, B.L., 1999. Effects of trawling on seafloor habitat and associated invertebrate taxa in the Gulf of Alaska. Marine Ecology Progress Series 182, 119–126. Guijarro Garcia, E. (Ed.), Ragnarsson, S., Steingrímsson,S., Nævestad, D., Haraldsson, H., Fosså, J., Tendal,O. & Eiríksson, H. 2006. Bottom Trawling and Scallop Dredging in the Arctic: Impacts of fishing on non-target species, vulnerable habitats and cultural heritage. TemaNord 2006:529 Hiddink J.G., Jennings S. & Kaiser M.J. 2006. Indicators of the ecological impact of bottom-trawl disturbance on seabed communities. *Ecosystems* 9: 1190–1199. Husebø, Å., Nøttestad, L., Fosså, J.H., Furevik, D.M. & Jørgensen, S.B. (2002). Distribution and abundance of fish in deep-sea coral habitats. *Hydrobiologia* 471: 91–99. Jensen, A.& Fredriksen, R. 1992. The fauna associated with the bank forming deepwater coral ***Lophelia pertusa*** (Scleractinaria) on the Faroe shelf. *Sarsia* 77: 53–69. Klitgaard, A.B. & Tendal, O.S. "Ostur" – "cheese bottoms" – sponge dominated areas in the Faroese shelf and slope areas. In *Marine biological investigations and assemblages of benthic invertebrates from the Faroe Islands* (Bruntse, G. & Tendel, O.S. eds) pp 13–21. Kaldbak Marine Biological Laboratory, The Faroe Islands. *www.vliz.be/imisdocs/publications/217806.pdf* Løkkeborg S. 2005. Impacts of trawling and scallop dredging on benthic habitats and communities. FAO fisheries technical paper 472, 69 p. Marine protected areas: http://www.fiskeridir.no/english/fisheries/marine-protected-areas Mortensen, P.B., Hovland, M., Brattegard, T. & Farestveit, R. (1995). Deep water bioherms of the Scleractinian coral *Lophelia pertusa* (L.) at 64° N on the Norwegian shelf: structure and associated megafauna. *Sarsia* 80: 145–158. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. OSPAR, 2010. Background Document for Deep-sea sponge Aggregations. Biodiversity Series, OSPAR, London. http://www.ospar.org/documents/dbase/publications/p00485_deep_sea_sponge_aggregations.pdf WGDEC, 2014. Report of the ICES/NAFO Joint Working Group on Deep-water

PI 2.4.1	The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
	Ecology ICES CM 2014/ACOM:29. WGECO, 2014. Report of the Working Group on Ecosystem Effects of Fishing Activities (WGECO) ICES CM 2014/ACOM:26 Anon. 1999. Brent Spar Outcry Leaves Shell With A £60M Bill. *Professional Engineering* **12:** 16 Bell, N. & Smith, J. 1999. Coral growing on North Sea oil rigs. *Nature* **402** (6762): 601–2 Gass, S. & Roberts, J.M. 2006. "The occurrence of the cold-water coral *Lophelia pertusa* (Scleractinia) on oil and gas platforms in the North Sea: colony growth, recruitment and environmental controls on distribution. *Marine pollution bulletin* **52** (5): 549–559.
OVERALL PERFORMANCE INDICATOR SCORE:	**70**
CONDITION NUMBER (if relevant):	**5**

Evaluation Table for PI 2.4.1: Norway NEA cod and haddock – Danish seine

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
		Y	N	N
	Justification	Danish seines have a very light construction and can only be used on relatively flat ground that is known not to have any significant irregularities or obstructions; *i.e.* it is not suitable for use in areas where coral or sponge communities are known to exist. **Norway SMHs** • **Coral**: the gear will not be used in the vicinity of coral. **Score 100.** • **Sponges**: the gear will not be used in the vicinity of sponge communities**. Score 100**. • **Burrowing megafauna**: true infauna are not vulnerable disturbance by this gear as it is too light to dig in. The principal exception are the Pennatulacea (sea pens). Their distribution is known in the MAREANO mapping area, and they are widely, albeit sparsely, distributed throughout the Barents Sea, which suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60.** **Russia SMHs** • **Coral**: the gear will not be used in the vicinity of coral. **Score 100**. • **Sponges**: the gear will not be used in the vicinity of sponge communities. **Score 100**. • **Burrowing megafauna**: true infauna are not vulnerable disturbance by this gear as it is too light to dig in. The principal exception are the Pennatulacea (sea pens). Their distribution is sparse but they are recorded, abundance and distributiuon plotted in the annual IMR–PINRO ecosystem survey. Their continued presence and sparse distribution suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60.**		
References		MAREANO Seabed mapping project: http://www.mareano.no/english/news/seabed_to_be_mapped http://www.mareano.no/english/topics/coral_reefs http://www.mareano.no/kart/viewer.php?language=en&bbox=592707.1,7846700.0,802279.9,7952140.0&KARTBILDE_ID=115 http://www.mareano.no/kart/viewer.php?language=en&bbox=-036028.8,6550180.0,1748198.3,7854310.0&KARTBILDE_ID=122 Buhl-Mortensen, L., Aglen, A., Breen, M., Buhl-Mortensen, P., Ervik, A., Vivian Husa, V., Løkkeborg, S., Røttingen, I. & and Hagen Stockhausen, H. (2013). Impacts of fisheries and aquaculture on sediments and benthic fauna: suggestions for new management approaches. Fisken og Havet 2-2013. Bergen: IMR. Coral reef regualtions: http://www.fiskeridir.no/content/download/34340/301378/version/1/file/J-151-2014.pdf Løkkeborg S. 2005. Impacts of trawling and scallop dredging on benthic habitats		

PI 2.4.1	The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function
	and communities. FAO fisheries technical paper 472, 69 p. Marine protected areas: http://www.fiskeridir.no/english/fisheries/marine-protected-areas Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. OSPAR, 2010. Background Document for Deep-sea sponge Aggregations. Biodiversity Series, OSPAR, London. http://www.ospar.org/documents/dbase/publications/p00485_deep_sea_sponge_aggregations.pdf WGDEC, 2014. Report of the ICES/NAFO Joint Working Group on Deep-water Ecology ICES CM 2014/ACOM:29. WGECO, 2014. Report of the Working Group on Ecosystem Effects of Fishing Activities (WGECO) ICES CM 2014/ACOM:26
OVERALL PERFORMANCE INDICATOR SCORE:	**75**
CONDITION NUMBER (if relevant):	**5**

Evaluation Table for PI 2.4.1: Norway NEA cod and haddock - Jiggers, longlines, gillnet

PI 2.4.1		The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.	There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.
		Y	Y	P
	Justification	The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. As the name implies, static gear such as longline and gillnets are not dragged across the seabed in the way that mobile gears are. Insofar as they pose a risk, it is that if either lines or gillnets are short across (which is now prohibited for all ground-contact fishing gears) or in close proximity to coral, they might become hooked onto and break coral heads during hauling. As even quite small vessels have the navigation aids and ground-discrimination echo sounders to enable them to avoid such areas, the risk of such events is undoubtedly less than it was in earlier decades. **Norway SMHs** • **Coral**: a very small risk of some damage during hauling but not sufficient for these gears to result in significant loss of habitat structure or function. **Score 80**. • **Sponges**: For all practical purposes, there will not be any interaction between these gears and sponges. **Score 100**. • **Burrowing megafauna**: For all practical purposes, there will not be any interaction between these gears and sponges. **Score 100**. **Russia SMHs** • **Coral**: a very small risk of some damage during hauling but not sufficient for these gears to result in significant loss of habitat structure or function. **Score 80**. • **Sponges**: For all practical purposes, there will not be any interaction between these gears and sponges. **Score 100**. • **Burrowing megafauna**: For all practical purposes, there will not be any interaction between these gears and sponges. **Score 100**.		
References		MAREANO Seabed mapping project: http://www.mareano.no/english/news/seabed_to_be_mapped http://www.mareano.no/english/topics/coral_reefs http://www.mareano.no/kart/viewer.php?language=en&bbox=592707.1,7846700.0,802279.9,7952140.0&KARTBILDE_ID=115 http://www.mareano.no/kart/viewer.php?language=en&bbox=-036028.8,6550180.0,1748198.3,7854310.0&KARTBILDE_ID=122 Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. WGDEC, 2014. Report of the ICES/NAFO Joint Working Group on Deep-water Ecology ICES CM 2014/ACOM:29. WGECO, 2014. Report of the Working Group on Ecosystem Effects of Fishing Activities (WGECO) ICES CM 2014/ACOM:26		
OVERALL PERFORMANCE INDICATOR SCORE:				**95**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 2.4.2: Norway NEA cod and haddock - All gears

PI 2.4.2		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of the fishery on habitat types.
	Met?	Y	Y	N
	Justification	**Norway** The strategy covering Norwegian waters is set out in the Norwegian Marine Resources Act, in the the Norwegian seas management plans and in the protocols for both the Joint Norwegian –Russian Commission on Environmental Protection (JNRCEP) and the JRNFC, which explicitly requires an ecosystem approach to marine environmental management. These require close monitoring of the fishery to ensure that all species and habitat protection measures are complied with in full. The IMR–PINRO ecosystem surveys and MAREANO mapping programme are ongoing, as required by the Norwegian seas management to monitor SMHs. The annual status reports of each of the regional seas are presented to parliament. Additionally, the Marine Resources Act requires an ecosystem approach to safeguarding biodiversity in addition to managing exploited resources. Aspects of the CRISP project are also aimed at improving gear efficiency and selectivity to reduce adverse environmental effects. Although cod and haddock fisheries have undoubtedly had a significant adverse effects in the past there is clearly a national strategy and specific measures aimed at minimising further harm to SMHs. Insofar as the strategy has shortcomings with respect to SMHs it is that the threshold levels of the coaral and sponge move-on regulations are set at twice the level recommended by NEAFC and there are no threshold levels for soft corals or sea pens, as in the NW Atlantic (NAFO area); hence the reduced **Score 80**. **Russia** Environmental protection and sustainability is the responsibility of the Ministry of Natural Resources (http://www.mnr.gov.ru/english/). Documentation for for marine environmental and living resource protection in Russian waters that compares with the situation in Norwegian waters is less readily available. Nevertheless, in addition to the bilateral conventions with Norway (JRNFC; JNRCEP) to safeguard the Barents Sea environment and its living marine resources, Russia is a signatory to and participant other international measures for safeguarding Arctic regions including the Barents Sea (e.g. UNEP, 2011 et al.). Specific measures for protecting living marine resources are those agreed under the protocols of the JRNFC, JNRCEP and the Ramsar designations that cover many coastal regions, including areas of the Barents Sea. The large vessels in the Norwegian fleet (i.e. those most likely to fish – occasionally – in Russian waters) are excluded from fishing within 12 miles and it is this coastal zone that is most likely to support SMH (a general truism for the marine environment and one supported by the MAREANO data). While the sum of the parts do not amount to a clearly defined, integrated national marine strategy, there is undoubtedly a partial strategy for Russian waters, albeit less coherent than the Norwegian strategy. **Score 80**.		

PI 2.4.2		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		
b	**Guidepost**	The measures are considered likely to work, based on plausible argument (*e.g.* general experience, theory or comparison with similar fisheries/habitats).	There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved.	Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved.
	Met?	Y	Y	N
	Justification	The ongoing MAREANO monitoring programme, in Norwegian Waters and IMR–PINRO ecosystem surveys, throughout the Barents Sea ecoregion, monitor the environmental status of the NEA Arctic, year on year and provide advice for conservation measures where deemed necessary, *e.g.* the coral-reef MPAs and general prohibition on ground-contact fishing is similar areas. The general conclusion from the regular and *ad hoc* research surveys is that there is no significant fishery-related environmental degradation across the NE Arctic, from which it is concluded that the strategy is working although there has been little testing other than the annual ecosystem surveys to confirm that this is the case, hence the reduced score.		
c	**Guidepost**		There is some evidence that the partial strategy is being implemented successfully.	There is clear evidence that the strategy is being implemented successfully.
	Met?		Y	N
	Justification	There is 'clear evidence' in that both coastal states' authorities monitor the location and activities through VMS and at-sea surveillance, including official observers embarked on all vessels fishing in the Russian zone, but find very few instances of incursions into protected areas and known significant SMHs. Also, commercial self-interest encourages skippers to avoid coral areas and sponge communities because of the risks to the quality of the catch and damage to fishing gear. There is some evidence provided by comparison of benthic biodiversity studies in the Barents Sea that show biomass decreased from the 1920s to the 1960s (attributed in part to climatic factors and intensive towed-gear fishing) but in recent years have shown a steady increase since 2005–2007. This all point to Norwegian–Russian strategies that are being implemented successfully, but only partially as environmental and benthic protection measures are possibly not yet as robust in Russian waters as they are for Norway..		
d	**Guidepost**			There is some evidence that the strategy is achieving its objective.
	Met?			Y
	Justification	The on-going MAREANO and IMR–PINRO ecosystem regional seas monitoring programmes provide some evidence that the strategies are providing protection to sensitive habitats and therefore achieving their objectives. Furthermore, ecosystem surveys provided data with which to compare increasing benthic biodiversity and biomass in the Barents Sea since 2005–2007 when compared with the more impoverished period 1920–60 (attributed in part to climatic factors and intensive towed-gear fishing).		

PI 2.4.2	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
References	Joint Norwegian –Russian Commission on Environmental Protection (JNREP). http://www.miljodirektoratet.no/ JRNFC – http://www.jointfish.com/eng/ MAREANO Seabed mapping project: http://www.mareano.no/english/news/seabed_to_be_mapped http://www.mareano.no/english/topics/coral_reefs http://www.mareano.no/kart/viewer.php?language=en&bbox=592707.1,7846700.0,802279.9,7952140.0&KARTBILDE_ID=115 http://www.mareano.no/kart/viewer.php?language=en&bbox=-036028.8,6550180.0,1748198.3,7854310.0&KARTBILDE_ID=122 BSMP, 2006. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report No. 8 to the Storting. Ministry of the Environment,Oslo. Coral reef protection: http://www.fiskeridir.no/content/download/34340/301378/version/1/file/J-151-2014.pdf Guijarro Garcia, E. (Ed.), Ragnarsson, S., Steingrímsson,S., Nævestad, D., Haraldsson, H., Fosså, J., Tendal,O. & Eiríksson, H. 2006. Bottom Trawling and Scallop Dredging in the Arctic: Impacts of fishing on non-target species, vulnerable habitats and cultural heritage. TemaNord 2006:529 JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea Marine protected areas: http://www.fiskeridir.no/english/fisheries/marine-protected-areas Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. NSMP. 2010. Integrated Management of the Marine Environment of the Norwegian Sea. Report No. 37 (2008–2009) to the Storting. Ministry of the Environment, Oslo. OSPAR, 2010. Background Document for Deep-sea sponge Aggregations. Biodiversity Series, OSPAR, London. http://www.ospar.org/documents/dbase/publications/p00485_deep_sea_sponge_aggregations.pdf WGDEC, 2014. Report of the ICES/NAFO Joint Working Group on Deep-water Ecology ICES CM 2014/ACOM:29. WGECO, 2014. Report of the Working Group on Ecosystem Effects of Fishing Activities (WGECO) ICES CM 2014/ACOM:26 UNEP, 2011. Protecting Arctic Biodiversity: limitations and strengths of environmental agreements. Nairobi: United Nations Environment Programme. http://content.yudu.com/A1pish/MEAreport/resources/87.htm Agreement between the Goverment of the Kingdom of Norway and the Russian Federationon Cooperation in Environmental Matters. Oslo, 1992. Joint declaration from the meeting of the Ministers of Environment of the Nordic Countries and the Russian Federation. Kirkenes, 1992.
OVERALL PERFORMANCE INDICATOR SCORE:	**85**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.4.3: Norway NEA cod and haddock - All gears

PI 2.4.3		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There is basic understanding of the types and distribution of main habitats in the area of the fishery.	The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery.	The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types.
	Met?	Y	Y	N
	Justification	The fishing industry were the first to gain a basic understanding of the typoes and distribution of the main habitat types in the 1920s and '30s and contributed this information to the compilation and publication of the *Close's Fishermen's Chart of the Murman Coast and White Sea* – 1940 and subsequently to the U.K *Kingfisher* fishermen's charts. More recently, Norway has invested significant time and resources (MAREANO) into detailed mapping of areas in which SMHs are known to occur in the greatest frequency and density. The greater part of Barents Sea ecoregion habitats are monitored and mapped annually as a core part of the IMR – PINRO ecosystem survey. This shows (Figure 21) that the occurrence of SMHs beyond the MAREANO mapping area are few, sparsely distributed and mainly around the coastal and ice-edge periphery. The vulnerability of the SMHs is known and understood and both operational practices and regulatory measures are in place to minimise adverse effects. **Norway – Score 100** **Russia – Score 80** **Cumulative - 90**		
b	**Guidepost**	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.	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 of interaction, and the timing and location of use of the fishing gear.	The physical impacts of the gear on the habitat types have been quantified fully.
	Met?	Y	Y	N

PI 2.4.3		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		
	Justification	The nature of the impacts of trawling and, to a lesser extent Danish seining (but this gear has a lower environmental footprint) on habitat types have been identified and there is reliable information on the spatial extent, timing and location of use of all fishing gears. Notionally, the principal concern with static gears is ghost fishing, which primarily affects the fish stocks (PI 2.1 & 2.2) but can influence the distribution and abundance of benthic communities through encouraging aggregation of scavengers. These risks are minimised, however, by the Coastguard's annual lost-gear recovery programme. Detailed information is available in quasi real time from VMS on the exact location of fishing activity, which allows both the spatial extent and timing to be determined. There is also extensive data on the nature of effects of trawl gears. Studies from elsewhere in northern seas are relevant, as is international experience. Over and above this body of readily applicable international research, there is more localised research on the impacts of towed gears among the Nordic nations and their neighbours under the auspices of the Nordic Council. 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). Although it is known that some habitats are more sensitive and vulnerable to mobile-gear activity that others the extent to which the NE Arctic has been affected, in terms of km^2, has not been quantified fully. **Norway – 80** **Russia - 80**		
c	Guidepost		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).	Changes in habitat distributions over time are measured.
	Met?		Y	Y
	Justification	The MAREANO project is ongoing, as are the IMR–PINRO ecosystem surveys. While MAREANO continues to focus on mapping along the shelf break and on the continental shelf in the western part of the survey area – areas regarded as especially ecologically important and vulnerable – the ecosystem surveys are more wide-ranging and generic. The annual IMR–PINRO ecosystem surveys include benthic grab samples that are building a time series of habitat distribution and benthic community composition trends. Some supplementary data is collected by observers aboard the Norwegian reference fleet and by the observers embarked aboard all third country vessels fishing in the Russian zone. All these data not only underpin the strategy for an ecosystem approach to management but highlight wherever there may be a need for specific conservation measures. **Norway – 100** **Russia – 100** **Cumulative score 90**		
References		MAREANO Seabed mapping project: http://www.mareano.no/english/news/seabed_to_be_mapped http://www.mareano.no/english/topics/coral_reefs http://www.mareano.no/kart/viewer.php?language=en&bbox=592707.1,7846700.0,802279.9,7952140.0&KARTBILDE_ID=115		

PI 2.4.3	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
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OVERALL PERFORMANCE INDICATOR SCORE:	**90**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.5.1: Norway NEA cod and haddock - All gears

PI 2.5.1		**The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	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.	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.
	Met?	Y	Y	Partial

PI 2.5.1		The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function
	Justification	Two ICES working groups (AFWG & WGDEC) provide a comprehensive annual review of ecosystem status in the NE Arctic. Additionally, IMR–PINRO provide a comprehensive annual description of the Barents Sea ecosystem which gives a scientific basis for development of an ecosystem-based management plan for the Russian part of the Barents Sea and contribute to the further development of ecosystem-based management already in place in the Norwegian seas management plans. The resulting annual Barents Sea ecosystem status report provides comprehensive information about key ecosystem components, presents trends and highlights any potential cause for concern. There are also a number of ecosystem modelling projects which inform management of key commercial species. These include EcoCod (developed in 2005 to estimate cod MSY taking into account a range of ecosystem factors), Biofrost (multispecies model for Barents Sea – main emphasis cod–capelin dynamics), Gadget (Multispecies interactions between cod, herring, capelin & minke whale (& krill) in the Barents Sea). The ecosystem description work shows that although The Barents Sea remains relatively clean from pollution, it can no longer be regarded as a pristine ecosystem. There is evidence that many of the key elements of the ecosystem are in good shape, and there is a good understanding of the factors affecting the negative change in other ecosystem elements. Of relevance to the cod and haddock, both stocks are at an all-time high and are harvested at sustainable levels. Capelin, a key species in the ecosystem in terms of food web dynamics, is also at high stock levels. Although stocks of saithe (an important bycatch species in this fishery) have declined in recent years, ICES concludes that current exploitation levels remain sustainable. By contrast, stocks of Greenland halibut and redfish are at low levels but there are indications that both are increasing. In both cases, however the low stock levels are not caused by the fishery under assessment, but rather by other targeted fisheries or by high bycatch levels in other fisheries or non-specific environmental factors. Higher temperatures, declining sea ice and lower recent recorded zooplankton levels are all driving change in the ecosystem – also beyond the immediate influence of the fishery under assessment. The continued declining population trends and breeding failure of several seabird species, such as northern fulmar, black-legged kittiwake, razorbill, Atlantic puffin and common guillemot are experiencing declines is similar to patterns elsewhere in the northeast Atlantic. This is probably caused by food shortage, predation from an increasing population of white-tailed eagles and lagged effects from previous by-catch in (particularly long line and gill net fisheries) fisheries. Again, the fishery under assessment is highly unlikely to play a significant role in this. For marine mammals, some of which prey on cod, haddock saithe etc but which are not obligate predators of any one of them. The clearest evidence that the fishery for cod and haddock is highly unlikely to disrupt the key elements underlying ecosystem structure and function is provided by the long-term historic overview. Despite the extreme variation in abundance of several of the major fish stocks over the past 50 – 70 years (which includes current stock and haddock stocks being c. twice all previous recorded levels) there has never been any substantiated indication of any significant adverse effect on ecosystem structure or function (as might be indicated by a universal collapse of bird or mammal populations or plague blooms of jellyfish). Nevertheless, although it can be concluded that the fishery is highly unlikely to disrupt key elements of the ecosystem there are still some habitats that are vulnerable, hence the reduced score.
References		AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05 Anker-Nilssen, T. (ed.), Barrett, R.T., Bustnes, J.O., Christensen-Dalsgaard, S., Erikstad, K.E., Fauchald, P., Lorentsen, S.-H., Steen, H., Strøm, H., Systad, G.H. & Tveraa, T. 2008. SEAPOP studies in the Barents and Norwegian Seas in 2007. NINA Rapport 363 BSMP, 2006. Integrated Management of the Marine Environment of the Barents

PI 2.5.1	The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function
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OVERALL PERFORMANCE INDICATOR SCORE:	**95**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.5.2: Norway NEA cod and haddock - All gears

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are measures in place, if necessary.	There is a partial strategy in place, if necessary.	There is a strategy that consists of a plan, in place.
	Met?	Y	Y	N
	Justification	**Norway:** The strategy is set out in the Norwegian Marine Resources Act, in the protocol for the JNRFC and the Norwegian seas management plans, which explicitly requires an ecosystem approach to marine environmental management. These include the requirement to retain catches of all commercial species and to record interactions with ETP species, thus improving the information and understanding of mixed fisheries, the closure of key spawning or nursery grounds, both by area and by gears, the protection of key habitat areas (cold water coral) and compulsory gear restrictions (sorting grid and large cod-end mesh size). An integral part of the strategy is the JRNFC commitment to safeguarding the exploited stocks, as demonstrated through the agreed management plans for, inter alia, cod, haddock and saithe. Fundamental to the strategy is the annual planning and execution of a series of research cruises both by individual states and under the auspices of the JRNFC, to monitor and assess the status of resources, ecosystems and environment. Yet despite the undoubted breadth and many virtues of this strategy, there are still notable shortcomings. SMH protection measures are limited to just corals and sponges, and there are no explicit measures to protect burrowing megafauna. To reach the SG100 standard, the coaral protection measures should be applied to all corals and the move-on threshold levels brought in line with NEAFC recommendations, i.e. 30 kg, if not lower. Similarly, the sponge move-on threshold should be brought in line with the NEAFC recommendation of 400 kg and threshold limits should be introduced for sea pens, e.g <7 kg, as in the NAFO area. **Score 80** **Russia**: Although the Ministry of Natural Resources has responsibility for developing and implementing a national strategy for safeguarding the natural environment and living resources, it is not a coherent, readily accessible strategy as is found in Norway. Nevertheless, Russia's involvement in and commitment to the JNRCEP, JRNFC and ICES, for example, does constitute a partial strategy for safeguarding marine habitats, species and ecosystem. **Score 80** **Cumulative Score 80**		

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function		
b	**Guidepost**	The measures take into account potential impacts of the fishery on key elements of the ecosystem.	The partial strategy 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.	The strategy, which consists of a plan, contains 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. 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.
	Met?	Y	Y	N
	Justification	The results from annual planning and research exercises are published as annual status reports that specifically focus on ecosystem trends, threats and projections. This information is then subject to scientific analysis and review nationally and within the JNRFC, ICES, OSPAR, NAMMCO etc as part of a comprehensive exercise to ensure that not only are strategy objectives being met but that the strategy is being developed in response to new information. Both the MAREANO programme and the IMR–PINRO ecosystem surveys continue to monitor potential interactions between fisheries and both ecosystem and habitats. These procedures take into account available information and are expected to restrain impacts of the fishery on the ecosystem but, with the exception of fish-stock management plans, there is no explicit requirement that action will be taken within any of the national plans or international conventions; the scientists can only advise. **Norway**: a key element of the strategic planning is the ongoing MAREANO mapping programme that progressively improves knowedge on the distribution and sttus of SMHs in critical Norwegian waters (i.e. those areas subject to the most intense fishing pressure; Fig 21). MAREANO data are subject to regular review in relation to developing further measures to restrain fishery impacts on the ecosystem where such measures are necessary. Nevertheless, there are still notable shortcomings. SMH protection measures are limited to just corals and sponges, and there are no explicit measures to protect burrowing megafauna. To reach the SG100 standard, the coaral protection measures should be applied to all corals and the move-on threshold levels brought in line with NEAFC recommendations, i.e. 30 kg, if not lower. Similarly, the sponge move-on threshold should be brought in line with the NEAFC recommendation of 400 kg and threshold limits should be introduced for sea pens, e.g <7 kg, as in the NAFO area. **Score 80**. **Russia**: there is a partial strategy that is geared to meet immediate current needs, both with respect to national legislation and international agreements. The critical element that is missing is a specific plan with respect to SMHs. **Score 80**. **Cumulative score 80**		

PI 2.5.2		There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function		
c	Guidepost	The measures are considered likely to work, based on plausible argument (*e.g.*, general experience, theory or comparison with similar fisheries/ecosystems).	The partial strategy is considered likely to work, based on plausible argument (*e.g.*, general experience, theory or comparison with similar fisheries/ecosystems).	The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved.
	Met?	Y	Y	N
	Justification	The JRNFC came into effect in 1988 and agreed fish-stock management plans have been in operation for the past decade. The JNRCEP was agreed in 2005 and covers many non-fishery aspects of (mrine) environmental protection and sustainability. More recently, Norway has enacted its regional seas management plans and both coastal states in the NE Arctic are signatories to a variety of conventions and agreements (*e.g.* ICES, NAMMCO, OSPAR) to ensure the long-term protection of the environment and its natural resources. Over the past decade there have been notable improvements, not least with the growth and stability of major fish stocks, both demersal and pelagic, and in addition to numerous areas closed to fishing for the protection of fish stocks, feeding and breeding birds and (in Norwegian waters) seabed habitats. These are all measures that are already yielding positive results but they fall short of what is deemed appropriate by NEAFC (i.e. 30 kg threshold for coral, 400 kg threshold for sponges) and NAFO (7 kg for sea pens). It would seem appropriate, therefore, that Norway should, as a minimum, bring its SMH protection measures into line with these international standards. **Norway score 80** **Russia** lacks the coherence and transparency of the Norwegian strategy, hence **score 80**. **Cumulative score 80**.		
d	Guidepost		There is some evidence that the measures comprising the partial strategy are being implemented successfully.	There is evidence that the measures are being implemented successfully.
	Met?		Y	Y
	Justification	Fishery enforcement is robust in defence of fish stocks and environment throughout the NE Arctic and demonstrates its effectiveness through warnings, administrative penalties and court action where appropriate. IMR–PINRO–ICES stock assessments have shown, and continue to show that the fishery management measures are effective at rebuilding stocks and maintaining them at high levels to sustain high catch levels. The MAREANO programme and IMR–PINRO ecosystem surveys continues to build a database of seabed habitats anthropogenic effects throughout the NE Arctic. Thus, the shortcomings in the existing measures notwithstanding, there is no reason to believe that the current measures are not being implemented successfully.		
References		AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05 BSMP, 2006. Integrated Management of the Marine Environment of the Barents Sea and the Sea Areas off the Lofoten Islands. Report No. 8 to the Storting. Ministry of the Environment,Oslo. Christensen-Dalsgaard, S., Bustnes, J., Follestad, A., Systad G., Eriksen, J., Lorentsen S. & Anker-Nilssen, T. 2008. Intersectoral Assessment of Impacts on Seabirds. Baseline Report for a Comprehensive Environmental Management		

PI 2.5.2	There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function
	Plan for the Norwegian Sea. NINA Rapport 338. JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea MAREANO: www.mareano.no NSMP. 2010. Integrated Management of the Marine Environment of the Norwegian Sea. Report No. 37 (2008–2009) to the Storting. Ministry of the Environment, Oslo. Olsen, E., Gjøsæter, H., Røttingen, I., Dommasnes, A., Fossum, P. & Sandberg, P. 2007. The Norwegian ecosystem-based management plan for the Barents Sea. ICES Journal 0f Marine Science 64: 599–602. Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Skaret, G. & Pitcher , T. J., 2006. An estimation of compliance of the fisheries of Norway with Article 7 (Fisheries Management) of the UN Code of Conduct for Responsible Fishing. FAO, Rome. WGDEC, 2014. Report of the ICES/NAFO Joint Working Group on Deep-water Ecology ICES CM 2014/ACOM:29. Wienerroither R., Johannesen E., Dolgov A., Byrkjedal I., Aglen A., Bjelland O., Drevetnyak, K., Eriksen KB., Høines Å., Langhelle G., Langøy H., Murashko P., Prokhorova T., Prozorkevich D., Smirnov O., Wenneck T. 2013. Atlas of the Barents Sea Fishes based on the winter survey. IMR-PINRO Joint Report Series 2-2013.
OVERALL PERFORMANCE INDICATOR SCORE:	**85**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 2.5.3: Norway NEA cod and haddock - All gears

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Information is adequate to identify the key elements of the ecosystem (*e.g.*, trophic structure and function, community composition, productivity pattern and biodiversity).	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Y	Y	
	Justification	Understanding of food web dynamics related to both cod and haddock is reasonably well advanced for the Barents Sea, with good quantitative information as a result of stomach content analysis of both cod, haddock and saithe, which gives considerable insight into the dynamic relationships with prey species such as capelin. This information is sufficient to parameterise ecosystem models and in so doing underpins both the formulation of annual stock management advice, and in the case of Norway, the development of the regional seas ecosystem management plans. In spite of these regularly updated data there remain some key questions about the exact ecosystem dynamics in the Barents Sea. For example, future effects of further ocean warming on the marine production cycle and food cahin, but this is a subject that is a core of the Hjort Centre and IMR research programmes and Nordic Council working groups. Thus, not only is information adequate to broadly understand the key elements of the ecosystem but the information and understanding are constantly growing.		
b	**Guidepost**	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail.	Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail.	Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated.
	Met?	Y	Y	Y
	Justification	Over the past quarter century considerable research effort and modelling has been undertaken internationally to increase and improve our knowledge and understanding of interactions between fisheries and ecosystems; this is no less true for the NE Arctic where work has been undertaken nationally and under the auspices of the Nordic Council, than it is for many other areas, including Iceland. Thus, not only can the consequences of main interactions be inferred, many of them have been identified and quantified – most obviously the effect of fishing on fish stocks.		
c	**Guidepost**		The main functions of the Components (*i.e.*, target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.	The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood.
	Met?		Y	N

PI 2.5.3		There is adequate knowledge of the impacts of the fishery on the ecosystem		
	Justification	There is a good understanding of the function of key ecosystem components, such as target species – cod and haddock – and bycatch species such as saithe, ETP species (marine mammals and seabirds) and habitats (productive nursery areas). There does remain opportunity for improving the quantifiable level of understanding of fishery interactions with some components. Arguably, the habitat about which least is known with respect to fisheries is the sponge community.		
d	Guidepost		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.	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.
	Met?		Y	Y
	Justification	The simulation models developed for the Barents Sea using data collected over many years, including stomach content analysis and other investigations enable the main consequences for the ecosystem to be inferred and tested. As ecosystem management strategies and our understanding of the data requirements for ecosystem based management improve, there is the opportunity for regular refinement of data collection methodologies and priorities – meaning that data remains tailored to the management strategies designed to mitigate ecosystem impacts.		
e	Guidepost		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).	Information is sufficient to support the development of strategies to manage ecosystem impacts.
	Met?		Y	Y
	Justification	The long-established and long-term research programmes and their associated databases (and not only those of coastal states but other nations with an historic scientific interest in the NE Arctic) are undoubtedly sufficient to support the development of strategies to manage ecosystem interactions. The regional seas management plans are de facto examples of such management strategies.		
References		Hjort Centre: http://www.imr.no/prosjektsiter/hjortcentre/forskning/en AFWG, 2014. Report of the Arctic Fisheries Working Group. ICES CM2014/ACOM:05. Anker-Nilssen, T. (ed.), Barrett, R.T., Bustnes, J.O., Christensen-Dalsgaard, S., Erikstad, K.E., Fauchald, P., Lorentsen, S.-H., Steen, H., Strøm, H., Systad, G.H. & Tveraa, T. 2008. SEAPOP studies in the Barents and Norwegian Seas in 2007. NINA Rapport 363 Anker-Nilssen, T., Barrett, R.T., Bustnes, J.O., Erikstad, K.E., Fauchald, P., Lorentsen, S.-H., Steen, H., Strøm, H., Systad, G.H. & Tveraa, T. 2007. SEAPOP studies in the Lofoten and Barents Sea area in 2006. NINA Report 249.		

PI 2.5.3	There is adequate knowledge of the impacts of the fishery on the ecosystem
	Anker-Nilssen, T., Barrett, R.T., Bustnes, J.O., Erikstad, K.E., Fauchald, P., Lorentsen, S.-H., Steen, H., Strøm, H., Systad, G.H. & Tveraa, T. 2006. SEAPOP studies in the Lofoten and Barents Sea area in 2005. NINA Report 127, Bruntse, G. & Tendel, O.S. (2001) *Lophelia pertusa* and other cold water corals in the Faroe area. In *Marine biological investigations and assemblages of benthic invertebrates from the Faroe Islands* (Bruntse, G. & Tendel, O.S. eds) pp 22–32. Kaldbak Marine Biological Laboratory, The Faroe Islands. Christensen-Dalsgaard, S., Bustnes, J., Follestad, A., Systad G., Eriksen, J., Lorentsen S. & Anker-Nilssen, T. 2008. Intersectoral Assessment of Impacts on Seabirds. Baseline Report for a Comprehensive Environmental Management Plan for the Norwegian Sea. NINA Rapport 338. Chust G, Allen JI, Bopp L, Schrum C, Holt J, Tsiaras K, Zavatarelli M, Chifflet M, Cannaby H, Dadou I, Daewel U, Wakelin SL, Machu E, Pushpadas D, Butenschon M, Artioli Y, Petihakis G, Smith C, Garçon V, Goubanova K, Le Vu B, Fach BA, Salihoglu B, Clementi E, Irigoien X. 2014. Biomass changes and trophic amplification of plankton in a warmer ocean *Global Change Biology*. 20: 2124-2139. Denisenko N.V., Denisenko S.G. 1991. On impact of bottom trawling on benthos in the Barents Sea: Environmental situation and protection of flora and fauna of the Barents Sea. Apatity, published by Kola Science Centre of USSR Academy of Science. S. 158-164. Denisenko S.G. 2007. Zoobenthos of the Barents Sea under conditions of changing climate and human intervention. S. 418-511- In : Dynamics of marine ecosystems and contemporary problems of protection of biological potential of Russian seas. Vladivostok: Dalnauka. Eide, A., Ese, A.-C. & Håkon Hoe A. (Eds) 2014. Fisheries Management and Global Warming: Effects of climate change on fisheries in the Arctic region of the Nordic countries. TemaNord 2014:515 Fachald, P., Erikstad, K. E. & Skarsfjord, H. 1996. Physical and biological environmental properties as predictors of the broad scale spatial distribution of pelagic seabirds. - NINA.NIKU Project Report 06: 1-20 Filin, A., Tjelmeland, S. & Stiansen, J. 2007. Ecosystem dynamics and fisheries management in the Barents sea. http://brage.bibsys.no/xmlui/bitstream/handle/11250/107599/12thSymp_30.pdf?sequence=1 Freese, J.L. 2001. Trawl-induced damage to sponges observed from a res research submersible. Marine Fisheries Review 63: 7–13. Freese, J.L., Auster, P., Heifetz, J., Wing, B.L., 1999. Effects of trawling on seafloor habitat and associated invertebrate taxa in the Gulf of Alaska. Marine Ecology Progress Series 182, 119–126. Guijarro Garcia, E. (Ed.), Ragnarsson, S., Steingrímsson,S., Nævestad, D., Haraldsson, H., Fosså, J., Tendal,O. & Eiríksson, H. 2006. Bottom Trawling and Scallop Dredging in the Arctic: Impacts of fishing on non-target species, vulnerable habitats and cultural heritage. TemaNord 2006:529 Hiddink J.G., Jennings S. & Kaiser M.J. 2006. Indicators of the ecological impact of bottom-trawl disturbance on seabed communities. *Ecosystems* 9: 1190–1199. Hjøllo, S.S., 2007. EcoFish WP2 workandWind, NAO and ecosystem-selected articles. IMR, Bergen. http://ecofish.imr.no/__data/page/6432/work_and_Wind,_NAO_and_ecosystems elected_articles080307.pdf http://www.mareano.no/english/topics/coral_reefs Husebø, Å., Nøttestad, L., Fosså, J.H., Furevik, D.M. & Jørgensen, S.B. (2002). Distribution and abundance of fish in deep-sea coral habitats. *Hydrobiologia* 471: 91–99. Jensen, A.& Fredriksen, R. 1992. The fauna associated with the bank forming deepwater coral ***Lophelia pertusa*** (Scleractinaria) on the Faroe shelf. *Sarsia* 77: 53–69.

PI 2.5.3	There is adequate knowledge of the impacts of the fishery on the ecosystem
	JNRFC: http://barentsportal.com/barentsportal_v2.5/index.php/en/barents-sea-status-report/important-issues/fisheries/657-joint-russian-norwegian-management-of-the-fisheries-in-the-barents-sea Klitgaard, A.B. & Tendal, O.S. "Ostur" – "cheese bottoms" – sponge dominated areas in the Faroese shelf and slope areas. In *Marine biological investigations and assemblages of benthic invertebrates from the Faroe Islands* (Bruntse, G. & Tendel, O.S. eds) pp 13–21. Kaldbak Marine Biological Laboratory, The Faroe Islands. *www.vliz.be/imisdocs/publications/217806.pdf* Løkkeborg S. 2005. Impacts of trawling and scallop dredging on benthic habitats and communities. FAO fisheries technical paper 472, 69 p. MAREANO Seabed mapping project: http://www.mareano.no/english/news/seabed_to_be_mapped NAMMCO, 2014. Report of the Twentieth Meeting of the Scientific Committee of NAMMCO. Tromso. http://www.nammco.no/webcronize/images/Nammco/1001.pdfpdf Olsen, E., Gjøsæter, H., Røttingen, I., Dommasnes, A., Fossum, P. & Sandberg, P. 2007. The Norwegian ecosystem-based management plan for the Barents Sea. ICES Journal 0f Marine Science 64: 599–602. OSPAR, 2010. Background Document for Deep-sea sponge Aggregations. Biodiversity Series, OSPAR, London. http://www.ospar.org/documents/dbase/publications/p00485_deep_sea_sponge_aggregations.pdf Prokhorova, T. (Ed.). 2013. Survey report from the joint Norwegian/Russian ecosystem survey in the Barents Sea and adjacent waters, August-October 2013. IMR/PINRO Joint Report Series, No. 4/2013. Rindorf, A., Schmidt,J., Bogstad, B., Reeves, S. & Walther. 2013. A Framework for Multispecies Assessment and Management. An ICES/NCM Background Document: TemaNord 2013:550 Sparre, P. 1984. A computer programme for estimation of food suitability coefficients from stomach content data and multipsecies VPA. ICES CM 1984/25. WGBYC, 2014. Report of the Working Group on Bycatch of Protected Species. ICES CM 2014/ACOM:28 WGDEC, 2014. Report of the ICES/NAFO Joint Working Group on Deep-water Ecology ICES CM 2014/ACOM:29. WGECO, 2014. Report of the Working Group on Ecosystem Effects of Fishing Activities (WGECO) ICES CM 2014/ACOM:26 WGMME, 2014. Report of the Working Group on Marine Mammal Ecology. ICES CM 2014/ACOM:27. WGSE, 2013. Report of the Working Group on Seabird Ecology. ICES CM 20131/SSGEF:19. Chust G, Allen JI, Bopp L, Schrum C, Holt J, Tsiaras K, Zavatarelli M, Chifflet M, Cannaby H, Dadou I, Daewel U, Wakelin SL, Machu E, Pushpadas D, Butenschon M, Artioli Y, Petihakis G, Smith C, Garçon V, Goubanova K, Le Vu B, Fach BA, Salihoglu B, Clementi E, Irigoien X. 2014. Biomass changes and trophic amplification of plankton in a warmer ocean *Global Change Biology*. 20: 2124-2139. Filin, A., Tjelmeland, S. & Stiansen, J. 2007. Ecosystem dynamics and fisheries management in the Barents sea. http://brage.bibsys.no/xmlui/bitstream/handle/11250/107599/12thSymp_30.pdf?sequence=1
OVERALL PERFORMANCE INDICATOR SCORE:	**95**
CONDITION NUMBER (if relevant):	

Principle 3 – Norway NEA cod and haddock

Evaluation Table for PI 3.1.1 – Norway NEA cod and haddock

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There is an effective national legal system and a framework for cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and organised and effective cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Y	Y	Y

	Justification	Norway has a well-established system for fisheries management, which has evolved over more than a century and is now codified in the 2008 Marine Resources Act. The Act provides for a formal system of cooperation between regulatory bodies of governance, such as the Ministry of Trade, Industry and Fisheries, the Directorate of Fisheries and the Coast Guard, and further for cooperation between management authorities and scientific research institutes, primarily the Institute of Marine Research. The 2008 Integrated Management Plan for the Norwegian Sea provides for cooperation between different sector authorities, such as the Ministry of Trade, Industry and Fisheries and the Ministry of Climate and Environment. The national legal documents refer to and are in compliance with relevant international agreements, such as the 1982 Law of the Sea Convention (UNCLOS) and the 1995 Fish Stocks Agreement. 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. Norway has implemented actions against IUU fishing in accordance with the FAO Global Plan of Action against IUU fishing and is a signatory to the 2009 FAO Port State Agreement. The system is considered to be effective, at the national level, insofar as it constitutes a coherent set of rule-making practices. However this fishery is subject to international cooperation for management of the stock and the revised MSC requirements, version 1.3, have to take into account the international perspective (CBA 4.2.1.2). In that context the fishery does meet the requirements of scoring issue SG 100 in that a framework for international cooperation does exist through the JNRFC which have proven to be effective in the management of the NEA cod and haddock fishery since 1975. Since its establishment, the JNRFC has dealt with issues such as the stipulation of quotas and minimum sizes for jointly managed live marine resources, regulation of mesh width in nets, use of fish sorting grids in trawlers and the introduction of satellite monitoring of fishing and transport vessels in addition to a number of other issues related to strengthening control of catches of live marine resources. Today, the JNRFC provides efficient joint management of the most important fish stocks of both countries, in the Barents Sea and the Norwegian Sea. In line with the international trend for a more comprehensive, eco-based strategy, and since the turn of the century, the Fisheries Commission has been working towards a more long-term, precautionary approach to harvesting strategies for the live marine resources in the Barents Sea and the Norwegian Sea. There is clear evidence of continued international cooperation under the JNRFC on science and research and together these have delivered the outcomes, in terms of stock and marine ecosystem status, consistent with MSC Principles1 and 2.		
b	**Guidepost**	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery.	The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective.
	Met?	Y	Y	N

	Justification	At the national level in Norway, there is an effective, transparent dispute resolution system in place, as fishermen can take their case to court if they do not accept the rationale behind an infringement accusation by enforcement authorities, or the fees levied against them. Verdicts at the lower court levels can be appealed to higher levels. There are instances from recent years that management authorities have lost cases against fishermen and accepted the verdict, which is a clear demonstration that the system works. The NEA cod is shared, high-seas stock subject to international cooperation for its management. The bilateral JNRFC agreement is the fundamental mechanism to achieve that management based on the agreed harvest strategy endorsed as precautionary by ICES. The main core of that agreement is to set the annual TAC on the basis of ICES advice. The 50/50 TAC allocation to each party (with 3rd country allocations reached through bilateral agreements) is based on a legally binding long term agreement. At the international level, a state can institute proceedings against another state through mechanisms such as the International Court of Justice and the International Tribunal for the Law of the Sea. Disputes between Norway and Russia are solved within the frameworks of the 1975 JNRFC agreement on the regulation of the NEA cod and haddock fisheries and the annual fisheries consultations. The system is considered to be effective insofar as no major disputes have emerged, although it has not been tested and proven that this is the case; hence it falls short of SG100.		
d	**Guidepost**	The management system has a mechanism to generally respect 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.	The management system has a mechanism to observe 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.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	The Norwegian system for fisheries management includes various mechanisms that generally respect and observe the rights of the coastal population along the country's coast. For the most important species, significantly and proportionately larger quota shares are allotted to coastal fisheries than to the ocean going fleet, although this established custom is not enshrined in law. Another example is the support provided by the authorities for the transport of fish from vessels in the country's remote areas to statutory landing points. Although this represents a subsidy to the fishing communities involved, it has no bearing on the total quantity of fish landed as this is set by national quotas. These national arrangements are not in conflict with MSC P1 and P2. At the international level the historical fishing rights of countries particularly depending on fishing for food and livelihood are respected and observed through the appropriate regional fisheries management bodies, e.g. JNRFC and NEAFC.		
References		• Act of 6 June 2008 no. 37 relating to the Management of Wild Living Marine Resources (the Marine Resources Act) • Interviews with representatives of the Ministry of Fisheries and Coastal Affairs, Directorate of Fisheries, the Norwegian Fishermen's Association and the Fishermen's Sales Organization during site visit • Report to the Storting No. 8 (2005–2006) Integrated Management of the Marine Environment in the Barents Sea and Ocean Areas around Lofoten (management plan). • Meld.St. 26 (2013-2014) Fiskeriavtalane Noreg har inngått med andre land for 2014 og fisket etter avtalane I 2012 og 2013, Oslo: Ministry of Trade, Industry and Fisheries		

OVERALL PERFORMANCE INDICATOR SCORE:	**90**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 3.1.2 – Norway NEA cod and haddock

PI 3.1.2		The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	Met?	Y	Y	Y
	Justification	The most important organizations involved in Norwegian fisheries management are government bodies such as the Ministry of Trade, Industry and Fisheries, the Directorate of Fisheries and the Coast Guard, sales organizations such as Norwegian Fishermen's Sales Organization (Norges Råfisklag), fishermen's organizations such as the Norwegian Fishermen's Association (Norges Fiskarlag) and The Norwegian Fishing Vessel Owners Association (Fiskebåt). The roles, functions and responsibilities of the various actors are clearly defined in the legislation establishing the statutory bodies and the constitutions of the trade bodies. Their participation in the management process is codified in the Marine Resources Act. According to interviews at site visit, they are well understood by all involved entities in all areas of responsibility and interaction. In the fisheries negotiations at the international level (JNRFC and bilateral negotiations with third parties), the roles and responsibilities of each state are explicitly defined and well understood.		
b	**Guidepost**	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.
	Met?	Y	Y	Y

PI 3.1.2		**The management system has effective consultation processes that are open to interested and affected parties.** **The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties**		
	Justification	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 (statutory bodies, trade organizations, community representatives and environmental NGOs) have an opportunity to attend and make representations. 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. Representatives of the Ministry of Trade, Industry and Fisheries during the site visit stressed the importance of this 'open-door' policy in order to ensure the legitimacy of regulations. In addition there is regular day-to-day communication by telephone, email and social media between authorities, user-groups and other interested parties and according to interviews at site visit, management authorities often amend their policies to conform to the views of user-groups and other interested parties. They also explain how this information is used or not used in the ensuing policy-making process. Also, annual meetings of fishermen's organisations, such as e.g. the regular "Skippers meetings" are important venues for presentation of science and policy developments and dialogue between fisheries and scientists and administrators. User-groups expressed the view that they work together towards the common goal of sustainable fisheries management, not against each other.		
c	**Guidepost**		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	Met?		Y	Y
	Justification	All interested parties are given the opportunity to participate in the Regulatory Meetings, which is the most important formal arena for interaction between fisheries management authorities and the public. Meetings are announced publicly and all relevant stakeholders are well informed about where and when the meetings take place. At these consultation meetings the management authorities actively seek advice from all interested parties in preparation for international consultations and negotiations.		
References		• Act of 6 June 2008 no. 37 relating to the Management of Wild Living Marine Resources (the Marine Resources Act) • Interviews with representatives of the Ministry of Trade, Industry and Fisheries and Directorate of Fisheries, the Norwegian Fishermen's Association, The Norwegian Association of Boatowners, and the Fishermen's Sales Organization during site visit		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.3 – Norway NEA cod and haddock

PI 3.1.3		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		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy.
	Met?	Y	Y	Y
	Justification	The 2008 Marine Resources Act, which covers all living marine resources, requires that Norwegian fisheries management be guided by the precautionary approach and by an ecosystem approach that takes into account habitats and biodiversity. These objectives are made explicit in the relevant policy documents, such as the "Integrated Management of the Marine Environment in the Barents Sea and Ocean Areas around Lofoten". This plan is aimed not just at the sustainable utilization of living marine resources, but also safeguarding the marine environment and ecosystem as a whole. There are similar plans for the Norwegian Sea and the North Sea. At the international level, the JNRFC in 2002 adopted a harvesting strategy for live marine resources; a strategy which came into effect from 2004. This strategy paves the way for long-term, sustainable stocks, a high degree of stability in the total quota from year to year and full exploitation of all available information on the condition of the stocks. The reference points and code of conduct for the Precautionary Approach have subsequently been fine-tuned, based on experience and new knowledge gained. As with the Norwegian regional seas management plans, the convention also underpins safeguarding the marine environment and ecosystems.		
References		• Act of 6 June 2008 no. 37 relating to the Management of Wild Living Marine Resources (the Marine Resources Act) • Report to the Storting No. 8 (2005–2006) Integrated Management of the Marine Environment in the Barents Sea and Ocean Areas around Lofoten (management plan). • Report to the Storting No. 37 (2008–2009) Integrated Management of the Marine Environment in the Norwegian Sea (management plan)		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.1.4 – Norway NEA cod and haddock

PI 3.1.4		The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	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 perverse 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 explicitly considers incentives in a **regular review** of management policy or procedures to ensure they do not contribute to unsustainable fishing practices.
	Met?	Y	Y	P
	Justification	The management system provides for negative incentives designed to prevent fishermen from violating regulations (see 3.2.3 on the enforcement system for details), designed to meet the outcomes expressed by MSC Principles 1 and 2 (see 3.1.3 and 3.2.1 on the objectives of the general and fishery-specific management systems, respectively). These incentives are subject to regular internal review of enforcement policies. A risk-based framework aimed at utilizing resources to optimize compliance at any given moment is applied, implying that priorities are regularly amended. Positive incentives include support for research on e.g. gear improvements (cf. the CRISP programme) and for the transport of fish from vessels in the country's remote areas to statutory landing points. The management system does not include any subsidies that contribute to unsustainable fishing or ecosystem degradation. Subsidies to the fishing fleet were terminated in 1990 following the agreement between the European Free Trade Area signatories, negotiated in preparation of the European Economic Area Agreement. However, the reserve by government of some quota for reallocation in autumn to inshore fishing dependent communities, for socioeconomic reasons, may be acting contrary to the coastal cod recovery plan. Although this concern has been drawn to the attention of the Norwegian authorities, it has not been examined (by IMR) in detail, but is sufficient to justify a reduced score.		
References		• Act of 6 June 2008 no. 37 relating to the Management of Wild Living Marine Resources (the Marine Resources Act) • Interviews with representatives of the Ministry of Trade, Industry and Fisheries, Directorate of Fisheries, the Norwegian Fishermen's Association, the Norwegian Boatowners Association, and the Fishermen's Sales Organization during site visit		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.1 – Norway NEA cod and haddock

PI 3.2.1		The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system	Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.	Well defined and measurable short and long-term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system.
	Met?	Y	Y	Partial
	Justification	Long-term objectives for the fishery are defined in Norwegian legislation and policy documents (see 3.1.3), as well as in the management plan for the NEA cod and haddock fishery: fisheries management consistent with the precautionary approach intended to constrain harvesting within safe biological limits and designed to provide for sustainable fisheries. The management plan further provides for specific reference points for spawning stock biomass and fishing mortality. Short-term objectives explicitly addressed in Norwegian fishery legislation include avoiding that TACs are exceeded, that discard does not take place and that catch of non-target species is minimized, which is demonstrably consistent with achieving the outcomes expressed by MSC Principles 1 and 2. These short-term objectives are well defined and measurable, in the sense that performance against them can be measured through the enforcement bodies' recording and inspection routines (see 3.2.3). Well defined and measurable long-term objectives consistent with achieving the outcomes of MSC Principle 1 are explicit within the fishery's management system, reflected in the management plan's ambition to maintain fishery at a level consistent with defined biological reference levels. However, despite the ongoing programmes to map and safeguard vulnerable and sensitive marine habitats and ecosystems, less well defined and measurable objectives exist for Principle 2, warranting a partial score on the SG100.		
References		• Act of 6 June 2008 no. 37 relating to the Management of Wild Living Marine Resources (the Marine Resources Act) • Report to the Storting No. 8 (2005–2006) Integrated Management of the Marine Environment in the Barents Sea and Ocean Areas around Lofoten (management plan).		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
CONDITION NUMBER (if relevant):				

Evaluation Table for PI 3.2.2 – Norway NEA cod and haddock

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Y	Y	
	Justification	Established decision-making procedures at national level in Norway – evolved over several decades and now codified in the 2008 Marine Resources Act – ensure that strategies are produced and measures taken to achieve the fishery-specific objectives. The Ministry of Trade, Industry and Fisheries decides on policy and regulatory schemes, while the Directorate of Fisheries acts as a technical body with a main responsibility for secondary legislation. The Directorate and the Coast Guard perform compliance control, on shore and at sea respectively. The decision making processes include the allocation of national quotas to fleet groups according to an elaborate distributional scheme based on vessel groups defined by gear, length of the vessels and community dependence. Further, technical regulations are defined by the Directorate of Fisheries, after consultations with user-groups and other stakeholders, as well as with other nations for shared stocks. The enforcement system is further described in 3.2.3. At the international level, management plans are produced and reviewed and TAC agreed and shared among the parties of the 1975 Joint Russia Norway Fisheries Commission agreement. Third party allocations are agreed through bilateral negotiations. These decision-making processes have so far resulted in measures that contribute to achieving the objectives of the management plan.		
b	**Guidepost**	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to **all issues** identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Y	Y	Y

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
	Justification	According to interviews during the site visit, the established decision-making procedures at national level in Norway respond to all issues identified in research, monitoring, evaluation or by groups with an interest in the fishery. This is ensured through regular consultations between governmental agencies and the public, first and foremost the Regulatory Meetings, further through ad hoc consultation with the industry and other stakeholders. In addition, there is close contact between authorities and scientific research institutions, i.e. JNRFC, IMR-PINRO and ICES. The management response to the outcomes of research, monitoring, evaluation and consultation is further investigations of issues raised, initiation of new/additional research activities and amendments of fishery regulations as required. Both scientists and user-group representatives claim that the relevant government agencies are open to any kind of input at any time. They feel that the authorities' response is transparent and timely and that the ensuing policy options take adequate account of their advice. From the authorities' point of view, these consultations contribute to enhanced quality of decision-making and also to the legitimacy of the regulations. At the international level, the management system also responds to issues raised on the basis of knowledge from science, review and evaluation.		
c	Guidepost		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Y	
	Justification	Decision-making processes are based on the agreement set out in the JNRFC and the stock assessment advice provided by ICES. The stock assessments are updated annually using all best available information and the management plans, which ICES judges to be consistent with the precautionary principle and MSY approach, are subject to regular review. Similarly, safeguarding the marine environment and ecosystems is based on best available information from ongoing research programmes and monitoring in support of the regional seas management plans and JNRFC.		
d	Guidepost	Some information on fishery performance and management action is generally available on request to stakeholders.	Information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	**Formal reporting** to **all** interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Y	Y	N

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.		
	Justification	The Ministry of Trade, Industry and Fisheries submits annual reports to the Parliament on behalf of the entire system for fisheries management. Other involved agencies, such as the Institute of Marine Research, the Directorate of Fisheries and the Coast Guard, produce annual reports that are readily available to the public. The results from the annual IMR-PINRO research and monitoring surveys in the Barents sea are published in a timely manner and available on the web, as are the results from IMR research programmes and ICES stock assessments and formal advice. In these reports, actions taken or not taken by the relevant authority are accounted for, including those proposed on the basis of information from research, monitoring, evaluation and review activity. However, formal reports are not always provided as to why a particular action is taken or not taken.		
e	Guidepost	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.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts **proactively** to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	Y	Y	Y
	Justification	The management authority is not subject to continuing court challenges. When occasionally taken to court by fishing companies, the management authority complies with the judicial decision in a timely manner. There are, for instance, recent examples of authorities losing court cases and immediately accepting the verdict. However, the management authority works proactively to avoid legal disputes. This is done partly through the tight cooperation with user-groups at the regulatory level, ensuring as high legitimacy as possible for regulations and other management decisions. Regulatory and enforcement authorities offer advice to the fleet on how to avoid infringements, on request but often on their own initiative. For example, Coast Guard inspectors work in a dedicated manner to communicate with fishermen on the fishing grounds, keeping them updated on changes in regulations and explaining the rationale of the rules in an attempt to increase their legitimacy. In 2012, the enforcement agencies and the sales organizations were given the authority to issue administrative penalties for minor infringements (serious enough to be met by a reaction above a written warning though; see 3.2.3), thus referring only the most serious cases to prosecution by the police and possible transfer to the court system.		
References		• 1975 Joint Russia Norway Fisheries Commission agreement. www.Jointfish.com • Interviews with representatives of the Ministry of Trade, Industry and Fisheries Directorate of Fisheries, the Norwegian Fishermen's Association, The Norwegian Boatowners Association, and the Fishermen's Sales Organization during site visit		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**

PI 3.2.2	**The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment.**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 3.2.3 – Norway NEA cod and haddock

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.	A comprehensive 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.
	Met?	Y	Y	Y
	Justification	Monitoring, control and surveillance is taken care of through shared responsibility and close collaboration between the Directorate of Fisheries, the Coast Guard and the national sales organizations. The Directorate of Fisheries keeps track of how much fish is taken of the quotas of different vessels, vessel groups or other states at any given time, based on reports from the fishing fleet. Norwegian vessels are required to have electronic logbooks, where real-time catch data are forwarded to the Directorate of Fisheries. The self-reported catch data can be checked at sales operations through the sales organizations, which have monopoly on first-hand sale of fish in Norway, and through physical checks performed by the sales organizations, the Directorate of Fisheries and the Coast Guard. The sales organizations are required to record all landings of fish in Norway and keep track of how much remains of a vessel's quota at any given time, on the basis of the landings data. This information is compared to the figures provided by the vessels to the Directorate of Fisheries through the electronic logbook. The value of any catch delivered above a vessel's quota is retained by the sales organization and used for control purposes. The sales organizations have their own inspectors who carry out physical controls of landings. For instance, the Fishermen's Sales Organization has inspectors scattered along the Norwegian coastline. The Directorate has seven regional offices along the coast, staffed with inspectors that carry out independent physical control of the fish at the point of landing, including total volume, species and fish size. The landed volumes are then compared to the volumes reported to the Directorate through the logbooks. The Coast Guard is administratively part of the Norwegian Navy but performs tasks on behalf of several ministries, including the Ministry Trade, Industry and Fisheries. Coast Guard inspectors board fishing vessels and control the catch (e.g. catch composition and fish size) and fishing gear (e.g. mesh size) on deck and the quantity of fish in the holds. Using the established conversion factors for the relevant fish product, the inspectors calculate the quantity of the fish in round weight and compare this with the catches reported to the Directorate through the logbooks. Hence there are a number of possibilities for enforcement authorities to check whether the data provided by fishermen through self-reporting are indeed correct. In addition, VMS data enables control of whether area restrictions (MPAs, coral areas, juvenile fish-RTC) are observed, among other things. A study of the implementation by the world's fishery nations of the FAO Code of Conduct for Responsible Fisheries gives Norway a top score on the monitoring, control and surveillance indicator.		

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
b	Guidepost	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	Met?	Y	Y	Y
	Justification	The Norwegian enforcement agencies use a graded sanctioning system, with sanctions ranging from oral warnings, written warnings and administrative fines to formal prosecution. If the fishermen do not accept the fines issued by the enforcement or prosecution authority, the case goes to court. The decision of a lower-level court can then be appealed to higher-level courts. The Coast Guard in total carried out 1671 at-sea inspections in 2013. In the vast majority of these inspections, no infringements were discovered. 57 inspections (3 %) resulted in a fine or prosecution. The share of infringements relative to the total number of inspections has remained at this level in recent years. The Directorate of Fisheries in 2013 made 406 inspections of vessels engaged in the NEA cod/haddock fisheries leading to 6 cases with sanctions (<2%).(The Fishermen's Sales Organization in 2013 carried out 698 physical inspections, in which 9 infringements (<1.5 %) were revealed. The comprehensive enforcement system combined with the high level of compliance demonstrates that the system provides effective deterrence.		
c	Guidepost	Fishermen are generally thought 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.	Some evidence exists to demonstrate fishermen comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery.	There is a high degree of confidence that fishermen comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.
	Met?	Y	Y	Y

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with		
	Justification	As noted under SI 3.2.3 b) above, inspection statistics indicate that the level of compliance in Norwegian fisheries is high. There is a high degree of confidence that this is indeed so, given the many opportunities to cross-check information between the different enforcement authorities. Taking together the high compliance level and the comprehensiveness of the enforcement system, it is reasonable to conclude that the system provides for effective deterrence. In particular, compliance with VMS and elogbooks provides information of importance to the effective management of the fishery. In addition, there is evidence that other factors contribute to the high compliance levels in Norwegian fisheries: - the legitimacy of regulations - the close contact between enforcement bodies/inspectors and the fishing fleet - the general respect for the law in Norway Sociological investigations indicate that the close collaboration between user groups and management authorities has ensured regulations a high degree of legitimacy among Norwegian fishermen. Relations with the Coast Guard inspectors are generally reported by Norwegian fishermen to be very good. Inspectors spend time on board fishing vessels explaining the rationale behind different regulations and advising fishermen on how to avoid unintentional infringements. Finally, investigations indicate that the trust in the management system is contributing to a high degree of compliance in fisheries. Additional information of importance to the effective management of the fishery is provided through the reference fleet agreements and access to catches for biological sampling to gather data fundamental for reliable stock assessments.		
d	Guidepost		There is no evidence of systematic non-compliance.	
	Met?		Y	
	Justification	A recent program on Norwegian television raised the question of systematic non-compliance with respect to landing records. This was raised and discussed during the site visit, both with the Directorate of Fisheries, the client and the Ministry. The concerns highlighted in the program were based on a NOFIMA report. The Directorate of Fisheries took the concerns seriously and undertook an investigation. It concluded that the quantities involved were trivial (c. 11,000 tons) relative to the scale of the fishery (c. 480,000 tons), and did not constitute systematic non-compliance, but their investigation did result in two successful prosecutions. More generally, as demonstrated in 3.2.3b, the level of compliance in Norwegian fisheries is generally high. Interviews during the site indicated that among the relatively few cases of detected infringements there is no evidence of systematic non-compliance.		
References		• Act of 6 June 2008 no. 37 on the Management of Wild Living Marine Resources (the Marine Resources Act) • Act of 21 June 2013 on the First Hand Sale of Living Marine Resources (Law on Fish Sale) • Annual Report of the Norwegian Coast Guard 2013 • Årsrapport 2013, Norges Råfisklag (Norwegian Fishermen's Sales Organisation Annual Report 2013) • Årsrapport 2013, Norges Råfisklag (Norwegian Fishermen's Sales Organisation Annual Report 2013)		

PI 3.2.3	Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with
	• http://www.nofima.no/filearchive/Rapport%2026-2014.pdf • Gezelius, Stig S. (2002), 'Do norms count? State regulation and compliance in a Norwegian fishing community', Acta Sociologica, 45, 305–314. • Hønneland, Geir (2000/2013), Coercive and Discursive Compliance Mechanisms in the Management of Natural Resources: The Case of the Barents Sea Fisheries, Dordrecht: Springer • Hønneland, Geir (2012), Making Fishery Agreements Work: Post-Agreement Bargaining in the Barents Sea, Cheltenham: Edward Elgar • Interviews with representatives of the Ministry of Fisheries and Coastal Affairs, Directorate of Fisheries, the Norwegian Fishermen's Association, The Norwegian Boatowners' Association and the Fishermen's Sales Organization during site visit. • Jentoft & McCay: Jentoft, Svein and Bonnie J. McCay (1995), 'User participation in fisheries management', Marine Policy, 19, 227–246. • National strategic risk assessment for the resource control 2013-2014 (http://www.fiskeridir.no/fiske-og-fangst/rapporter-utredninger/nasjonal-risikovurdering-for-ressurskontrollen) • Pitcher, T.J., Kalikoski, D. and Pramod, G. (eds) (2006), Evaluations of Compliance with the FAO (UN) Code of Conduct for Responsible Fisheries, Fisheries Centre • Research Report Vol. 14 No. 2, Vancouver: University of British Columbia
OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER (if relevant):	

Evaluation Table for PI 3.2.4 – Norway NEA cod and haddock

PI 3.2.4		The fishery has a research plan that addresses the information needs of management		
Scoring Issue		SG 60	SG 80	SG 100
a	Guidepost	Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2.	A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.	A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	Norway has a research plan embodied in the objectives of the Marine Resource Act, the integrated management plans for the Barents Sea and the Norwegian Sea, as well as in the statutory documents of the Institute of Marine Research. CRISP, MAREANO and IMR-PINRO projects are examples of dedicated research plans. A coherent and strategic approach to research across all three MSC principles is primarily found in the integrated regional seas management plans, where economic and social viability are emphasized along with precautionary and ecosystem-based resource management. The various national plans feed into international conventions affecting the North East Atlantic, e.g the Arctic council, OSPAR and NAMMCO. Further at the international level research plans exist in the JNRFC and Coastal State management plans. The primary objective of the research plans is to ensure scientific data necessary to conduct fisheries management according to the precautionary and ecosystem approaches. The various research plans are peer reviewed (e.g. by ICES) and the integrated management plan subject to regular revisions and update. Hence the information covered in these documents can be considered to be reliable and timely, and adequate to achieve the objectives consistent with the MSC principles.		
b	Guidepost	Research results are available to interested parties.	Research results are disseminated to all interested parties in a timely_fashion.	Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available.
	Met?	Y	Y	Y
	Justification	The IMR, PINRO, JNRFC research plan and research results are disseminated to all interested partied in a timely fashion and are widely and publicly available on the internet. The terms of reference and annual reports of ICES working groups and study groups are disseminated to interested parties and publically available on the ICES website in a timely fashion. In particular, the results of stock assessments are disseminated to decision-makers in time for annual fishery negotiations. In addition to formal reports, results are also published in popular format by both IMR and ICES, and in the Norwegian trade press.		

References	• Act of 6 June 2008 no. 37 relating to the Management of Wild Living Marine Resources (the Marine Resources Act) • JNRFC Agreement: www.Jointfish.com • Arctic council: http://www.arctic-council.org/index.php/en/environment-and-people/environment-and-climate/environmental-protection • Nordic Council of Ministers: http://www.norden.org/no/nordisk-ministerraad/samarbeidsministrene-mr-sam/arktis/kalender/arctic-changing-realities/nordic-council-of-ministers-arctic-co-operation • OSPAR: http://www.ospar.org • NAMMCO: http.// *www.nammco.no*	
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		

Evaluation Table for PI 3.2.5 – Norway NEA cod and haddock

PI 3.2.5		**There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives** **There is effective and timely review of the fishery-specific management system**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Guidepost**	The fishery has in place mechanisms to evaluate some parts of the management system.	The fishery has in place mechanisms to evaluate key parts of the management system	The fishery has in place mechanisms to evaluate all parts of the management system.
	Met?	Y	Y	Y
	Justification	All parts of the management system are subject to evaluation. The Norwegian management system at large is reviewed by the Parliament upon submission by the Government (through the Ministry of Trade, Industry and Fisheries) of annual reports on the state of affairs in Norwegian fisheries management. At the Regulatory Meetings that take place twice a year management authorities received feedback on management practices from the industry and other interested stakeholders, including NGOs. The scientific research component of the fisheries management system is regularly reviewed in ICES reports and advice. The annual assessments of the ICES AFWG are reviewed and summarized by ICES ACOM before publishing the official ICES advice. The methodologies adopted for stock assessment by the AFWG are subject to c. 5 yearly reviews through a benchmarking exercise, frequently involving scientists who have no direct involvement with the fisheries under assessment. The enforcement component is subject to continuous evaluation at meetings between the various bodies involved in enforcement activities, where priorities are hammered out on the basis of risk-based monitoring of past experience.		
b	**Guidepost**	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	Y	Y	Y

PI 3.2.5		There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives There is effective and timely review of the fishery-specific management system
	Justification	The fishery-specific management system is subject to internal review at regular internal self-evaluation meetings within the Norwegian bodies of governance. It is also subject to a number of mechanisms for regular external review. It is annually reviewed by Parliament following the submission of status reports by the Ministry of Trade, Industry and Fisheries, and by the industry and other interested stakeholders at the Regulatory Meetings (see 3.2.5 b). The Auditor General conducted a comprehensive evaluation of the entire Norwegian system for fisheries management in 2003–2004 and in 2007–2008 a *parallel audit with the Accounts Chamber of the Russian Federation of the management of the fish resources in the Barents Sea and the Norwegian Sea*. A follow-up report was submitted in 2011. In addition, Norwegian authorities present information on the national system for fisheries management for review by a number of international organizations at regular intervals, e.g. to the FAO Committee of Fisheries, the UN Resolution on Sustainable Fisheries and the OECD. Such reviews typically takes place every 3-5 year. In summary, the international fishery-specific management system is evaluated through regular internal and external reviews of management plans.
References		• ICES Arctic Fishery Working Group: http://www.ices.dk/community/groups/Pages/AFWG.aspx • Auditor General's Report No. 3:13 (2003–2004): Study of the management of fish resources. • Auditor General's Report No. 3:2 (2007–2008) Investigation of the management and control of fish resources in the Barents Sea and the Norwegian Sea – a parallel audit conducted by the Office of the Auditor General of Norway and the Accounts Chamber of the Russian Federation. • Auditor General's Report No. 3:8 (2010–2011) F*ollow-up of the parallel audit with the Accounts Chamber of the Russian Federation of the management of the fish resources in the Barents Sea and the Norwegian Sea*

OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER (if relevant):	

Appendix 1.3 Conditions and recommendations

Appendix 1.3.1 Conditions carried over from previous assessments

Following the successful assessment of the inshore component of the fisheries in 2011, a variation was granted by MSC 28 November 2011 to combine the inshore and already certified (2010) offshore components. The variation stated that "Where the inshore components have slightly different conditions, they will be evaluated according to the timescale established in the inshore fishery Public Certification Report" and that "if necessary, these timescales would be continued into the recertification period, assuming progress is on-target for completion".

Conditions 1 and 2 from the initial assessment are therefore carried over into the reassessment period and do not hinder receommendation of recertification. The client was considered to be fully compliant with Condition 3 from the initial assessment at the 4th surveillance audit in 2014, and this condition is therefore not carried over.

The original expiry date for the certificates issued for the inshore component is 20 October 2016. When stated in the initial assessment report for the inshore fishery that "the fishery must meet the overall SG80 requirement within the timescale of this certification", this refers to the original expiry date for the certificates originally issued for the inshore component, 20 October 2016.

Table 50 Condition 1 from initial assessment – all gear types

Performance indicator	**2.1.1 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.** **SG80: 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 of depleted species**
Score	70
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. 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. 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.

Related to previously raised condition? (Y/N/NA)	NA
Milestones	**From the initial assessment:** The fishery must meet the overall SG80 requirement within the timescale of this certification. 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. **From SA 4:** - The necessary data specified by this condition are being collected as required - Specific measures for the management and conservation of coastal cod continue to be developed and implemented. Similarly, there are specific measures in place to safeguard redfish stocks; the client is fully compliant with these measures - the client has not demonstrated that they have made an "Initial evaluation of any potential impacts completed within 3 years" - Through discussions with the client it seems highly probable that they have met the requirements of this condition in principle but they have failed to draw all their actions together (consultations with DoF, IMR, participation in CRISP etc) and present it as a coherent evaluation of the fishery and their contribution to its management. **Milestones:** The fishery must meet the overall SG80 requirement within the timescale specified in the variation granted 28 November 2011: "Where the inshore components have slightly different conditions, they will be evaluated according to the timescale established in the inshore fishery Public Certification Report. (If necessary, these timescales would be continued into the recertification period, assuming progress is on-target for completion.)" The original expiry date for the certificates issued for the inshore component is 20 October 2016. Within the original expiry date for the certificates issued for the inshore component, 20 October 2016, the client must demonstrate that they have completed the required evaluation of any impacts of the fishery on non-target fish species, and that were assessments of impacts on these species are shown to be significant, appropriate measures to reduce catches to acceptable and precautionary levels are developed and implemented.

Client action plan and NFA comments	**FROM APPENDIX B IN Initial certification report inshore:** 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 elasmobranches. 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 19th 2009 to Institute of Marine Research, Ministry of Fisheries and Coastal Affaires, 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 nontarget and/or ETP challenge. In addition Norwegian regulations passed in 2009 provides for a mandatory landing requirements for all catches. Actions 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.
Consultation on condition	Havforskningsinstitutt (IMR) and Directorate of Fisheries.

Table 51 Condition 2 from initial assessment – trawl, longline, gill net, Danish seine (the condition does not apply to Hook and Line fisheries)

Performance indicator	**2.3.1 The fishery meets national and international requirements for protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.** **SG 80: Direct effects are highly unlikely to create unacceptable impacts to ETP species.**
Score	75
Rationale	The assessment notes the general lack of knowledge on fishery gear specific impacts on ETP species. 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
Condition	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. In meeting this condition, the client should note the following specific issues: - 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.
Related to previously raised condition? (Y/N/NA)	NA

Milestones	**From the initial assessment report:** The fishery must meet the overall SG80 requirement within the timescale of this certification. 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. **From SA4:** - **the client is compliant with the data collection aspect of condition 2** - **With the exception of the gillnet fishery**, the body of evidence from ICES and NAMMCO working group reports is that there is no significant interaction between the NEA cod fishery and ETP species and **the client is compliant with this aspect of Condition 2**. In consultation with IMR and, or NINA (as appropriate) the **client needs to assess the level of interaction between gillnet fishing and marine mammals**, as highlighted in the NAMMCO (2014) report, before this condition can be closed on gillnets. **Milestones:** The fishery must meet the overall SG80 requirement within the timescale specified in the variation granted 28 November 2011: "Where the inshore components have slightly different conditions, they will be evaluated according to the timescale established in the inshore fishery Public Certification Report. (If necessary, these timescales would be continued into the recertification period, assuming progress is on-target for completion.)" The original expiry date for the certificates issued for the inshore component is 20 October 2016. Within the original expiry date for the certificates issued for the inshore component, 20 October 2016, the client must demonstrate that they have assessed the level of interaction between gillnet fishing and marine mammals quantitively. Where interactions are found to be unacceptable the fleet should implement appropriate actions to minimise interactions or eliminate mortalities of these species.

	FROM APPENDIX B IN Initial certification report inshore: 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 19th 2009 to Institute of Marine Research, Ministry of Fisheries and Coastal Affaires, 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 nontarget and/or ETP challenge. In addition Norwegian regulations passed in 2009 provides for a mandatory landing requirements for all catches.
Client action plan and NFA comments	Actions 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. 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
Consultation on condition	

Appendix 1.3.2 Conditions raised in the reassessment

The Norway NEA cod and haddock fisheries achieved a score of below 80 against two scoring indicator(s). The assessment team has therefore set four conditions for continued certification that the client is required to address. The condition is applicable to improve performance to at least the 80 level within the period set by the DNV GL assessment team. Two recommendations were set for the fisheries.

Table 52 Condition 3 – Gillnet fishing for both cod and haddock

Performance indicator	**2.3.1 The fishery meets national and international requirements for the protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.** **SG80a: 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.** **SG80b: Direct effects are highly unlikely to create unacceptable impacts to ETP species.**
Score	70
Rationale	On the basis of reference-fleet data and extrapolation to the whole fleet, it is estimated that c. 7000 porpoises could be killed each year by gillnetters. Although the exact status of the NE Arctic porpoise population is unknown, it is feared that this estimated level of mortality is unsustainable.
Condition	The quantity and quality of data available for estimating porpoise population size and fishery related mortalities must be improved to a level where the effects of the fishery are known and can be shown to be highly likely to be within limits of national and international requirements for protection of ETP species; i.e. gillnet induced mortality rates must be within internationally agreed levels of sustainability.
Related to previously raised condition? (Y/N/NA)	The condition on PI 2.3.1 from the initial assessment required the collection of better data. The reference fleet has produced data suitable for assessing the effects of specific fisheries. A consequence of meeting the condition for the initial assessment is that a potential problem has been identified which was not known previously. The condition raised during this reassessment addresses this specific potential problem.
Milestones	At the first surveillance visit, provide evidence that discussions have been held with the appropriate experts to agree a sampling programme for gathering the necessary data for developing more robust population and mortality estimates, particularly with respect to the gillnet fisheries. At the surveillance visits two and three, the client shall provide a written progress report on achieving the requirements of the condition. At the fourth surveillance meeting, the client shall produce an assessment of the NE Arctic porpoise population that demonstrates clearly whether or not the fishery is meeting the standards of required by 2.3.1A.

	The concerns raised in condition 3 relate to bycatch of porpoise in the coastal gillnet fishery. This is based on recent findings by the reference fleet program, which identified cod and monkfish gillnetting to have a potentially significant bycatch of porpoises. The number attributed to the cod fishery under certification is in the range of 5500-5700 animals per year; a high number that surprises and puzzles the NFA. It is important to point out that these are initial findings and that there is a high degree of uncertainty in the actual figures. In any case, the findings certainly merit further investigation, as well as action if necessary. Initial steps are already being taken in the reference fleet program and through ongoing research. NFA therefore finds the conditions set to be sound and just, and commits to the following plan to address the condition. **Action 3.1** NFA will hold meetings with cetacean experts at the IMR together with the Directorate of Fisheries to discuss status and potential improvements to monitoring porpoise bycatch in the small coastal gillnetting fleet. There is already ongoing work to follow up the 2013 report with improved estimates of porpoise mortality, and NFA will strongly support this. Since statistical area 00 (mainly Vestfjorden) is identified as the main impact area, efforts will be focused on building a surveillance program for this particular area.
Client action plan and NFA comments	Timeframe: initial meetings in year 1. Written progress reports in SA2 and SA3. **Action 3.2** NFA will hold meetings with cetacean experts at the IMR together with the Directorate of Fisheries to discuss status and potential improvements to estimate the total porpoise population in the NEA area. Initial discussions have indicated that this *may* not be practically feasible and that performing an assessment of the Vestfjorden may be more realistic and result in just as effective management tools. NFA will engage in this work and drive it forward. Timeframe: In parallel with action 3.1 - initial meetings in year 1. Written progress reports in SA2 and SA3. **Action 3.3** Depending on a successful outcome of action 3.1 and 3.2, NFA will produce updated and more robust mortality rates for harbor porpoises, as well as an assessment of the total stock. Alternatively, similar figures may be produced for key management areas if total figures are not feasible or scientifically necessary. The outcome of this will be a scientifically robust estimate of whether or not the bycatch levels are within sustainable levels as required in PI 2.3.1A. Timeframe: progress reports in SA2 and SA3. Completion in SA4. Follow-up and evaluation in year 5 in preparation of re-assessment.
Consultation on condition	Directorate of Fisheries and Institute of Marine Research

Table 53 Condition 4 - Gillnet fishing for both cod and haddock

Performance indicator	**2.3.2 The fishery has in place precautionary management strategies designed to:** • **Meet national and international requirements;** • **Ensure the fishery does not pose a risk of serious harm to ETP species;** • **Ensure the fishery does not hinder recovery of ETP species; and** • **Minimise mortality of ETP species.** **SG80a: There is a strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.**
Score	70
Rationale	On the basis of reference-fleet data and extrapolation to the whole fleet, it is estimated that c. 7000 porpoises are killed each year by gillnettering. Although the exact status of the NE Arctic porpoise population is unknown, it is feared that this level of mortality is unsustainable. Mitigation measures (pingers) are under development and review but their efficacy has yet to be assessed.
Condition	A strategy for managing the fishery's impact on porpoise shall be developed that includes measures to minimise gillnet-related mortality and is highly likely to achieve national and international requirements for the protection of ETP species, i.e. harbour porpoise.
Related to previously raised condition? (Y/N/NA)	N
Milestones	The client shall engage actively with the appropriate authorities in developing, assessing and introducing effective means by which porpoise bycatch in gillnets can be reduced. At the first surveillance visit, provide evidence that discussions have been held with the appropriate experts to agree a programme for developing and testing systems for reducing porpoise bycatch in gillnets. At surveillance visits two and three, the client shall provide a written progress report. At the fourth surveillance meeting, the client shall produce an assessment of the mitigation measures developed, tested and introduced that demonstrates clearly whether or not the fishery is meeting the standards of required by 2.3.2a.

	Condition 4 builds on condition 3, and the same comments apply. NFA would like to make the distinction that the knowledge gained from the actions under condition 3 will dictate whether or not it is actually necessary to *implement* mitigation measures. For this reason NFA agrees with the wording of condition 4; regardless of what we learn about the true extent and sustainability of cetacean bycatch, it is prudent to develop a *strategy* in parallel to ensure a swift management response if needed. Research has already begun recently within the IMR and the CRISP-program to develop and assess potential mitigation methods. NFA will engage with the management authorities and contribute to and develop this work. **Action 4.1** NFA will hold initial meetings with the IMR, Directorate of Fisheries and the CRISP-programme to engage with, develop and contribute to the ongoing research of porpoise mitigation methods in the coastal gillnet fishery. NFA will support this work and drive it forward. NFA will also engage with the experts to ensure that a holistic management review will be undertaken; the group will need to evaluate other potential management measures than just "pingers".
Client action plan and NFA comments	Timeframe: initial meetings in year 1. **Action 4.2** NFA will hold meetings with experts in the IMR, Directorate of Fisheries, and if necessary, the Ministry to specifically evaluate the use of "pingers" in the coastal gillnet fishery. Initial field pilot studies are already being performed. Pending on the results from this, management options for implementation of these pingers will be evaluated. Timeframe: Initial meeting in year 1. Progress reports in SA2 and SA3. **Action 4.3** NFA will engage with the IMR, Directorate of Fisheries, and if necessary, the Ministry to evaluate other potential management measures than pingers. Timeframe: in parallel with action 4.2. Initial meeting in year 1. Progress reports in SA2 and SA3. **Action 4.4** NFA will present a comprehensive assessment of the mitigation measures that have been developed and tried in the field. An implementation strategy will also be presented in order to meet the standards required by 2.3.2. Implementation will be evaluated in light of the outcomes of the research under condition 2. Timeframe: SA4
Consultation on condition	Directorate of Fisheries and Institute of Marine Research.

Table 54 Condition 5 – Cod and haddock – trawl and Danish seine

Performance indicator	**PI 2.4.1 The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function** **SG80a: The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.**
Score	Overall scores for 2.4.1: • Trawl: 70 (Norway and Russia SMHs – burrowing megafauna: 60) • Danish seine: 75 (Norway and Russia SMHs – burrowing megafauna: 60)
Rationale	For full rationale, please see PI 2.4.1 scoring tables for trawl and Danish seine. **Trawl:** • **Norway SMHs - Burrowing megafauna**: Most burrowing fauna, indeed, most epibenthic fauna are not subject to direct effects of rock-hopper trawls. The principal possible exceptions are the (flexible) upright Pennatulacea – sea pens. Their distribution is known in the MAREANO mapping area, and they are widely, albeit sparsely, distributed throughout the Barents Sea, which suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60** • **Russia SMHs - Burrowing megafauna**: Most burrowing fauna, indeed, most epibenthic fauna are not subject to direct effects of rock-hopper trawls. The principal possible exceptions are the (flexible) upright Pennatulacea – sea pens. Their distribution is sparse but recorded in the annual IMR–PINRO ecosystem survey. Their continued presence and sparse distribution suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60.** **Danish seine** • **Norway SMHs - Burrowing megafauna**: true infauna are not vulnerable disturbance by this gear as it is too light to dig in. The principal exceptions are the Pennatulacea (sea pens). Their distribution is known in the MAREANO mapping area, and they are widely, albeit sparsely, distributed throughout the Barents Sea, which suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60**. • **Russia SMHs - Burrowing megafauna:** true infauna are not vulnerable disturbance by this gear as it is too light to dig in. The principal exceptions are the Pennatulacea (sea pens). Their distribution is sparse but they are recorded, abundance and distributiuon plotted in the annual IMR–PINRO ecosystem survey. Their continued presence and sparse distribution suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60.**
Condition	The fishery shall demonstrate that it is highly unlikely to reduce Pennatulacea (sea pens) habitat structure and function of to a point where there would be serious or irreversible harm.
Related to previously raised condition? (Y/N/NA)	N

Milestones	By the **fourth annual surveillance audit**, the fishery shall present evidence that it is highly unlikely to reduce Pennatulacea (sea pens) habitat structure and function of to a point where there would be serious or irreversible harm. The intended probability interpretation of "highly unlikely" is here that there should be no more than a 30% probability that the true status of the component is within the range where there is risk of serious or irreversible harm. The evidence requested would allow for a score of 80 for this SG.
Client action plan and NFA comments	The knowledge basis regarding sea pens and burrowing megafauna in the Norwegian Sea and Barents sea is limited, as is the basis with regard to the effects of demersal fisheries on these habitats. The condition is set on the premise of a theoretical possibility that trawling and Danish seine has an effect on these habitats north of 62°. Much of this theoretical damage potential is based on limited studies from nephrops trawling in Scottish lochs. It is obvious that a broader knowledge basis needs to be in place, before management can evaluate potential regulatory actions. Some of these points are: - Lack of habitat definition. OSPAR is yet to set consistent threshold levels for defining sea pen and burrowing megafauna habitats. IMR has been tasked with setting such levels for the north, and this is an ongoing scientific debate. It is probable that a regional approach must be taken. Scottish lochs and the Barents sea probably have very different potential density levels. - Lack of habitat identification. Consequently, even with the Mareano projects' unique habitat mapping, identified sea pen and burrowing megafauna habitats are still very limited. The sea pen areas that are identified have been mapped by modelling and probability. - From initial discussions with the IMR, bottom gear destruction of sea pens and burrowing megafauna is unlikely to cause serious or irreversible harm to over 30 % of the component. Following from this condition, NFA has the responsibility to prove that this is "highly unlikely". **Action 5.1** Consult with IMR and Directorate of Fisheries to perform VMS data analysis of bottom gear affected area and probable coverage with sea pen and burrowing megafauna communities. Timeframe: initial consultations in year 1. Progress reports and/or presentations of findings in SA2 and SA3. **Action 5.2** Support and review ongoing IMR and OSPAR processes in defining sea pen and burrowing megafauna habitats. Timeframe: progress reports at each surveillance audit. **Action 5.3** Monitor Mareano project outputs and mapping of new habitat areas. Timeframe: progress reports at each surveillance audit. **Action 5.4** Support and implement ongoing project to make Mareano habitat data available on fishing vessel map plotters. This has a large potential to allow for a higher degree of voluntary avoidance of special habitats. Timeframe: progress reports at each surveillance audit.
Consultation on condition	Directorate of Fisheries and Institute of Marine Research.

Table 55 Condition 6 – All gears fishing for both cod and haddock

Performance indicator	**2.3.1 The fishery meets national and international requirements for the protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.** **SG80a: 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.** **SG80b: Direct effects are highly unlikely to create unacceptable impacts to ETP species.**
Score	75 – Trawl, longline, Danish seine, jiggers 70 - Gillnet
Rationale	Although there are restrictions on the targeting and capture of golden redfish (*Sebastes norvegicus*), there is still no sign of stock recovery. Despite ICES advising that there should be no targeted fishing and the TAC should be zero (advice that is supported by IMR), there are licensed seasonal gillnet and longline fisheries (that are beyond the remit of this assessment) and relatively generous permitted bycatch levels for all gears in the cod and haddock fisheries that confound the aim of stock recovery. SG80a: There are specific measures prohibiting targeted fishing for the golden redfish, other than in licensed seasonal gillnet fishery, there are bycatch per haul and quota limits. While it is impractical for vessels to avoid golden redfish bycatch completely, the bycatch limits are relatively generous and should be made more demanding as a means to reducing the catch (ICES advice is for a zero TAC) and optimizing potential for stock recovery (Score 60). SG 80b: Potentially, the direct effects are capture and mortality. Even though catches may be small, any catch of golden redfish is contrary to current ICES advice and the potential for stock recovery (score 60).
Condition	The effects of the fishery on the golden redfish (i.e. *Sebastes norvegicus*, previously *S. marinus)* should be highly likely to be within limits of national and international requirements for protection of this ETP species. The client must present evidence that the direct effects of the fishery are highly unlikely to create unacceptable impacts to this ETP species.
Related to previously raised condition? (Y/N/NA)	N
Milestones	By the **fourth annual surveillance audit**, the client must present evidence to demonstrate that the direct effects of the fishery on the golden redifish (i.e. *Sebastes norvegicus*, previously *S. marinus)* are highly unlikely (specifically at least 80% probability) to create unacceptable impacts to this ETP species. The evidence requested would allow for a score of 80 for SG a and b.

	The declining stock status of golden redfish (*Sebastes norvegicus)* is well documented, and a key current focus area in Norwegian management, as well as for the NFA. It is a complex issue, and as the report points out, it is impossible to avoid catches of redfish altogether. However, it is well recognized that catches must be minimized, and there is currently a ban on directed fisheries for redfish. In response to the situation, NFA and Norwegian fisheries management have for several years imposed strict bycatch restrictions in the cod and haddock fishery, as well as other relevant fisheries. These have not yet proven to have had the desired effects, *although* there is a slight improvement in recruitment in the latest 2014 assessment. This increase is a small positive sign, but it does not change the fact that further management measures should be taken. NFA and Norwegian management authorities are currently in process of making such measures, and this is laid out in the following actions:
Client action plan and NFA comments	**Action 6.1** The Directorate of Fisheries established a redfish working group in 2014. The group's mandate is to review the regulations in the redfish fisheries and suggest appropriate measures to rebuild the redfish stocks. NFA participates in this working group, together with representatives from the Directorate and IMR. The group suggests the following changes in regulations: • General reduction to 10 % weekly bycatch levels. • Reduction to 30 % weekly bycatch levels for conventional vessels below 21 meters between august 1st and December 31st. • Exemption for handline fisheries. NFA will follow up the working group's findings, support the proposed regulations, and work towards their implementation. **Timeframe:** progress reports at each surveillance audit. **Action 6.2** NFA and the working group advice that observation and evaluation of the regulatory measures are necessary, and that adjustment will be made if these measures are not proving to be effective. **Timeframe:** progress reports at each surveillance audit.
Consultation on condition	Directorate of Fisheries and Institute of Marine Research.

Table 56 Recommendation

Recommendation number	Recommendation	Gear
1	The client should be aware of the designation of the Norwegian coastal cod stock as an Inseparable or Practically Inseparable (IPI) stock within the scope of this certification process. This designation can only be applied to this stock for one assessment. For any future re-assessment the MSC Certification Requirements, CR v1.3 CH 3.1, suggest that; the CAB may make a recommendation to either promote the future Principal 1 assessment of the IPI stock (CH 6.1.1.1) or to develop techniques to effectively separate the catches of the currently IPI stock (CH 6.1.1.2) or to develop measures to reduce the proportion of the IPI stock in the catches to 2% or less and ensure that the catch of the IPI stock does not create a significant impact on the state of the IPI stock as a whole (CH 6.1.1.3) triggering a variation request (27.4.10.2). We therefore recommend that the client takes due note of the MSC requirements for any future re-assessment of this fishery and takes the necessary action well before any re-assessment process begins. For the Norwegian coastal cod we consider it highly unlikely that they can be practically separated in the mixed catches with NEA cod. Therefore the client needs to make representations to the appropriate authority for action to ensure that, for any future re-assessment of the fishery the Norwegian coastal cod can either; • be dealt with under Principle 1 • or the catch of Coastal cod can be reduced to 2% or less of the total combined cod catch.	All gears
2	It is recommended that steps are taken to bring Norwegian SMH protection measures in line with internation standards recommended elsewhere. *i.e.* • the move-on rule should apply to all coaral catches (soft and hard) exceeding 30 kg; • the move-on rule should apply to sponge bycatch that exceeds 400 kg; • the move-on rule should be applied to all catches of sea pens, or similar burrowing megafauna, exceeding 7 kg; the move-on rule should be increase from 2 to 5 nautical miles.	All gears

Appendix 1.3.3 Client action plan and support from involved entities

Norges Fiskarlag / Norwegian Fishermen's Association

DNV GL

NORGES FISKARLAG
FISKARLAGETS SERVICEKONTOR AS

Vår dato	*Vår referanse*	*Vår saksbehandler*	*Deres referanse*
18.05.2015	2014/00456-9	Tor Bjørklund Larsen/	

Client action plan for meeting the reassessment certification conditions:
Norway North East Arctic cod and haddock fishery

The Norwegian Fisherman's Association (NFA) submits this action plan for meeting the conditions for the reassessment of the Norwegian North East Arctic cod and haddock fisheries.
NFA agrees to make a good faith effort to meet the intent of the conditions set forth by the conformity assessment body Det Norske Veritas (DNV) in October 2014 in the client review draft report. This report determines that, with three conditions, the fisheries are sustainable and well-managed in accordance with the MSC principles and criteria for sustainable fisheries.

The Norwegian Seafood Industry has set up a permanent formal advisory committee working with environmental and eco-labelling issues, reporting to the boards of NFA, the fisherman's sales organizations, the Norwegian Seafood Export Council and the Norwegian Seafood Federation. The Norwegian Ministry of Trade, Industry and Fisheries is a permanent observer to the group. This ensures that all certification decisions, including this action plan, are supported and accepted among all the parties involved directly or indirectly in the fisheries.

In the following sections we will address each of the conditions individually in the table format laid out by the CAB. This document supersedes the earlier submitted client action plan dated 01.12.2014, and includes conditions 5 and 6.

Condition 3 – Gillnet fishing for both cod and haddock

Performance indicator	**2.3.1 The fishery meets national and international requirements for the protection of ETP species.** **The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species**
Score	65
Rationale	On the basis of reference-fleet data and extrapolation to the whole fleet, it is estimated that c. 7000 porpoises are killed each year by gillnetters. Although the exact status of the NE Arctic porpoise population is unknown, it is feared that this level of mortality is unsustainable.
Condition	The quantity and quality of data available for estimating porpoise population size and fishery related mortalities must be improved to a level where effects of the fishery are known and can be shown to be highly likely within limits of national and international requirements for protection of ETP species; i.e. gillnet induced mortality rates must be within internationally agreed levels of sustainability.
Related to previously raised condition? (Y/N/NA)	The condition on PI 2.3.1 from the initial assessment required the collection of better data. The reference fleet has produced data suitable for assessing the effects of specific fisheries. A consequence of meeting the condition for the initial assessment is that a potential problem has been identified what was not known previously. The condition raised during this reassessment addresses this specific potential problem.
Milestones	At first surveillance visit, provide evidence that discussions have been held with the appropriate experts to agree a sampling programme for gathering the necessary data for developing more robust population and mortality estimates, particularly with respect to the gillnet fisheries.

	At surveillance visit two and three, the client shall provide a written progress report. At the fourth surveillance meeting, the client shall produce an assessment of the NE Arctic porpoise population that demonstrates clearly whether or not the fishery is meeting the standards of required by 2.3.1A.
NFA comments and action plan	The concerns raised in condition 3 relate to bycatch of porpoise in the coastal gillnet fishery. This is based on recent findings by the reference fleet program, which identified cod and monkfish gillnetting to have a potentially significant bycatch of porpoises. The number attributed to the cod fishery under certification is in the range of 5500-5700 animals per year; a high number that surprises and puzzles the NFA. It is important to point out that these are initial findings and that there is a high degree of uncertainty in the actual figures. In any case, the findings certainly merit further investigation, as well as action if necessary. Initial steps are already being taken in the reference fleet program and through ongoing research. NFA therefore finds the conditions set to be sound and just, and commits to the following plan to address the condition. **Action 3.1** NFA will hold meetings with cetacean experts at the IMR together with the Directorate of Fisheries to discuss status and potential improvements to monitoring porpoise bycatch in the small coastal gillnetting fleet. There is already ongoing work to follow up the 2013 report with improved estimates of porpoise mortality, and NFA will strongly support this. Since statistical area 00 (mainly Vestfjorden) is identified as the main impact area, efforts will be focused on building a surveillance program for this particular area. Timeframe: initial meetings in year 1. Written progress reports in SA2 and SA3. **Action 3.2** NFA will hold meetings with cetacean experts at the IMR together with the Directorate of Fisheries to discuss status and potential improvements to estimate the total porpoise population in the NEA area. Initial discussions have indicated that this *may* not be practically feasible and that performing an assessment of the Vestfjorden may be more realistic and result in just as effective management tools. NFA will engage in this work and drive it forward. Timeframe: In parallel with action 3.1 - initial meetings in year 1. Written progress reports in SA2 and SA3. **Action 3.3** Depending on a successful outcome of action 3.1 and 3.2, NFA will produce updated and more robust mortality rates for harbor porpoises, as well as an assessment of the total stock. Alternatively, similar figures may be produced for key management areas if total figures are not feasible or scientifically necessary. The outcome of this will be a scientifically robust estimate of whether or not the bycatch levels are within sustainable levels as required in PI 2.3.1A. Timeframe: progress reports in SA2 and SA3. Completion in SA4. Follow-up and evaluation in year 5 in preparation of re-assessment.
Consultation on condition	Directorate of Fisheries and Institute of Marine Research.

Condition 4 - Gillnet

Performance indicator	**2.3.2 The fishery has in place precautionary management strategies designed to:** **· Meet national and international requirements;** **· Ensure the fishery does not pose a risk of serious harm to ETP species;** **· Ensure the fishery does not hinder recovery of ETP species; and** **· Minimize mortality of ETP species.**
Score	70
Rationale	On the basis of reference-fleet data and extrapolation to the whole fleet, it is estimated that c. 7000 porpoises are killed each year by gillnetting. Although the exact status of the NE Arctic porpoise population is unknown, it is feared that this level of mortality is unsustainable. Mitigation measures (pingers) are under development and review but their efficacy has yet to be assessed.
Condition	A strategy for managing the fishery's impact on porpoise shall be developed that includes measures to minimise gillnet-related mortality and is highly likely to achieve national and international requirements for the protection of ETP species, i.e. harbour porpoise.
Related to previously raised condition? (Y/N/NA)	N
Milestones	The client shall engage actively with the appropriate authorities in developing, assessing and introducing effective means by which porpoise bycatch in gillnets can be reduced. At first surveillance visit, provide evidence that discussions have been held with the appropriate experts to agree a programme for developing and testing systems for reducing porpoise bycatch in gillnets. At surveillance visit two and three, the client shall provide a written progress report. At the fourth surveillance meeting, the client shall produce an assessment of the mitigation measures developed, tested and introduced that demonstrates clearly whether or not the fishery is meeting the standards of required by 2.3.2A.
NFA comments and action plan	Condition 4 builds on condition 3, and the same comments apply. NFA would like to make the distinction that the knowledge gained from the actions under condition 3 will dictate whether or not it is actually necessary to *implement* mitigation measures. For this reason NFA agrees with the wording of condition 4; regardless of what we learn about the true extent and sustainability of cetacean bycatch, it is prudent to develop a *strategy* in parallel to ensure a swift management response if needed. Research has already begun recently within the IMR and the CRISP-program to develop and assess potential mitigation methods. NFA will engage with the management authorities and contribute to and develop this work. **Action 4.1** NFA will hold initial meetings with the IMR, Directorate of Fisheries and the CRISP-programme to engage with, develop and contribute to the ongoing research of porpoise mitigation methods in the coastal gillnet fishery. NFA will support this work and drive it forward. NFA will also engage with the experts to ensure that a holistic management review will be undertaken; the group will need to evaluate other potential management measures than just "pingers". Timeframe: initial meetings in year 1. **Action 4.2** NFA will hold meetings with experts in the IMR, Directorate of Fisheries,

	and if necessary, the Ministry to specifically evaluate the use of "pingers" in the coastal gillnet fishery. Initial field pilot studies are already being performed. Pending on the results from this, management options for implementation of these pingers will be evaluated. Timeframe: Initial meeting in year 1. Progress reports in SA2 and SA3. **Action 4.3** NFA will engage with the IMR, Directorate of Fisheries, and if necessary, the Ministry to evaluate other potential management measures than pingers. Timeframe: in parallel with action 4.2. Initial meeting in year 1. Progress reports in SA2 and SA3. **Action 4.4** NFA will present a comprehensive assessment of the mitigation measures that have been developed and tried in the field. An implementation strategy will also be presented in order to meet the standards required by 2.3.2. Implementation will be evaluated in light of the outcomes of the research under condition 2. Timeframe: SA4
Consultation on condition	Directorate of Fisheries and Institute of Marine Research.

Condition 5 – Cod and haddock – trawl and Danish seine

Performance indicator	**PI 2.4.1 The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function**
Score	Overall scores for 2.4.1: · Trawl: 70 (Norway and Russia SMHs – burrowing megafauna: 60) · Danish seine: 75 (Norway and Russia SMHs – burrowing megafauna: 60)
Rationale	**Trawl:** · **Norway SMHs - Burrowing megafauna**: Most burrowing fauna, indeed, most epibenthic fauna are not subject to direct effects of rock-hopper trawls. The principal possible exceptions are the (flexible) upright Pennatulacea – sea pens. Their distribution is known in the MAREANO mapping area, and they are widely, albeit sparsely, distributed throughout the Barents Sea, which suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60** · **Russia SMHs - Burrowing megafauna**: Most burrowing fauna, indeed, most epibenthic fauna are not subject to direct effects of rock-hopper trawls. The principal possible exceptions are the (flexible) upright Pennatulacea – sea pens. Their distribution is sparse but recorded in the annual IMR–PINRO ecosystem survey. Their continued presence and sparse distribution suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60.** **Danish seine** · **Norway SMHs - Burrowing megafauna**: true infauna are not vulnerable disturbance by this gear as it is too light to dig in. The principal exceptions are the Pennatulacea (sea pens). Their distribution is known in the MAREANO mapping area, and they are widely, albeit sparsely, distributed throughout the Barents Sea, which suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60**.

	· **Russia SMHs - Burrowing megafauna:** true infauna are not vulnerable disturbance by this gear as it is too light to dig in. The principal exceptions are the Pennatulacea (sea pens). Their distribution is sparse but they are recorded, abundance and distributiuon plotted in the annual IMR–PINRO ecosystem survey. Their continued presence and sparse distribution suggests that the fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm even though they are vulnerable to damage or removal. **Score 60.**
Condition	The fishery shall demonstrate that it is highly unlikely to reduce Pennatulacea (sea pens) habitat structure and function of to a point where there would be serious or irreversible harm.
Related to previously raised condition? (Y/N/NA)	N
Milestones	By the fourth annual surveillance audit, the fishery shall present evidence that it is highly unlikely to reduce Pennatulacea (sea pens) habitat structure and function of to a point where there would be serious or irreversible harm. The intended probability interpretation of "highly unlikely" is here that there should be no more than a 30% probability that the true status of the component is within the range where there is risk of serious or irreversible harm. The evidence requested would allow for a score of 80 for this SG.
NFA comments and action plan	The knowledge basis regarding sea pens and burrowing megafauna in the Norwegian Sea and Barents sea is limited, as is the basis with regard to the effects of demersal fisheries on these habitats. The condition is set on the premise of a theoretical possibility that trawling and Danish seine has an effect on these habitats north of 62°. Much of this theoretical damage potential is based on limited studies from nephrops trawling in Scottish lochs. It is obvious that a broader knowledge basis needs to be in place, before management can evaluate potential regulatory actions. Some of these points are: -Lack of habitat definition. OSPAR is yet to set consistent threshold levels for defining sea pen and burrowing megafauna habitats. IMR has been tasked with setting such levels for the north, and this is an ongoing scientific debate. It is probable that a regional approach must be taken. Scottish lochs and the Barents sea probably have very different potential density levels. -Lack of habitat identification. Consequently, even with the Mareano projects' unique habitat mapping, identified sea pen and burrowing megafauna habitats are still very limited. The sea pen areas that are identified have been mapped by modelling and probability. - From initial discussions with the IMR, bottom gear destruction of sea pens and burrowing megafauna is unlikely to cause serious or irreversible harm to over 30 % of the component. Following from this condition, NFA has the responsibility to prove that this is "highly unlikely". **Action 5.1** Consult with IMR and Directorate of Fisheries to perform VMS data analysis of bottom gear affected area and probable coverage with sea pen and burrowing megafauna communities. Timeframe: initial consultations in year 1. Progress reports and/or presentations of findings in SA2 and SA3. **Action 5.2** Support and review ongoing IMR and OSPAR processes in defining sea pen and burrowing megafauna habitats. Timeframe: progress reports at each surveillance audit.

	Action 5.3 Monitor Mareano project outputs and mapping of new habitat areas. Timeframe: progress reports at each surveillance audit. **Action 5.4** Support and implement ongoing project to make Mareano habitat data available on fishing vessel map plotters. This has a large potential to allow for a higher degree of voluntary avoidance of special habitats. Timeframe: progress reports at each surveillance audit.
Consultation on condition	Directorate of Fisheries and Institute of Marine Research.

Condition 6 – All gears fishing for both cod and haddock

Performance indicator	**2.3.1 The fishery meets national and international requirements for the protection of ETP species. The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species.**
Score	75 – Trawl, longline, Danish seine, jiggers 70 - Gillnet
Rationale	Although there are restrictions on the targeting and capture of golden redfish (*Sebastes norvegicus*), there is still no sign of stock recovery. Despite ICES advising that there should be no targeted fishing and the TAC should be zero (advice that is supported by IMR), there are licensed seasonal gillnet and longline fisheries (that are beyond the remit of this assessment) and relatively generous permitted bycatch levels for all gears in the cod and haddock fisheries that confound the aim of stock recovery. SG80a: There are specific measures prohibiting targeted fishing for the golden redfish, other than in licensed seasonal gillnet fishery, there are bycatch per haul and quota limits. While it is impractical for vessels to avoid golden redfish bycatch completely, the bycatch limits are relatively generous and should be made more demanding as a means to reducing the catch (ICES advice is for a zero TAC) and optimizing potential for stock recovery (Score 60). SG 80b: Potentially, the direct effects are capture and mortality. Even though catches may be small, any catch of golden redfish is contrary to current ICES advice and the potential for stock recovery (score 60).
Condition	The effects of the fishery on the golden redfish (i.e. *Sebastes norvegicus*, previously *S. marinus)* should be highly likely to be within limits of national and international requirements for protection of this ETP species. The client must present evidence that the direct effects of the fishery are highly unlikely to create unacceptable impacts to this ETP species.
Related to previously raised condition? (Y/N/NA)	N
Milestones	By the fourth annual surveillance audit, the client must present evidence to demonstrate that the direct effects of the fishery on the golden redifish (i.e. *Sebastes norvegicus*, previously *S. marinus)* are highly unlikely (specifically at least 80% probability) to create unacceptable impacts to this ETP species. The evidence requested would allow for a score of 80 for SG a and b.
NFA comments and action plan	The declining stock status of golden redfish (*Sebastes norvegicus)* is well documented, and a key current focus area in Norwegian management, as well as for the NFA. It is a complex issue, and as the report points out, it is impossible to avoid catches of redfish altogether. However, it is well recognized that catches must be minimized, and there is currently a ban on

	directed fisheries for redfish. In response to the situation, NFA and Norwegian fisheries management have for several years imposed strict bycatch restrictions in the cod and haddock fishery, as well as other relevant fisheries. These have not yet proven to have had the desired effects, *although* there is a slight improvement in recruitment in the latest 2014 assessment. This increase is a small positive sign, but it does not change the fact that further management measures should be taken. NFA and Norwegian management authorities are currently in process of making such measures, and this is laid out in the following actions: **Action 6.1** The Directorate of Fisheries established a redfish working group in 2014. The group's mandate is to review the regulations in the redfish fisheries and suggest appropriate measures to rebuild the redfish stocks. NFA participates in this working group, together with representatives from the Directorate and IMR. The group suggests the following changes in regulations: • General reduction to 10 % weekly bycatch levels. • Reduction to 30 % weekly bycatch levels for conventional vessels below 21 meters between august 1st and December 31st. • Exemption for handline fisheries. NFA will follow up the working group's findings, support the proposed regulations, and work towards their implementation. Timeframe: progress reports at each surveillance audit. **Action 6.2** NFA and the working group advice that observation and evaluation of the regulatory measures are necessary, and that adjustment will be made if these measures are not proving to be effective. Timeframe: progress reports at each surveillance audit.
Consultation on condition	Directorate of Fisheries and Institute of Marine Research.

With kind regards,
NORGES FISKARLAG

Jan Birger Jørgensen

Tor Bjørklund Larsen

Directorate of Fisheries

Letter of support from Directorate of Fisheries, represented by Anne Kjos Veim (Head of the development section, Resource management department) and Modulf Overvik (Senior advisor, the development section, Resource management department).

DIRECTORATE OF FISHERIES

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Your reference:
Our date: 21.05.2015
Your date:

Att:

STAKEHOLDER PARTICIPATION IN NORWEGIAN FISHERY MANAGEMENT

The Directorate of Fisheries are regularly consulting The Norwegian Fishermen's Association NFA) as a hearing and discussion partner on fishery regulatory issues. According to the Marine Resources Act, this is, among other things, both an obligation and a responsibility for The Directorate of Fisheries to ensure a sustainable and economically profitable management of wild living marine resources and genetic material derived from them in cooperation with stakeholders. The Directorate of Fisheris is obliged to engage actively in exploring ways to reduce impact on habitat structures exposed to fisheries activity.

Yours sincerely

Anne Kjos Veim

Modulf Overvik

This letter is approved for electronic submission and does not need a signature

Institute of Marine Research

Letter of support from Institute of Marine Research represented by Harald Loeng, Forskningsdirektør Havøkologi (translated title: Director of Research Ocean Ecology).

INSTITUTE OF MARINE RESEARCH
HAVFORSKNINGSINSTITUTTET

Norges Fiskarlag

Att: Tor Bjørklund Larsen

Your ref: | Our ref: 2015/620 | 20.05.2015
Archive No.:
Serial No.: 8108/2015

CLIENT ACTION PLAN TO THE RECERTIFICATION OF THE NORTH EAST ARCTIC COD AND HADDOCK FISHERIES

We are referring to the request by the Norwegian Fishermen's Association (NFA), dated 18.05.2015, to provide consultation on the client action plan to the recertification of the North East Arctic cod and haddock fisheries.

The IMR has read the client comments and actions for the four new conditions, relating to cetacean stock situation, cetacean mitigation methods, burrowing megafauna and sea pen habitat impacts, and redfish bycatch. There are several ongoing and planned projects within the IMR and affiliated projects, that can serve to aid the NFA in fulfilling their action plan. Additionally, the IMR has well-established cooperation and communications with the NFA, and are willing to discuss the issues addressed in the conditions further with the NFA in the future.

Yours sincerely,

Harald Loeng
Research director

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APPENDIX 2. PEER REVIEW REPORTS

Peer reviewer A

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**Conformity Assessment Body Response**
PI 1 scoring is straight forward and there is no comment. This applies both for cod as well for haddock. *PI 2 is the critical part of this assessment. Retained species includes in particular coastal cod and redfish, There is information from ICES on stock status and management is responsive to this information and has established appropriate measures. The assessment finds that the fishery meets the various SG 80 signposts which the review finds well founded. In scoring PI 2.1. and PI 2.2 there is risk of double scoring with respect to haddock (scored as PI 1). However, the scores under PI 2.1 and PI 2.2 do not hinge on haddock but on depleted stocks, i.e. coastal cod and redfish. Scoring PI 2.4 for trawls takes into account recent strengthening of Norwegian legislation to ensure that habitat impact on vulnerable area. On this basis the various SG 80 signposts are met. There are two conditions related to ETP species and these appear to be well founded.* *The PI 3 scoring is straight forward and there is no comment.*		The cross-referencing to NEA haddock and NEA cod under PI 2 is a consequence of this being a combined species report where cod are (main) retained spceis when haddock are targeted and vice versa.

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes**	**Conformity Assessment Body Response**
The estimate of harbour porpoise by-catch in the gillnet fishery is high and calls for both clarification of these estimates, an analysis of the impact on the harbor porpoise stock and a management framework to control these by-catches.		The condition is aimed at clarifying the reliability of the estimates and the consequences for porpoise stock dynamics.

Do you think the client action plan is sufficient to close the conditions raised?	**Yes**	**Conformity Assessment Body Response**
The action plan as presented in Appendix 1.3.3 addresses the needs to collect data and analyse these data together with setting up a management framework to ensure that these by-catches are at a low level also in the future.		No response required

Risk-Based Framework not used.
The fisheries do not involve enhanced fisheries practices

General Comments on the Assessment Report (optional)

1. Scoring PI 2.1.1 and PI 2.2.3 would be helped by a Table showing total international catches of the retained species and the % that the Norwegian fishery contributes. This would allow judgments of the relative impact by the Norwegian fishery.

Assessment team response: Table 17 has been amended to accommodate this request.

2. PI 2.1.1 NEA haddock is scored as a PI 1 species and double scoring should be avoided. However, scoring PI 2.1 and PI 2.2 issues do not hinge on the evaluation of the NEA haddock.

Assessment team response: The cross-referencing to NEA haddock and NEA cod under PI 2 is a consequence of this being a combined species report where cod are (main) retained spceis when haddock are targeted and vice versa.

3. The harbour porpoise by-catch estimate is quoted at around 7,000 ind or at around 5,500 ind at various places in the report and in the scoring. The best estimate available seems to be around 5,500 ind/year for the gillnet fishery and the report should be updated in particular the executive summary. However, as noted in the NFA letter (Appendix 11) this does not change the conditions set nor any scoring.

Assessment team response: The variation in figures used in the report reflect the uncertainty surrounding the estimates but with the lower figure being the possible best current estimate associated specifically with cod (and haddock?) fishing.

4. Because of the structure chosen with individual scoring tables without cross reference between the tables the scoring appendix includes large repetitive chunks of text.

Assessment team response: The structure of individual scoring tables has been used to handle the different UoCs separately where required.

5. PI 2.4.1 From the harmonization Table it appears that five of the assessments (including this assessment) have scored this PI at 80, while the other five have scored it at 60 and 70 and issued conditions. The conditions relate to the need to document that impact on vulnerable habitats is low. 2014 saw a significant change in the regulations that increased the degree of protection to sensitive marine habitats; i.e. no bottom contact fishing is permitted in any area of known coral reef or garden, irrespective of whether it is a designated MPA. If a vessel has coral in the net, it must report it and move a minimum of 2 miles before shooting the gear again. These new measures meet the SG80 threshold.

Assessment team response: It is the recent change in regulations that are seen to justify the higher score.

6. Scoring PI 2 is as appropriate segmented by gear and fishery because impacts on the various ecosystem components vary between fishing grounds, season and gear. Trawls are used everywhere but this group is diverse and particularly with respect to habitat impact shows major variations between Danish seine and different trawl types and some distinction might have been appropriate. However, the impact assessment is based on consideration of the most impacting trawls.

Assessment team response: It is true that the environmental footprints of trawls vary with the ground gear and rig, and size (power) of vessel but information is only available for 'trawl' as a grouped category. Consequently, the assessment is based on the assumption that all trawling is undertaken with heavy, rock-hopper gear. The Danish seine is grouped with trawls to simplify the report. As a type of towed gear, they have an extremely light environmental footprint and are invariably limited to smooth, clear seabed, i.e. away from upright sensitive features. These charachteristics are noted in the report and, as with lightweight trawls, they fall under the shadow of the heavy trawl assessment.

7. The form that has been chosen in presenting PI 2 scoring with separate scoring tables for combinations of fisheries and gear generates large text repeats and the final scoring is difficult to follow and the key points are to be dug out through a rather tiresome process.

Assessment team response: The report is complex; handling two target species targeted using five different gear types. The current presentation seeks to present Principle 2 scoring tables as efficient as possible, making sure different impacts by different gears are presented clearly and at the same time avoiding repetitions where impacts are considered to be equivalent.

Editorial comments

1. Scientific names for fish are used somewhat unsystematic

Assessment team response: Noted. This may be so and is an editorial problem frequently found in the multi-author MSC reports. For P2, where the most different species are mentioned, the author has endeavoured to be consistent in giving the common and scientific name on first mention and the common name thereafter.

2. Acronyms
    a. XSA: Extended survivors analysis (not Extended survivorship analysis). Referred correctly to full name in scoring 1.2.4
    b. JRNFC and JNRFC (e.g. section 1.4) used interchangeably in the text acronym list suggests JRNFC, however in apparent quotes from the Commission this is JNRFC /see f. ex. p, 25 and p. 33)

Assessment team response: The acronyms have been corrected throughout the report, although even the commissions website uses both; Joint Russian-Norwegian Fisheries Commission in the title and Joint Norwegian-Russian in the text.

3. P. 13 The redfish S. marinus is now S. norvegicus. The S norvegicus is used elsewhere in the report

Assessment team response: Naming of *S. norvegicus* has been corrected throughout the report.

4. P. 16 Table 7 caption 2013 not 2031

Assessment team response: Table 7 caption corrected.

5. P. 21 Table 10 maturity ogive age 12 and plus group should be 100 (%) [not 1.0]

Assessment team response: Table 10 has been corrected.

6. The scoring Tables include several misprint

Assessment team response: Difficult to address as the comment is not specific, but a few minor errors have been corrected.

Performance Indicator Review

Principle 1

Northeast Arctic Cod

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1 (Stock status)	Yes	Yes	NA		
1.1.2 (Reference points)	Yes	Yes	NA	Fail 1.1.2c SG100 (ecological role not considered for ref point with 95% probability)	Yes, it has a NO at SG 100 Sic Score 90
1.1.3 (Depleted stock)	NA	NA	NA	Stock not depleted	No response required
1.2.1 (Harvest strategy)	Yes	Yes	NA		
1.2.2 (Harvest Control Rule)	Yes	Yes	NA		

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.2.3 (information in support for HCR)	Yes	Yes		PI 1.2.3.b SG 100 fail Downgrade score because of uncertainties with data colelctions and a special issue with coastal cod. However, the SG 100 is partially fulfilled	Yes, it has a No at SG 100 Sib and scores 90
1.2.4 (Assessment of stock status)	Yes	Yes		Score 95: 1.2.4c SG 100 fails as uncertainties are not fully included in the assessment model (stochastic model)	Yes, it is scored at 95 because it fails to meet SG 100 at 1.2.4c

Northeast Arctic Haddock

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1 (Stock status)	Yes	Yes	NA		

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.2 (Reference points)	Yes	Yes	NA	Score 90: Fail 1.1.2c (ecological role considered for ref point with 95% probability)	Yes, it has a NO at SG 100 SIc Score 90
1.1.3 (Depleted stock)	NA	NA	NA	Stock not depleted	No response required
1.2.1 (Harvest strategy)	Yes	Yes	NA		
1.2.2 (Harvest Control Rule)	Yes	Yes	NA		
1.2.3 (inf in support for HCR)	Yes	Yes		Downgrade score because of uncertainties with data collection	Yes, it has a No at SG 100 SIb and scores 90
1.2.4 (Assessment of stock status)	Yes	Yes		Score 95: 1.2.4c SG 100 fails as uncertainties are not fully included in the assessment model	Yes, this is scored at 95 because it fails to meet SG 100 at 1.2.4c

Principle 2 Impact on by-catch species, habitats and ecosystem

PI 2 scoring is done by fishery (cod and haddock) and by gear. The grouping varies between scoring issue. This means that for each scoring issue the cells in the Table below are considered

	Trawls, Danish Seine	Jiggers	Gillnets	Long lines
NEA cod				
NEA haddock				

The grouping that is used in the scoring is depicted in the tables below (each group is coloured separately).

PI 2.1.1, PI 2.1.2 Retained species status

	Trawls, Danish Seine	Jiggers	Gillnets	Long lines
NEA cod				
NEA haddock				

PI 2.1.3

	Trawls, Danish Seine	Jiggers	Gillnets	Long lines
NEA cod				
NEA haddock				

PI 2.2.1. PI 2.2.2, PI 2.2.3 Impact from assessed fishery on retained species

	Trawls, Danish Seine	Jiggers	Gillnets	Long lines
NEA cod				
NEA haddock				

PI 2.3.1, PI 2.3.2 ETP

	Trawls, Danish Seine	Jiggers	Gillnets	Long lines
NEA cod				
NEA haddock				

PI 2.3.3

	Trawls, Danish Seine	Jiggers	Gillnets	Long lines
NEA cod				
NEA haddock				

PI 2.4.1 Habitats

	Trawls, Danish Seine	Jiggers	Gillnets	Long lines
NEA cod				
NEA haddock				

PI 2.4.2, PI 2.4.3

	Trawls, Danish Seine	Jiggers	Gillnets	Long lines
NEA cod				
NEA haddock				

PI 2.5.1, PI 2.5.2, PI 2.5.3 Ecosystem

	Trawls, Danish Seine	Jiggers	Gillnets	Long lines
NEA cod				
NEA haddock				

The Table below evaluates the scores combined for each PI

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.1 (Retained species)	Yes	Yes		The justification does not mention the European plaice that is identified as retained species	Plaice-specific text added.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.2 (Strategy for retained species)	Yes	Yes		Much of the text refers to JNRFC which deals with overall TAC (all gears) supplemented by technical measures (gear restrictios and closed areas and seasons).	It is true that the JRNFC sets the TAC and agrees the specific management measures year on year but these are the annual manifestation of the Convention's overarching long-term strategy to manage all the resources and their environment in a sustainable manner. i.e the JRNF Convention (plus the Norwegian Seas management plans) are the formal declarations of thee strategy.
2.1.3 (inf adequate to determine risk posed by fishery)	Yes	Yes			
2.2.1 (Risk to bycatch species)	Yes	Yes			

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.2.2 (management of by-cacth)	Yes	Yes		2.2.2.c SG100 (clear evidence that the strategy is implemented successfully) is scored N. However the text argues that the strategy is working, ie avoiding major risks to the by-catch species or is irrelevant as there is no by-catch. It should be considered to score this point as a Y Clearly this point is not clearly distinct from 2.2.2.d that is scored Y..	There is undoubtedly "some evidence ", hence score Y for 2.2.2d. "Testing", however, requires something more rigorous, e.g. great intensity of referrence-fleet sampling and annual analysis of reference-fleet data. The N at SG100 for 2.2.2b is justified but the assessment team accepts that it is a moot point for 2.2.2c. On balance, the assessment team thinks the "clear evidence" is dependent on 'testing' and retains the N at SG100 for 2.2.2c.
2.2.3 (Inf available tio determine the risk and efficiency of by-catch strategy	Yes	No (2.2.3.a SG 100 is partly met)		There are two sources of information available a) catches and their composition [claimed to be accurate and verifiable] and 2) reference fleet and survey results [claimed to be accurate and verifiable]. The survey provides a trend assessment so one has both the impact and the result. The relative importance can be jugded based on knowlegde of the assessed fishery's share of the total fishery.	The assessment team agrees that 2.2.3a 100 is partially met, but as partial scoring is allowed only for those PIs that include only a single scoring issue at each SG level (MSC CR 27.10.6.3), the scoring is in accordance with MSC CR 27.10.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.3.1(International standards for ETP)	Yes	Yes	Condition 3 (Porpoise, gillnets) seems appropriate		
2.3.2 (ETP managememt strategies)	Yes	Yes	Condition 4 (Porpoise, gillnets) seems appropriate		
2.3.3	Yes	Yes			
2.4.1 (Habitat impact)	Yes	Yes		The IMR.PINRO and Mareano surveys provides detailed mapping information information the specific fishing grounds are not presented Figure 22 suggests that data are only available on a rather large scale.	The Directorate monitor activity on a much finer scale through VMS.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.4.2 (Habitat protection strategy)	Yes	Yes		Noting recent Norwegian legislattion	The recent tightening of regulations to safeguard coral areas is very significant.
2.4.3 Inf to determine risk to habitat types)	Yes	Yes		2.4.2 discusses ghostfishing. There is no indication that ghostfishing is impacting habitats rather this is fishing fish and should be scored under PI 2.2	The text has been amended to reflect the peer reviewers point.
2.5.1 (ecosystem status)	Yes	Yes			
2.5.2 (measures)	Yes	Yes			
2.5.3 (knowledge of impact)	Yes	Yes			

Principle 3 Management, Control and Enforcement

This group of issues are scored for the combined fishery. This is sensible as the Norwegian management system applies to all components.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.1 Management system that can deliver on PI 1 and PI 2)	Yes	Yes		Based on Norwegian legislation and JNRFC and bilateral EU-Norway arrangements	No comment required
3.1.2 (Consultation process)	Yes	Yes			
3.1.3 (Objectives in Marine Policy)	Yes	Yes			
3.1.4 (economic and social incentives)	Yes	Yes			

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.1 (Management objectives)	Yes	Yes			
3.2.2 (Decision-making process)	Yes	Yes			
3.2.3 (MCS)	Yes	Yes			
3.2.4 (Research Plan) addressing management needs)	Yes	Yes			
3.2.5 (evaluation performance of fishery specific management system)	Yes	Yes			

Any Other Comments

Comments	Conformity Assessment Body Response

Peer reviewer B

Overall Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**Conformity Assessment Body Response**
Justification: The assessment team concluded with a recommendation that the fishery be certified. This is an appropriate conclusion given that the average score for each of the three MSC principles was well above 80 and no single score below 60. The assessment builds on relevant information about the fishery in question. The scoring is also compatible with previous assessments of Barents Sea cod and haddock.		No response required

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?	**Yes**	**Conformity Assessment Body Response**
Justification: The conditions address the identified shortcomings of the fishery, with reasonable milestones throughout the certification period.		No response required

If included:

Do you think the client action plan is sufficient to close the conditions raised?	**Yes**	**Conformity Assessment Body Response**
Justification: The client action plan addresses the conditions in an appropriate way.		No response required

Risk-Based Framework not used.
The fisheries do not involve enhanced fisheries practices

General Comments on the Assessment Report (optional)

This is a very well-researched and well-written report. I only have a few minor comments, nothing that affects the scoring of the fishery or in any other way the substance of the report.

Performance Indicator Review

Please complete the table below for each Performance Indicator which are listed in the Conformity Assessment Body's Public Certification Draft Report.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
1.1.1	Yes	Yes	NA	The justification given supports this score.	No response required
1.1.2	Yes	Yes	NA	The justification given supports this score.	No response required
1.1.3	Yes	Yes	NA	The justification given supports this score.	No response required
1.2.1	Yes	Yes	NA	The justification given supports this score.	No response required
1.2.2	Yes	Yes	NA	The justification given supports this score.	No response required
1.2.3	Yes	Yes	NA	The justification given supports this score.	No response required
1.2.4	Yes	Yes	NA	The justification given supports this score.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.1.1	Yes	Yes	NA	The justification given supports this score.	No response required
2.1.2	Yes	Yes	NA	The justification given supports this score.	No response required
2.1.3	Yes	Yes	NA	The justification given supports this score.	No response required
2.2.1	Yes	Yes	NA	The justification given supports this score.	No response required
2.2.2	Yes	Yes	NA	The justification given supports this score.	No response required
2.2.3	Yes	Yes	NA	The justification given supports this score.	No response required
2.3.1	Yes	Yes	Yes	The justification given supports this score.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.3.2	Yes	Yes	Yes	The justification given supports this score.	No response required
2.3.3	Yes	Yes	NA	The justification given supports this score.	No response required
2.4.1	Yes	Yes	NA	The justification given supports this score.	No response required
2.4.2	Yes	Yes	NA	The justification given supports this score.	No response required
2.4.3	Yes	Yes	NA	The justification given supports this score.	No response required
2.5.1	Yes	Yes	NA	The justification given supports this score.	No response required
2.5.2	Yes	Yes	NA	The justification given supports this score.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
2.5.3	Yes	Yes	NA	The justification given supports this score.	No response required
3.1.1	Yes	Yes	NA	The justification given supports this score. SG100 b): It is indeed tough to demand that the dispute resolution mechanism has been tested and proven to be effective as long as no dispute has arisen, but the score is in line with that of other Barents Sea fisheries.	Comment taken ad notam
3.1.2	Yes	Yes	NA	The justification given supports this score.	No response required
3.1.3	Yes	Yes	NA	The justification given supports this score.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.1.4	Yes	Yes	NA	The score might be right, but I would have liked to see the justification for giving a partial score a bit more elaborated. How certain is it that the autumn quota reserve acts contrary to the coastal cod recovery plan? Is there any evidence beyond information from interviews, which is currently listed as the only reference apart from the Marine Resources Act?	The issue was raised with IMR and the Directorate of Fisheries during site visit. The response was rather vague and nobody considered this a big issue. There is now a variation request granted to treat the coastal stock as an Inseparable or Practicably Inseparable stock (see Appendix 9 and 10). It has been emphasised to the client that this can only last for the period of a new certificate. The client has, in form of a recommendation, been reminded that the collection of information on coastal cod needs to be upgraded to a level which will allow it to be dealt with under Principle 1 next time. This should address the concerns raised by the peer reviewer.
3.2.1	Yes	Yes	NA	The justification given supports this score.	No response required

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.2	Yes	Yes	NA	The justification given supports this score. A minor issue: In the justification for SI a), the (1976) JRNFC agreement on reciprocal fishing rights is listed as the foundation for the management plans. The correct reference is probably the 1975 agreement on the establishment of Norwegian-Soviet cooperation in the Barents Sea fisheries management, in which the JNSFC/JNRFC was established. Regarding SI d): Please specify what is meant by 'the highest level of the fisheries management process'.	Agreed; correct reference inserted in text. Agreed; term "highest level of the management process" is not clear. Text revised.

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.3	Yes	Yes	NA	The justification given supports this score. Regarding SI d): I completely agree that there is no evidence of systematic non-compliance in the fishery. It is very pertinent to mention television programmes as the one discussed at the site visit, since they continue to be good media stories. One or a few infringements are used by the media to create an image that massive non-compliance is going on, which is not the case, as documented by the Directorate of Fisheries. I assume the results of this particular investigation by the Directorate were not published (only referred to during interviews at site visit); if they were, I would have liked to see the reference. However, the other references provide ample evidence that systematic non-compliance is not taking place.	The peer reviewer answers the question himself. What the reviewer has said, regarding systematic evidence of non-compliance, is basically what the Directorate said during the site visit. It seems that there has been no Norwegian response to the concerns raised in international media. The team has noted that the Directorate of Fisheries in September 2014 (post site visit) has made a proposal for strengthening the control procedures all along the value chain and particularly for the on shore control as a follow up to the new Landing Regulation that will come into force on 1 January 2015 (http://www.fiskeridir.no/fiske-og-fangst/aktuelt/2014/0914/forslag-til-en-bedre-ressurskontroll).

Performance Indicator	Has all the relevant information available been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary.	Conformity Assessment Body Response
3.2.4	Yes	Yes	NA	The justification given supports this score.	No response required
3.2.5	Yes	Yes	NA	The justification given supports this score.	No response required

Any Other Comments

Comments	Conformity Assessment Body Response
A few minor comments: 1. The rather recent problem of IUU catches in the fishery is mentioned several places in the report, as appropriate. In some places, however, it might be a bit unfair to the client since the overfishing was caused by the Russian fleet in the Barents Sea. In the summary of the assessment on p. 5, for instance, it is listed as 'weaknesses of the Norwegian North East Arctic cod and haddock fisheries' that IUU catches have been 'a major problem in the past in both fisheries'. 2. P. 34: second last paragraph: 'Knipovich' is the correct English transliteration, not 'Knipovitch'.	1. The IUU catches in the past do continue to affect the reliability of the assessment. It is right that they are mentioned here for both fisheries as this is a Principle 1 issue related to the whole stock and not only the client fishery. In that context it is also right that this past performance is highlighted as a weakness 2. The name of the Institute has been corrected. 3. The section on Points of landing has been updated to include the suggested information.

3. P. 88, ‘Points of landing’: The argument could be strengthened by not just stating that Norwegian authorities ‘cooperate with national control bodies at points of landing to ensure correct information’, but instead referring to the NEAFC port state control regime, which since 2007 has required that port state authorities ascertain with the relevant flag state that catches intended to be landed are within the total quota of the vessel in question, and that at least 15 per cent of landed catch is annually inspected physically.	

APPENDIX 3. STAKEHOLDER SUBMISSIONS

No written submissions from stakeholders were received during consultation opportunities on

- The announcement of full assessment
- Proposed team membership
- Proposed peer reviewers

Appendix 3.1 Comments to Public Comment Draft Report

The Public Comment Draft Report was published 20 January 2015. Comments to the PCDR were received from:

- the Marine Stewardship Council
- WWF

The stakeholder comments are included in full below, together with the explicit responses of the team to points raised in comments on the PCDR that identify the specific (if any) changes made to scoring, rationales or conditions, and a substantiated justification for not making changes where stakeholders suggest changes but the team has made no change.

Appendix 3.1.1 MSC Technical oversight of PCDR

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United Kingdom
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Fax: +44 (0)20 7246 8901

Date 19/02/2015

SUBJECT: MSC Review and Report on Compliance with the scheme requirements

Dear Anna Kiseleva

Please find below the results of our partial review of compliance with scheme requirements.

CAB	Det Norske Veritas Certification AS (DNV)
Lead Auditor	Anna Kiseleva
Fishery Name	Norway North East Arctic cod
Document Reviewed	Public Comment Draft Report

Ref	Type	Page	Requirement	Reference	Details	PI
11219	Minor	88	CR-27.12.2.1.b v.1.3	27.12.2 If the CAB determines the systems are sufficient, fish and fish products from the fishery may enter into further certified chains of custody and be eligible to carry the MSC ecolabel. The CAB shall determine:27.12.2.1 The scope of the fishery certificate, including the parties and categories of parties eligible to use the certificate and the point(s) at which chain of custody is needed. b. Chain of custody certification may be required at an earlier stage than change of ownership if the team determined that the systems within the fishery are not sufficient to make sure all fish and fish products identified as such by the fishery originate from the certified fishery.	The PCDR states that "The scope of the MSC Fishery certification is up to the point of landing and Chain of Custody will commence from the point of landing and sale". If traceability has been assessed up to point of landing, CoC must commence after point of landing (not sale). This means that all activities taking place between landing and first change in ownership must be assessed for continued traceability.	

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Page 1 of 3

11220	Minor	88	CR-27.12.2.1.b v.1.3	27.12.2 If the CAB determines the systems are sufficient, fish and fish products from the fishery may enter into further certified chains of custody and be eligible to carry the MSC ecolabel. The CAB shall determine:27.12.2.1 The scope of the fishery certificate, including the parties and categories of parties eligible to use the certificate and the point(s) at which chain of custody is needed. b. Chain of custody certification may be required at an earlier stage than change of ownership if the team determined that the systems within the fishery are not sufficient to make sure all fish and fish products identified as such by the fishery originate from the certified fishery.	None of the sales organisations listed in the PCDR feature as CoC holders in the MSC scheme database (eCert): - Norges Råfisklag, - Surofi, - Vest-Norges Fiskesalslag - Rogaland Fiskesalgslag - Skagerakfisk As these entities are not currently included in the fishery certificate (because the scope of the MSC Fishery certification is up to the point of landing), they would require their own CoC certificate to sell product as MSC certified (if they are actually taking ownership of product, which by their descriptions it sounds like they are).	
11222	Minor	242-262	CR-27.10.6.1 v.1.3	Rationale shall be presented to support the team's conclusion	PI 3.2.2. scoring isse b. It is not clear from the provided rationale how the management system responded to the outcomes of "research, monitoring, evaluation and consultation". PI 3.2.5. scoring issue b. In paragraph two, it is not clear how often the international organisations undertake their reviews.	3.1.1, 3.1.2, 3.1.3, 3.2.2, 3.2.5
11225	Major	263-266	CR-27.11.1.4 v.1.3	The CAB shall set one or more auditable and verifiable conditions for continuing certification if the fishery achieves a score of less than 80 but more than 60 for any individual PI. (...) 27.11.1.4 The CAB shall draft conditions to specify milestones that spell out: a. The measurable improvements and outcomes (using quantitative metrics) expected each year. b. The specific timeframes over which the milestones and the whole condition must be met. c. The outcome and score that shall be achieved at any interim milestones.	It is noted that two conditions are carried over from the previous assessment as per the variation request granted by MSC in November 2011. However, there are no new milestones established for these conditions specified in the PCDR for this re-assessment.	

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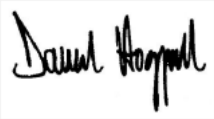
This report is provided for action by the CAB and ASI in order to improve consistency with the MSC scheme requirements; MSC does not review all work products submitted by Conformity Assessment Bodies and this review should not be considered a checking service. If any clarification is required, please contact Robert Lefebure on +44 (0)207 246 8935 for more information."

Best regards,
Fisheries Oversight Director
Dan Hoggarth
Marine Stewardship Council



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Page 3 of 3

Appendix 3.1.2 Assessment team response to MSC Technical oversight of PCDR

MSC Ref	Assessment team response
11219	The text has of Section 5.3 "Eligibility to enter further chains of custody" has been changed to clarify that the scope of the MSC Fishery certification is up to the point of landing and Chain of Custody will commence from the point of landing.
11220	The text has of Section 5.3 "Eligibility to enter further chains of custody" has been changed to clarify that the sales organizations do not take ownership of the fish and do not need separate CoC certification; "Fish is sold either through auctions organized by the sales organizations or directly from vessel to buyer. In both cases the same requirements for reporting apply. All transactions are done through the sales organizations, logged and publically available, but the sales organizations do not take ownership of the fish."
11222	• 3.2.2: The justification has been amended with the following sentence:" The management response to the outcomes of research, monitoring, evaluation and consultation is further investigations of issues raised, initiation of new/additional research activities and amendments of fishery regulations asrequired. • 3.2.5: The justification has been amended with the following sentence: " Such reviews typically takes place every 3-5 year" It has been verified with the MSC that the PIs 3.1.1, 3.1.2 and 3.1.3 were included in the MSC TO by mistake and that no response from the assessment team is required for these PIs.
11225	Appendix 1.3.1 has been amended to specify milestones for the conditions carried over from the initial assessments.

Appendix 3.1.3 WWF comments to PCDR

All identified stakeholders including WWF were invited to provide information relevant for the reassessment during the site visit /information gathering phase. Contact between the assessment team and WWF was established later in this process and not in time to include any information in the PCDR. Comments received from WWF on the PCDR are published in full below. The assessment team has encouraged WWF to engage actively during the information gathering phase of coming assessments.

WWF for a living planet

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Det Norske Veritas
Certification AS
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19. February 2015

WWF comments to The Public Common Draft Report for Norway North East Arctic cod and Norway North East Arctic haddock fisheries

Dear DNV GL Business,

WWF actively engages as a stakeholder in a number of Marine Stewardship Council (MSC) fishery assessments in order to improve fisheries sustainability. With this letter, we wish to provide comments on your public comment draft report (PCDR) for the re-assessment of the Norway North East Arctic cod and Norway North East Arctic haddock fisheries against the MSC Standard. Where possible, we relate our comments to relevant performance indicators. In each case, we try to provide objective evidence in support of our contentions. For some indicators, WWF does not believe that the scoring rationale that is provided is adequate to support some of the scores given. In other instances, we question whether the assessment team has considered and included all available information.

Procedural Concern #1

There was a serious procedural irregularity (CD2.7.2.1, MSC CRv1.3) in scoring PIs 2.4.1, 2.4.2 and 2.4.3.

Under Principle 2, the team did not assign separate scores for the different scoring elements (vulnerable marine ecosystems - VME) that comprise the habitat component affected by the fishery.

The PCDR explicitly acknowledges that the fishery overlaps with benthic habitat types recognized by The Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR) and FAO as VME. Their list includes several VME habitat types: e.g. *Lophelia pertusa* reefs, coral gardens, sea pens & burrowing megafauna and deep-sea sponge aggregations. Nonetheless, the scoring rationales presented for PIs 2.4.1, 2.4.2, and 2.4.3 do not score these habitat types separately as different scoring elements. 27.10.7 In Principle 2, the team shall score

PIs comprised of differing scoring elements (species or habitats) that comprise part of a component affected by the fishery.

Scoring Concern #1

The score assigned to PI 2.4.1 was arbitrary (CD2.7.2.2c, MSC CRv1.3) insofar as the rationale is not sufficient to explain how scoring elements of the habitat components (deep sea sponge aggregation, soft and hard coral gardens, burrowing megafauna such as sea pens (Pennatulaceans), mud habitats) attain the SG80 scoring level.

There is no adequate information available saying that the MSC certified demersal fishery for cod on the Norwegian shelf and shelf break does not still have significant, irreversible negative impacts on the deep-water habitat types and communities of the Barents Sea. The yearly impact of the cod fishery is definitely much less compared to trawl peaks in the 1970-1990, however large areas in the Barents Sea where VMEs formerly existed are already damaged or wiped out (e.g. 30-50% of the Lophelia cold water reefs[1]). Additionally, the rock hopper gear was introduced as recently as the late 80s/ early 90s and many VME areas that were formerly protected due to their location in rougher terrains are nowadays targeted by the fleet. With a decreasing abundance of VMEs the negative impact of each trawl in a sensitive area increases accordingly. Current knowledge suggests that ongoing trawling can lead to fundamental changes to benthic communities, which can in turn alter food chains and energy flows at the ecosystem level[1, 2]. In addition, the risk increases that local and regional population levels can fall below a critical thresholds from which recovery is not possible[2]. Most of the identified vulnerable and threatened species have irregular reproduction and very low growth rates[2] so any additional losses due to trawling can be compounded over time.

Fishing effort for cod is concentrated on locations with fast-current and sand-hard substrate habitats and it is known that these locations more or less exclusively host some highly vulnerable habitats like coral gardens or hard bottom sponge grounds. Recovery rates of deep-water sponge grounds, sea pen bottoms, hard and soft bottom coral gardens and deep-water soft bottom habitats are largely unknown und are expected to be very slow[2, 3]. Damage to or death of deep-water sponge communities, coral reefs, coral gardens will take, at a minimum, several human generations to regenerate to their current standing, making damage irreversible over several human generations and where the habitat is altered regeneration may never happen. (Corals[4,5,6]; Sponges[7]).

Additionally, several VMEs occur on sand bottoms e.g. Sponge communities, Sea pen bottoms, Soft-bottom coral forests (MAREANO).There are indications of benthic species being threatened with local extinction. Such indications can easily be found in the standard literature about the Arctic and Barents Sea ecosystem (e.g. bottom trawling and scallop dredging in the Arctic[2]). In earlier times it was common for fishermen to catch large *Paragorgia arborea* in bottom gear. This situation has changed and large individual colonies are now rarely reported or seen. The depletion of the populations *of Paragorgia arborea* is of great concern especially because of the disappearance of old individuals that, in this case, can be more than thousand years old. This is probably an irreversible process. Concern is likewise expressed for *Primnoa*, which is also slow growing[8]. In the case of deep sea sponges all observations point to very slow somatic growth rates, presumably decades[3].

It is true that fishermen usually attempt to avoid extensive coral reefs, coral gardens or sponge grounds as these obstruct and damage trawling gear, representing a rather time-consuming nuisance in cleaning and redeploying nets that are full of massive quantities of sponges. Nevertheless, given the rich abundance and diversity of fish that these grounds harbour, the edges of the grounds may often receive direct, physically devastating damage[9]. VMS data of fisheries and VME location data also clearly display an overlap according to the MAREANO data. MAREANO research found trawl tracks in most VME areas, including new trawl tracks in Lophelia

reef areas[10]. Please provide a map showing the fishing areas of the fleet (based on VMS data) in regards to VMEs (MAREANO data).

Given the evidence provided by MAREANO, it is highly likely that the trawl fishery for cod could cause serious and irreversible harm to the deep-water bottom habitats on the fishing ground over time. Nothing indicates that the client fleets behave differently from other fleets or that they avoid the normal fishing grounds. There is a high likelihood of continued trawling near and across defined vulnerable marine habitats (and OSPAR listed habitats) in the fishing area of the client. The fishing gear employed by the client fleet is considered one of the most bottom affecting of all towed gear, in particular in relation to mixed and hard bottom biotopes. It has to be assumed that especially the bottom trawl fisheries generate bycatch/ collateral damage to sponge grounds, various types of coral gardens, coral reefs and sedimentary habitat even thou there are few reports of coral- and/or sponge bycatch. Management in the Norwegian EEZ allows a threshold for bycatch of 60 kg corals and 800 kg sponges before the move-on rule comes in to place and the vessel has to move 2 miles away from the specific fishing position (not five miles as said in the assessment)[11]. The thresholds in the Norwegian EEZ are at present not harmonized with current thresholds in the NEAFC, which are 30 kg corals and 400 kg sponges.

In contrast, soft corals or sea pen fields do not present an obstruction to fishing gear or catches, nor they are addressed in the encounter rules implemented in Norwegian exclusive economic zone (EEZ) and international waters controlled by North East Atlantic Fisheries Commission (NEAFC). This is in contrast to the North West Atlantic where Northwest Atlantic Fisheries Organization (NAFO) set a trigger of 7 kg bycatch of sea pens or soft corals[12]. For sponge grounds, the size structure within populations indicates slow reproduction and recruitment, and high age of the large specimens. Accordingly, it will take a long time for a sponge-dominated area to recover even after partial destruction, and repeated disturbance may lead to permanent extirpation of the species in the area[2].

Fishing activity for cod is not homogeneously distributed over the Barents Sea, instead it focuses on fast-current and sand-hard substrate habitats along the shelf edge and canyons. VME types that occur mainly more or less exclusively in these locations (e.g. coral reefs, coral gardens, hard bottom sponge grounds) are over-proportional threatened and impacted by the certified fishery. Again, damage to or death of deep-water sponge communities, coral reefs, coral gardens will take, at a minimum, several human generations to regenerate to their current standing, making damage irreversible over several human generations and where the habitat is altered regeneration may never happen. One can argue that VMEs below 600 m are safeguarded from the certified fishery due to the fact that haddock and cod does not occur in depth below 600m[13] and habitats below 1000m are protected by Norwegian law. However, habitat types contain a wide range of species and species communities[14] and species composition within habitat types and functions of the habitats furthermore change substantially with depth. A sponge ground in 200m depth cannot be compared to one occurring at 1200m and a soft bottom sponge ground largely differ from a hard bottom sponge ground[3, 14].

The PCDR states that the Norwegian authorities have prohibited fishing by any ground-contact gear within any known coral reef or coral garden habitat. This is true for coral reefs, however coral-gardens are not included in the fishery law and remain unprotected. The argument that the average benthic biomass increased from 2005-2007 across the Barents Sea is invalid in the VME context due to the fact that this benthic biomass consists mainly of non-vulnerable species like sea stars, sea-cucumbers, urchins etc. To our knowledge, there is no study showing an increase in VME biomass or area. On the contrary, most studies report a decline of VMEs (see OSPAR VME descriptions[2, 14]).

Scoring Concern #2

The score assigned to PI 2.4.2 indicators cannot be justified. Regarding precautionary management actions, which are scored in the MSC Performance Indicator 2.4.2, conclude that

3

neither strategies nor active measures, neither from Norwegian fisheries management, MPAs, nor through precautionary action from the clients are in place to prevent serious or irreversible harm to deep-water VMEs other than Lophelia cold-water reefs. There is no protection in the form of closed areas for most vulnerable habitats e.g. deep sea sponge aggregations, coral gardens, sea pens and burrowing megafauna (VMEs defined by OSPAR). In all the north of the Lofoten islands, measures to protect corals are limited to the waters within 12 nm of the baseline of Norway, Svalbard and Bear Island. However, even there, many of the mapped coral reefs are unprotected. Because of a lack of specific habitat protection in all areas that may potentially be fished (especially within the Svalbard fisheries zone), and the obvious capacity of the heavy trawl gear used in this fishery to have a negative impact, it cannot be concluded that these measures, which are not expressly designed to manage the impact of the fishery on seabed habitats, ensure that the fishery does not pose a risk of serious or irreversible harm to habitat types. No access restrictions other than (self-controlled) voluntary avoidance measures are requested. The fishery does not meet the requirements for sustainable fishing of UNGA 61/105 (2006), FAO 2009, NEAFC or OSPAR guidelines which include closing areas where VMEs are known or likely to occur to bottom fishing, environmental impact assessments (EIAs) of single fisheries and precautionary encounter rules.

The only mitigation measure for all existing VMEs in Norwegian waters is the "Move on/ Encounter rule" implemented in the Marine Resources Act. Yet the move on rule is widely recognized to be a reactionary not a precautionary measure for protecting VMEs and has been criticized by ICES. Unfortunately, the encounter protocols or move-on rules have generally set the bycatch limits at such high levels that the rule can become rather meaningless. Reviews of move-on rules (e.g. [14, 15]) have detected the following frequent problems:

- There is limited or no scientific basis on whether the thresholds used for move-on rules are indicative of VMEs; and often they are not specific to different gears, species, or habitat and do not identify an effective move-on distance.
- In cases where the move-on distance is small, the effect may simply be to increase damage to VMEs.
- The materials necessary to help observers and fishers identify and quantify VME taxa are inadequate and/or not standardised.
- Good information collection, including vessel monitoring systems (VMS) and automatic identification systems (AIS), and full observer coverage is often needed to apply the move-on rules correctly.

A scientific estimate of a meaningful bycatch limit recommended that no more than 5 kg of stony coral, coral rubble, sponge or other habitat forming epifauna recovered in a single haul should be sufficient to trigger a vessel to cease fishing and move on from an area[14]. In response to the harsh scientific critics, 2013 NEAFC as mentioned in "Scoring Concern #1", halved the amount of invertebrate bycatch that triggers an encounter when fishing in adjacent international waters. These new thresholds are not included in the PCDR.

A partial strategy to protect VMEs (please note "Procedural concern #1"), in accordance with UNGA resolutions (especially 61/105 and 64/72) and more specifically the FAO Guidelines for deep-sea fisheries should include the establishment of an interim precautionary approach that allows for the development of appropriate conservation and management measures to prevent significant adverse impacts on VMEs while preventing such impacts from taking place inadvertently and that consists of (a) closing of areas where VMEs are known or likely to occur and (b) implementation of bycatch analysis and scientifically based move-on rules that are specific to the gear and VME.

To our knowledge, the Russian EEZ is within the scope of certification. Please provide information regarding the precautionary management actions in Russian EEZ and score them separately. Pleased note that FIUN was evaluated against PI 2.4.2 and the assessment team concluded that there were "*…no closed areas directed specifically at benthic habitat protection within the Russian jurisdiction*" and that the habitat management strategy does not specifically address VMEs.

Scoring Concern #3

The score assigned to PI 2.4.3 indicators cannot be justified.
There is no adequate information for a large percentage of the fishing grounds including the ecologically sensitive, very important fishing areas around Bear Island and along the Svalbard continental[3, 10]. On the other hand, some parts in Norwegian waters are among the best mapped ocean areas worldwide. The fishing grounds for North East Arctic cod north of the Norwegian mainland have been mapped to 72° N with high resolution by the MAREANO project. However, the assessment report does not provide any detailed information about the spatial overlap of fishing gear by the clients and known VMEs, although VMS and VME data are easily available. The information on VMEs are partially available online since 2009, consultation of the MAREANO and Polar Research Institute of Marine Fisheries and Oceanography (PINRO) scientists would likely have generated detailed information also for the northern areas by the time of the assessments. Recovery rates and potential of most VME types are unknown in the Barents Sea. Please provide an overview about the knowledge on VME types and locations for the Russian EEZ. We do not think that there is reliable information on the spatial extend of interaction.

Scoring Concern #4

A highly threatened species in Norwegian waters, Common Red Fish (*Sebastes marinus*) listed as endangered (EN) at the Norwegian red list for threatened species[15], is not included as an ETP species in scoring PIs 2.3.1. This is a species, which The *International Council for the Exploration of the Sea* (*ICES*) recommends to have a zero total allowable catch (TAC) quota for in Norwegian EEZ, but still is part of the legal bycatch for all MSC certified cod and haddock fisheries in the Barents Sea. The Institute of Marine Research in Bergen also supports ICES's suggestion for TAC. It is estimated that the stock of common red fish in Norwegian waters will collapse before the year 2018 if today's management for the species is to be continued[16]. The expected collapse shows that the description in PCDR PI 2.1.1. "*There are species-specific management measures in place to minimise capture of redfishes*" do not fully cover the severity of the situation.

The stock of coastal cod (*Gadus morhua*) north of 62° N is also listed in the Norwegian red list as endangered (EN) and should be addressed in the PCDR as an ETP species too.

Summary

The Norwegian cod and haddock fishery have come a long way, but still have some environmental sustainable issues to address especially when it comes to reducing the impact of known and unknown VME areas and reducing bycatch of two commercial ETP species.

WWF would like to see the following conditions included in the recertification of the Norwegian cod and haddock fisheries:

1. First year: Implement bycatch analysis of VME indicator species and reporting logbook.

   Following years: centralised data-collection + research cooperation.

2. First year: Implement NEAFC encounter rule thresholds.

   Following years: Develop and implement scientifically based gear- and habitat-specific move-on rules for all effected VME types.

3. First year: close areas with known/proven Lophelia reefs and Gorgonian corals (MAREANO layer: http://www.mareano.no/en/maps/mareano_en.html#maps/17). These are very small areas.

   Following years: Additional closures of VME hotspots (based on bycatch analysis/encounters, scientific knowledge and fishermen experience). Please Note: Results of the WWF-AIS analysis in the MAREANO mapped area showed an average of 0,5 – 3,6 trawls per year per vessel in areas where VMEs are likely /known to occur. So compared to the overall fishing patterns, known VME areas are often already avoided. However, due to the low recoverability of the impacted VMEs and the large number of vessels (cumulative effects) any trawl in sensitive areas should be avoided. It is presumed that area closures would lead only to a very minor reduction (between 0,02% to 3,6%) of the utilized fishing grounds (assuming an average of 100-250 trawls per year).

4. Generally, develop/establish platform and increase data exchange between all cod and haddock fishing fleets, science and government (use of OLEX-System, information on No-go areas/encounters/likely VME areas)

5. Risk based observer coverage and validation of best practice (e.g spatial activity (GPS/AIS), Net-Cams, independent on-board observers). Mainly important in Russian EEZ and international waters.

6. Participate (including financing) in research works of new models of trawls and their elements which have a milder impact on benthos. Implement new technology when appropriate. MSC definition: "appropriate" in the context of implementing reviewed measures shall be interpreted where potential alternative measures reviewed are:

   a. Determined to be more effective at minimising the impact on sensitive bottom habitats than current fishing gear and practices,

   b. Determined to be comparable to existing measures in terms of effect on target species catch, and impacts on vessel and crew safety,

   c. Determined to not negatively impact on other species or habitats, and

d. Not cost prohibitive to implement.

7. Implement measures that effectively reduces the significant negative effects from fishing activity on the two commercial ETP species; common red fish (*Sebastes marinus*) and costal cod (*Gadus morhua*).

On behalf of WWF
Sincerely yours,

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Appendix 3.1.4 Assessment team response to WWF comments to PCDR

Issue	Assessment team response
Procedural Concern #1	Assessment team response: The scoring tables have been amended to complete scoring of SMHs by elements.
Scoring Concern #1	Concern regarding scoring of PI 2.4.1. WWF states that "There is no adequate information available saying that the MSC certified demersal fishery for cod on the Norwegian shelf and shelf break does not still have significant, irreversible negative impacts on the deep-water habitat types and communities of the Barents Sea." Assessment team response: - The WWF critique indicates that there is a lack of detailed understanding of how fishing gear and technology have developed over the past 70 – 90 years and the implications of these changes with respect to SMHs in the NE Arctic fishing grounds. A brief review is given of these changes and how they help to minimise rather than repeat the adverse effects imparted by earlier generations. - Scientifically you cannot prove a negative, consequently there is no irrefutable evidence that trawl-related damage is all recent and ongoing or is all historic. What we do know is that, like any commercial enterprise, the industry has no desire to suffer avoidable costly damage ot gear or lost fishing time and there is evidence (such as VMS monitoring) that the industry is complying with current protection measures. Just as there are instances where underwater photographs reveal what appears to be recent trawl damage, there is also photographic evidence of trawl tracks being (relatively) old and recovery of SMH features. WWF states that "Current knowledge suggests that ongoing trawling can lead to fundamental changes to benthic communities, which can in turn alter food chains and energy flows at the ecosystem level. In addition, the risk increases that local and regional population levels can fall below a critical thresholds from which recovery is not possible. Most of the identified vulnerable and threatened species have irregular reproduction and very low growth rates so any additional losses due to trawling can be compounded over time." Assessment team response: Theoretically this is all true, but protection measures are in place; there is a high level of compliance; and there is evidence of SMHs in Barents Sea recovering. It is no less true to say that significant shifts in the balance of biomass within an ecosystem (such as the recent and current unprecedented high cod and haddock stocks) "can lead to fundamental changes to benthic communities, which can in turn alter food chains and energy flows at the ecosystem level". Irregular reproduction is not unique to 'vulnerable and threatened species', as examination of cod or, more particularly, haddock stock–recruitment relationships will show. WWF statement: "Fishing effort for cod is concentrated on locations with fast-current and sand-hard substrate habitats and it is known that these locations more or less exclusively host some highly vulnerable habitats like coral gardens or hard bottom sponge grounds. Recovery rates of deep-water sponge grounds, sea pen bottoms, hard and soft bottom coral gardens and deep-water soft bottom habitats are largely unknown und are expected to be very slow. Damage to or death of deep-water sponge communities, coral reefs, coral gardens will take, at a minimum, several human generations to regenerate to their current standing, making damage irreversible over several human generations and where the habitat is altered regeneration may never happen. (Corals; Sponges)." Assessment team response: - It is true that any habitat that has been disrupted as a result of anthropogenic pressure may take several human generations to reach its natural climax-community status once more. As with terrestrial sites, we must endeavour to identify the best (i.e. least disrupted) areas and offer them the best protection that we are able to provide while looking to mitigate adverse effects as widely as is practically possible. This is happening in the NE Arctic. Measures to protect marine habitats may be running 2–3 decades behind terrestrial habitat protection, but it is happening with the introduction of formal MPAs and more general regulations that include move-on rules. As with the terrestrial environment, however, we must recognise that it is neither practical or, in reality, desireable to imagine that the marine environment at large can be returned to some undefined pristine state. We must identify and protect the best while continuing to use the rest.

WWF statement: "Additionally, several VMEs occur on sand bottoms e.g. Sponge communities, Sea pen bottoms, Soft-bottom coral forests (MAREANO).There are indications of benthic species being threatened with local extinction. Such indications can easily be found in the standard literature about the Arctic and Barents Sea ecosystem (e.g. bottom trawling and scallop dredging in the Arctic). In earlier times it was common for fishermen to catch large Paragorgia arborea in bottom gear. This situation has changed and large individual colonies are now rarely reported or seen. The depletion of the populations of Paragorgia arborea is of great concern especially because of the disappearance of old individuals that, in this case, can be more than thousand years old. This is probably an irreversible process. Concern is likewise expressed for Primnoa, which is also slow growing8. In the case of deep sea sponges all observations point to very slow somatic growth rates, presumably decades."

Assessment team response:

- Slow growth rates of deep sea sponges are acknowledged in the report but there is also evidence of relatively rapid recolonisation of hard and soft corals, sponges and other benthic mega fauna (see for example [1] BMT Cordah, 2011; Hankinson & Ulvestad, 2013).The same is true for corals. It used to be said that Lophelia pertusa grew at the rate of 1 cm per century but when the Brent Spar oil-storage facility was brough ashore for demolition (after a few years in the northern North Sea) Lopehelia pertusa growths several cm long were found to be growing (Anon. 1999. Brent Spar Outcry Leaves Shell With A £60M Bill. *Professional Engineering* **12:** 16; Bell, N. & Smith, J. (1999). "Coral growing on North Sea oil rigs". *Nature* **402** (6762): 601–2; Gass, S. & Roberts, J.M. (2006). "The occurrence of the cold-water coral Lophelia pertusa (Scleractinia) on oil and gas platforms in the North Sea : Colony growth, recruitment and environmental controls on distribution". *Marine pollution bulletin* **52** (5): 549–559). More generally, see comments above.

WWF statement: It is true that fishermen usually attempt to avoid extensive coral reefs, coral gardens or sponge grounds as these obstruct and damage trawling gear, representing a rather time-consuming nuisance in cleaning and redeploying nets that are full of massive quantities of sponges. Nevertheless, given the rich abundance and diversity of fish that these grounds harbour, the edges of the grounds may often receive direct, physically devastating damage. VMS data of fisheries and VME location data also clearly display an overlap according to the MAREANO data. MAREANO research found trawl tracks in most VME areas, including new trawl tracks in Lophelia reef areas. Please provide a map showing the fishing areas of the fleet (based on VMS data) in regards to VMEs (MAREANO data).

Assessment team response:

- The scale at which the MAREANO and VMS data are plotted for public use, it is inevitable that they will appear to lay directly one over the other but this is not evidence of fishing vessels routinely going through an SMH. As vessels can plot the position of a trawl to within a few metres while fishing, they can fish with considerable precision with respect to known SMHs. This is not to say that there are never instances of fresh or recent fishing – SMH interaction but to draw specific negative conclusions it would be necessary to plot the VMS data at a scale that is commensurate with the precision of navigation and the known location of the SMH.
- In dynamic areas, trawl tracks can be obliterated very rapidly and any seabed debris (such as coral rubble) swept away to accumulate in areas that are less hydrodynamic. In such hydrodynamically quiet areas seabed debris may all be of local origin or some of it may have accumulated there from elsewhere. Also, as with seabed debris, in such quiet areas trawl tracks can last considerable time and it is not always easy to distinguish between a recent and an older track. One indicator or relatively undisturbed older tracks can be seen when they begin to fill with 'marine snow' (Hankinson, L. & Ulvestad, L. 2013), i.e. particulates settling out of suspension.

WWF statement: "Given the evidence provided by MAREANO, it is highly likely that the trawl fishery for cod could cause serious and irreversible harm to the deep-water bottom habitats on the fishing ground over time. Nothing indicates that the client fleets behave differently from other fleets or that they avoid the normal fishing grounds. There is a high likelihood of continued trawling near and across defined vulnerable marine habitats (and OSPAR listed habitats) in the fishing area of the client. The fishing gear employed by the client fleet is considered one of the most bottom affecting of all towed gear, in particular in relation to mixed and hard bottom biotopes. It has to be assumed that especially the bottom trawl fisheries generate bycatch/ collateral damage to sponge grounds, various types of coral gardens, coral reefs and sedimentary habitat even thou there are few reports of coral- and/or sponge bycatch. Management in the Norwegian EEZ allows a threshold for bycatch of 60 kg corals and 800 kg sponges before the move-on rule comes in to place and the vessel has to move 2 miles away from the specific fishing position (not five miles as said in the assessment). The thresholds in the Norwegian EEZ are at present not harmonized with current

thresholds in the NEAFC, which are 30 kg corals and 400 kg sponges."

Assessment team response:

- The assessment is based on available information. The WWF statement is primarily negative conjecture whereas the assessment team has presented a picture based on knowledge of the history of fishing in the NE Arctic, and understanding of how fishing gear and fishing vessels operate and detailed discussions of scientists and enforcement agencies actively engaged in monitoring and managing the Barents Sea region.
- If vessels are successful and efficient fishermen, they will avoid known areas of coral and sponges; consequently, there will be "few reports of coral- and/or sponge bycatch".
- The assessment team has raised a recommendation to the client group to harmonize with NEAFC & NAFO thresholds; to increase move-on rule for sponges and other benthic mega fauna.

WWF statement: "In contrast, soft corals or sea pen fields do not present an obstruction to fishing gear or catches, nor they are addressed in the encounter rules implemented in Norwegian exclusive economic zone (EEZ) and international waters controlled by North East Atlantic Fisheries Commission (NEAFC). This is in contrast to the North West Atlantic where Northwest Atlantic Fisheries Organization (NAFO) set a trigger of 7 kg bycatch of sea pens or soft corals. For sponge grounds, the size structure within populations indicates slow reproduction and recruitment, and high age of the large specimens. Accordingly, it will take a long time for a sponge-dominated area to recover even after partial destruction, and repeated disturbance may lead to permanent extirpation of the species in the area."

Assessment team response:

- Evidence has been provided for recovery in some areas (Hankinson, L. & Ulvestad, L. 2013)
- See comments above re recovery times and theneed to balance area protection with continued use.
- Studies of sea pen populations along the west coast of Scotland (http://www.ukmarinesac.org.uk/ communities/seapens/sp5_1_1.htm) concluded that trawling was not a significant cause for concern with respect to sea pen populations (Atkinson, 1989; Howson & Davies, 1991). Nevertheless, the assessment team has raised a recommendation to the client group to harmonize with NEAFC & NAFO thresholds; to increase move-on rule for sponges and other benthic mega fauna.

WWF statement: "Fishing activity for cod is not homogeneously distributed over the Barents Sea, instead it focuses on fast-current and sand-hard substrate habitats along the shelf edge and canyons. VME types that occur mainly more or less exclusively in these locations (e.g. coral reefs, coral gardens, hard bottom sponge grounds) are over-proportional threatened and impacted by the certified fishery. Again, damage to or death of deep-water sponge communities, coral reefs, coral gardens will take, at a minimum, several human generations to regenerate to their current standing, making damage irreversible over several human generations and where the habitat is altered regeneration may never happen. One can argue that VMEs below 600 m are safeguarded from the certified fishery due to the fact that haddock and cod does not occur in depth below 600m and habitats below 1000m are protected by Norwegian law. However, habitat types contain a wide range of species and species communities and species composition within habitat types and functions of the habitats furthermore change substantially with depth. A sponge ground in 200m depth cannot be compared to one occurring at 1200m and a soft bottom sponge ground largely differ from a hard bottom sponge ground"

Assessment team response:

- This statement is largely a reiteration os specific points made by WWF is other statements above and have been covered in the corresponding Assessment team response.

WWF statement: "The PCDR states that the Norwegian authorities have prohibited fishing by any ground-contact gear within any known coral reef or coral garden habitat. This is true for coral reefs; however coral-gardens are not included in the fishery law and remain unprotected. The argument that the average benthic biomass increased from 2005-2007 across the Barents Sea is invalid in the VME context due to the fact that this benthic biomass consists mainly of non-vulnerable species like sea stars, sea-cucumbers, urchins etc. To our knowledge, there is no study showing an increase in VME biomass or area. On the contrary, most studies report a decline of VMEs (see OSPAR VME descriptions)."

	Assessment team response: The SMH protection measures set out in J 128-2011 refer to 'live coral' and 'live sponge', thus, coral gardens are included. The increase in average benthic biomass was cited as a genral indicator of NE Arctic well being, not as an indicator that all was well with SMHs, which receive specific consideration.
Scoring Concern #2	Comments regarding score of PI 2.4.2. Assessment team response: - There are rules for avoiding known areas and move on rules if coral or sponges are encountered. These rules are statutory with regards to coral and sponge, not voluntary. - Precautionary measures for protecting VMEs include avoiding coral areas in the first place. - The assessment team has introduced a recommendation to align the bycatch limits with NEAFC limits. - Move-on rule apply to all ground-contact gears. - The move-on rule currently defines a move-on distance of 2 miles, but the assessment team has recommended increasing to 5 miles. - As the taxonomy of sponges is difficult it is unrealistic to expect fishermen to record more detailed than 'coral', 'sponge', 'sea pen'. In this context it is worth noting that the sponges from the 19th century 'Challenger' expedition remain unclassified in the British Museum (Natural History) becuase their taxonomy is difficult. - The assessment team notes WWF's opinion that "full observer coverage is often needed to apply the move-on rule correct." - Information regarding the precautionary management actions in Russian EEZ has been included, and the Russian EEZ has been scored separately.
Scoring Concern #3	Concern regarding scoring of PI 2.4.3. Assessment team response: The rationale of PI 2.4.3 has been amended to provide the requested information, and Norway and Russia have been scored separately.
Scoring Concern #4	Concern regarding scoring of Sebastes marinus and coastal cod as ETP species. Assessment team response: The most recent Norwegian Redlist was prepared by a panel of national experts and published by the Norwegian Biodiversity Information Centre in 2010 [Kålås, J.A., Viken, Å., Henriksen, S. & Skjelseth, S. (eds.)*The 2010 Norwegian Red List for Species*. http://www.artsdatabanken.no/File/685/Norsk%20r%C3%B8dliste%20for%20arter%202010]. In the report, it is acknowledged that internationally, cod (*Gadus mornhua*) and haddock (*Melanogrammus aeglefinus*) are listed as 'vulnerable' by the IUCN but within Norwegian waters (i.e. ICES Areas I & II, the NE Arctic) the status of both is of 'least concern' (Table 6; *The 2010 Norwegian Red List for Species*). More specifically, the Norwegian Red List does not recognise coastal cod as a separate entity from cod as a species. Further more, coastal cod are assessed within this report as an IPI species and are given consideration in the detail and context that is appropriate for these fish. Consequently, it is not appropriate for cod, specifically coastal cod, to be considered as an ETP species. Both commercial species of redfish, beaked redfish *Sebastes mentella* and golden redfish *Sebastes norvegicus* (previously *S. marinus*) appear on the 2010 Red List as 'vulnerable, and 'endangered', respectively. While the status of beaked redfish may continue to fall within the 'vulnerable' category, its status has improved since the 2010 list was prepared and ICES consiers all the stock indicators are positive, subject to management measures and constraints remain in place (ACOMsmen, 2014). It is appropriate, therefore, that this species has been assessed within context of retained species for this report. In contrast, the golden redfish stock continues to be at an all-time low with no indication of recovery (ACOMsmar, 2014). This being the case, the species has received specific consideration as an ETP species and as it continues to form a small retained bycatch in Norwegian demersal (cod, haddock and saithe) fisheries a condition has been set covering all gears. It cannot be overemphasised, however, that any measures to constrain golden redfish catches in the cod and haddock fisheries are likely to be confounded by the licensed seasonal gillnet and longline fisheries, which account for more than half the total catch and are beyond the scope of this certification assessment.
Summary	The assessment team has revisited Principle 2 issues pointed out by WWF. Text and scoring has been amended where required; condition and recommendation introduced.

APPENDIX 4 SURVEILLANCE FREQUENCY

The surveillance score for the Norway NEA cod and haddock fisheries is determined as detailed in Table 57. Based on the total score, the surveillance level is determined as provided in Table 58.

Table 57 Determination of surveillance score for Norway NEA cod and haddock fisheries per gear (Ref. CR v1.3 table C3).

Criteria	Alternatives	Surveillance score	Surveillane score Trawl	Surveillane score Lonngline	Surveillane score Gill-net	Surveillane score Danish seine	Surveillane score Hook and line gears	Rationale
Default assessment tree used?	Yes No	0 2	0	0	0	0	0	Default assessment tree used
Number of open conditions	Zero conditions Between 1-5 conditions More than 5	0 1 2	1	1	1	1	1	All gear types have between 2 and 5 open conditions.
Principle Level Scores	≥85 <85	0 2	0	0	0	0	0	All principle level scores >84
Conditions on outcome PIs?	Yes No	2 0	2	2	2	2	2	All gear types have conditions on outcome PIs
		Score per gear	3	3	3	3	3	
		Total score			**3**			

Table 58 Surveillance level (Ref. CR v1.3 table C4)

			Year after certification or recertification			
Surveillance score (	**Surveillance level**		**Year 1**	**Year 2**	**Year 3**	**Year 4**
2 or more	Normal surveillance		On-site surveillance audit	On-site surveillance audit	On-site surveillance audit	On-site surveillance audit
1	Remote surveillance	Option 1	Off-site surveillance audit	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit & recertification site visit
		Option 2	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit	
0	Reduced surveillance		Review of new information	On-site surveillance audit	Review of new information	On-site surveillance audit & recertification site visit

According to MSC Certification Requirements Version 1.3, the overall surveillance score for the Norway NEA cod and haddock fisheries is 3, which qualifies for a Normal surveillance level with annual on-site surveillance audits.

The performance of IPI stocks eligible to enter further certified chains of custody shall be reviewed and documented during surveillance activities.

APPENDIX 5 CLIENT AGREEMENT

From: Tor Bjørklund Larsen <tor@fiskarlaget.no> Sent: fr 02.10.2015 11:14
To: Pedersen, Guro Meldre
Cc:
Subject: SV: Norway NEA cod and haddock - PCR 20151001.docx

To DNV GL

This e-mail confirms that the Norwegian Fisherman's Association accepts the final PCR as received 01.10.2015.

Best regards,
Tor Bjørklund Larsen
Sustainability adviser

Norwegian Fishermen's Association | Norges Fiskarlag
Tor Bjørklund Larsen | tor@fiskarlaget.no
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NORGES FISKARLAG

APPENDIX 6 OBJECTIONS PROCESS

Following the publication of the Final report, the MSC allows 15 working days for stakeholders to file intent for objection to the Final report. No formal objection to the assessment were raised and accepted by an independent adjudicator as defined in the MSC Certification Requirements

Appendix 6.1 Changes to report following Technical Review

The PCR report has been revised from the Final Report to conform with DNV GL Technical reviewer request to clarify in the report that there are two different sets of regulations for protection of coral habitats, and that both regulations form a part of Norwegian National strategy for protection of Sensitive Habitats and are systematically revised in order to reflect new scientific knowledge and priorities in conservation:

- J-175-2015 regulation (J-151-2014 at the time of on-side audit) which sets requirements for protection of all known coral reefs and
- J-128-2011 regulation which sets requirements for reporting and move on rules in case of interactions with live corals and sponges.

Required editorial changes have been therefore added to the sections below:

- Section 3.4.4.1 Potential effects of fishing gear on benthic habitats and species, Navigational aids and seabed monitoring:
- Section 3.4.12 ETP Species and Sensitive Marine Habitats
- Section 4.1.2 Harmonization outcomes, Table 25, PI 2.4.1 and 2.4.2.
- Evaluation Table for PI 2.4.1: Norway NEA cod and haddock – Trawls. Rationale

None of this has resulted in changes to previously allocated scores.

APPENDIX 7 SCORING OF OVERLAPPING FISHERIES

Table 59 NEA cod - scoring of Principle 1 in overlapping fisheries

Fishery	Norway North East Arctic cod	Russian Federation Barents sea cod and haddock	AGARBA Spain Barents Sea cod	Barents Sea cod (Ocean Trawlers)	Comapêche and Euronor cod	Faroe Islands North East Arctic cod and haddock	Greenland cod	UK Fisheries/DFFU/Doggerbank Northeast Arctic cod	FIUN Barents & Norwegian Seas cod
MSC status	Reassessment 2014/2014	Certified May 2014	Certified 2013	Certified 2010	Certified 2012	Certified 2012	In assessment	Certified 2012	Certified 2013
FAO Area	27	27	27	27	27	27		27	27
ICES area	I & II	I & II	I & II	I & II	I & II	I & II	I & II	I & II	Ia, Ib, IIa, IIb
Harvest method	Trawl/longline/gill-net/Danish seine/hook and line gears	Bottom trawl	Bottom trawl	Demersal trawl	Demersal otter trawl	Demersal trawl	Demersal trawl	Demersal otter trawl	Demersal trawl / longline
1.1.1	100	90	100	100	95	100	100	95	100
1.1.2	90	90	80	80	90	95	100	90	80
1.1.3	NA	NA	NA	NA	NA	NA	NA	NA	NA
1.2.1	100	95	85	75	90	100	100	90	85
1.2.2	100	100	80	80	90	95	100	90	80
1.2.3	90	90	90	70	95	90	90	95	90
1.2.4	95	90	90	90	90	95	95	90	90

Table 60 NEA haddock - scoring of Principle 1 in overlapping fisheries

Fishery	Norway North East Arctic haddock	Russian Federation Barents sea cod and haddock	Barents Sea haddock (Ocean Trawlers)	Comapêche and Euronor haddock	Faroe Islands North East Arctic cod and haddock	Greenland haddock	UK Fisheries/DFFU/ Doggerbank Northeast Arctic haddock	FIUN Barents & Norwegian Seas haddock
MSC status	Reassessment 2014/2014	Certified May 2014	Certified 2010	Certified 2012	Certified 2012	In assessment	Certified 2012	Certified 2013
FAO Area	27	27	27	27	27	27	27	27
ICES area	I & II	I & II	I & II	I & II	I & II	I & II	I & II	Ia, Ib, IIa, IIb
Harvest method	Trawl/longline/ gill-net/Danish seine/hook and line gears	Bottom trawl	Demersal trawl	Demersal otter trawl	Demersal trawl	Demersal trawl	Demersal otter trawl	Demersal trawl / longline
1.1.1	100	90	100	95	100	100	95	100
1.1.2	90	90	80	80	95	100	80	80
1.1.3	NA	NA	NA	NA	NA	NA	NA	NA
1.2.1	100	95	80	90	100	100	90	80
1.2.2	100	100	80	90	95	100	90	80
1.2.3	90	90	70	95	90	90	95	80
1.2.4	95	90	85	90	95	95	90	85

Table 61 NEA cod & haddock - scoring of Principle 2 for trawl in overlapping fisheries

Fishery	Norway North East Arctic cod & haddock	Russian Federation Barents sea cod and haddock	AGARBA Spain Barents Sea cod	Barents Sea cod & haddock (Ocean Trawlers)	Comapêche and Euronor cod & haddock	Faroe Islands North East Arctic cod and haddock	Greenland cod & haddock	UK Fisheries/ DFFU/ Doggerbank Northeast Arctic cod & haddock	FIUN Barents & Norwegian Seas cod & haddock
MSC status	Reassessment 2014/2014	Certified May 2014	Certified 2013	Certified 2010	Certified 2012	Certified 2012	In assessment	Certified 2012	Certified 2013
FAO Area	27	27	27	27	27	27		27	27
ICES area	I & II	I & II	I & II	I & II	I & II	I & II	I & II	I & II	Ia, Ib, IIa, IIb
Harvest method	Trawl	Bottom trawl	Bottom trawl	Demersal trawl	Demersal otter trawl	Demersal trawl	Demersal trawl	Demersal otter trawl	Demersal trawl
2.1.1	80	85	80	75	80	90	85	80	70
2.1.2	95	90	85	75	90	95	90	90	75
2.1.3	85	80	70	90	90	85	90	90	80
2.2.1	90	80	100	80	100	100	80	100	80
2.2.2	85	90	80	85	100	95	95	100	90
2.2.3	85	90	80	80	90	85	80	100	90
2.3.1	75	90	85	80	90	80	85	90	85
2.3.2	85	80	75	80	85	85	85	85	80
2.3.3	80	80	75	80	80	80	80	80	80
2.4.1	70	80	70	60	70	80	80	70	60
2.4.2	85	80	75	75	80	95	85	80	65
2.4.3	90	90	75	80	80	95	85	80	90
2.5.1	95	100	90	90	80	95	100	90	90
2.5.2	85	95	90	80	100	95	90	100	85
2.5.3	95	95	90	95	100	95	95	100	90

Table 62 NEA cod & haddock - scoring of Principle 2 for longline in overlapping fisheries

Fishery	Norway NEA cod & haddock	FIUN Barents & Norwegian Seas cod & haddock
MSC status	Reassessment 2014/2014	Certified 2013
FAO Area	27	27
ICES area	I & II	Ia, Ib, IIa, IIb
Harvest method	Longline	longline
2.1.1	80	65
2.1.2	90	75
2.1.3	85	80
2.2.1	90	80
2.2.2	85	90
2.2.3	85	90
2.3.1	75	85
2.3.2	85	80
2.3.3	80	80
2.4.1	95	100
2.4.2	85	90
2.4.3	90	95
2.5.1	95	90
2.5.2	85	85
2.5.3	95	90

Table 63 NEA cod & haddock - scoring of Principle 3 in overlapping fisheries

Fishery	Norway North East Arctic cod & haddock	Russian Federation Barents sea cod and haddock	AGARBA Spain Barents Sea cod	Barents Sea cod & haddock (Ocean Trawlers)	Comapêche and Euronor cod & haddock	Faroe Islands North East Arctic cod and haddock	Greenland cod & haddock	UK Fisheries/ DFFU/ Doggerbank Northeast Arctic cod & haddock	FIUN Barents & Norwegian Seas cod & haddock
MSC status	Reassessment 2014/2014	Certified May 2014	Certified 2013	Certified 2010	Certified 2012	Certified 2012	In assessment	Certified 2012	Certified 2013
FAO Area	27	27	27	27	27	27		27	27
ICES area	I & II	I & II	I & II	I & II	I & II	I & II	I & II	I & II	Ia, Ib, IIa, IIb
Harvest method	Trawl/longline/ gill-net/Danish seine/hook and line gears	Bottom trawl	Bottom trawl	Demersal trawl	Demersal otter trawl	Demersal trawl	Demersal trawl	Demersal otter trawl	Demersal trawl & longline
3.1.1	90	95	95	95	90	95	95	90/70	95
3.1.2	100	90	85	85	80	95	85	80/70	75
3.1.3	100	100	100	100	100	100	90	100/100	80
3.1.4	90	90	80	80	80	100	80	80/80	80
3.2.1	90	90	90	90	90	90	90	90/90	90
3.2.2	90	80	90	80	90	95	85	90/70	80
3.2.3	100	100	95	80	100	100	100	100/100	80
3.2.4	100	80	90	90	90	90	90	90/90	80
3.2.5	100	80	90	80	90	80	90	90/70	80

APPENDIX 8 VARIATION REQUEST AND RESPONSE – IPI STOCK(S)

Marine Stewardship Council - Variation Request Form V1.3

Date submitted to MSC	*[please note the MSC will usually respond within fourteen days but for complex variations a longer time may be necessary]*
Conformity Assessment Body	DNV GL Business Assurance Norway
Fishery Name/CoC Certificate Number	Norway North East Arctic cod fishery
Lead Auditor/Programme Manager	Team leader: John Nichols Project manager: Guro Meldre Pedersen
Scheme requirement(s) to vary from	MSC CR v1.3 27.4.10 If IPI stocks are identified and are below the level of 15% specified in 27.4.9.1.c), the CAB shall , as early as practicable in the assessment process, and following the variation request procedure set out in Part A, clause 4.12, submit a variation request to the requirements 27.4 to the MSC to either: - **A27.4.10.1 Allow fish or fish products to be considered as coming from IPI stocks to enter into chains of custody, or** - B27.4.10.1 Allow an exemption to requirements for IPI stocks.
Is this variation sought in order to undertake an expedited P1 assessment (CR annex CL)?	No

1. Proposed variation
Fish and fish products to be considered as coming from IPI stocks – Norwegian coastal cod - should be allowed to enter into chains of custody (A27.4.10.1).

2. Rationale/Justification
The Norwegian Coastal Waters cod stock inhabits the Norwegian fjords and the Norwegian coastal zone out to 12nml. Within the 12nml coastal zone it is found together with the Northeast arctic cod offshore cod stock and is taken in combined catches in that area. The two components cannot be separated in the catches or during landings. They are only separable by apportioning catches taken in that area by scientific sampling of the landings. The separation method is based on the microscopic analysis of differences in the otolith type and structure. On the basis of this apportioning method the total catch of Norwegian coastal cod in 2013 in the commercial landings was 22.5kt. The total combined commercial catch of NEA cod and coastal cod in 2013 was 988.5kt and the Norwegian catch was 461.5kt. Therefore the proportion of Norwegian coastal cod in the total combined catch was 2.3 % and the proportion in the total Norwegian catch was 4.9%. On this basis the Norwegian coastal cod qualifies as an IPI stock because it cannot be separated in the catches from cod of the Northeast Arctic stock and it forms less than 15% of the total combined catches of the two stock components in the 2013 fishery. Coastal cod is not an ETP species, nor are the stocks certified separately. The requirements for IPI stocks in Annex CH shall apply to the assessment.

3. Implications for assessment (required for fisheries assessment variations only)
The requirements for IPI stocks in Annex CH shall apply to the assessment.

4. Have the stakeholders of this fishery assessment been informed of this request? (required for fisheries assessment variations only	No, the client has been informed in writing and stakeholders will be informed once the variation is granted.

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Guro Meldre Pedersen

Global seafood coordinator

DNV GL - Business Assurance

Veritasveien 1, Høvik 1363

Norway

Sent by email

Date: 10 September 2014

Subject: Request for variation to the MSC Certification Requirement CR A 27.4.10.1 for the Norway north east Arctic Cod fishery

Dear Guro

I write with reference to your submission on 2nd July, 2014 of a request for variation to the MSC Certification Requirement CR A27.4.10.1 to allow fish and fish products to be considered as coming from IPI stocks – Norwegian coastal cod –to enter into chains of custody.

As you are aware, the CR procedures relating to IPI stocks are integral to ensuring all MSC accredited Conformity Assessment Bodies operate in a consistent and transparent manner. The MSC intends that these requirements be met across all fisheries and CoC certificate holders, except in exceptional, well-justified circumstances, as part of the MSC programme.

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MSC notes the factors presented in your letter supporting your request, including:

- That Norwegian coastal cod is caught together with the off-shore cod stock within the 12nm Norwegian coastal zone.
- That the two stocks cannot be separated in the catches or during landings and are only separable by apportioning catches taken in that area by scientific sampling of the landings. The separation method is based on the microscopic analysis of differences in the otolith type and structure.
- That the proportion of Norwegian coastal cod in the total combined catch was 2.3 % and the proportion in the total Norwegian catch was 4.9% in 2013.
- Coastal cod should therefore qualify as an IPI stock because it cannot be separated in the catches from cod of the Northeast Arctic stock, it forms less than 15% of the total combined catches of the two stock components, it is not an ETP species and it is not certified separately.
- If accepted, the requirements for IPI stocks in Annex CH shall apply to the assessment.

Given the rationale provide, the MSC is willing to grant a variation to the CR in this case subject to the following conditions:

- That all stakeholders are notified that coastal cod shall be treated as an IPI stock and that they will enter chain of custody.
- That DNV assesses the stock status of coastal cod following the procedures in Annex CH

If you have any questions regarding this response, please do not hesitate to contact Robert Lefébure, the Fisheries Assessment Manager for this fishery either by email, Robert.lefebure@msc.org or phone +44 (0)20 7246 8935.

Best regards,

Dan Hoggarth

Fisheries Oversight director
Marine Stewardship Council

APPENDIX 9 VARIATION REQUEST AND RESPONSE – IPI STATUS EXTENDED FOR RECERTIFICATION PERIOD

Marine Stewardship Council - Variation Request Form V1.3

Date submitted to MSC	20.11.2014
Conformity Assessment Body	DNV GL
Fishery Name/CoC Certificate Number	Norway North East Arctic cod fishery
Lead Auditor/Programme Manager	Team leader: John Nichols DNV GL project manager: Guro Meldre Pedersen
Scheme requirement(s) to vary from	CH4.1 The CAB shall only allow defined and limited proportions of catches from MSC approved IPI stocks to enter into certified chains of custody and use the MSC ecolabel for a maximum of one certification period.
Is this variation sought in order to undertake an expedited P1 assessment (CR annex CL)?	No

1. Proposed variation
DNV GL proposes that catches of IPI stocks – Coastal cod – in the Norway NEA cod fishery are allowed to enter into certified chains of custody and use the MSC ecolabel for the full lifetime of the certificate to be issued following the reassessment of the Norway NEA cod fishery.

2. Rationale/Justification

Background

The Norwegian coastal cod stock inhabits the Norwegian fjords and the coastal zone out to 12nml where it may mix with Northeast Arctic cod at various stages in its life history. The coastal cod catch is taken entirely within the Norwegian 12nml zone. Coastal cod can be identified retrospectively in the landings by scientific sampling to examine morphometric characters in particular the otolith. However they cannot be separated by fishers either on board or in the landings.

As a consequence the commercial landings can be accurately quantified but there is an unrecorded recreational fishery taking only coastal cod. Removals by the recreational fishery are not estimated but are assumed by the Arctic Fisheries Working Group not to merit inclusion in the overall assessment. For an example their estimate of the coastal cod catch in 2013 represented just 2.3% of the total Northeast Arctic cod catch, 4.4% in 2012. The recreational fishery is very much in line with the basic principles of PI 3.1.1 d in respecting the rights of people dependent on fishing for food or livelihood.

Rationale

- Initially the assessment of this fishery was split into offshore and inshore cod
- The offshore component was initially certified in April 2010
- The inshore component was initially certified in October 2011
- The offshore and inshore components were combined in November 2011 through a variation
    - The new surveillance schedule will follow the shorter of the two schedules (i.e., the offshore certificate schedule).
    - On recertification, the inshore and offshore fisheries will be assessed jointly.
    - Where the inshore components have slightly different conditions, they will be evaluated according to the timescale established in the inshore fishery Public Certification Report. (If necessary, these timescales would be continued into the recertification period, assuming progress is on-target for completion.)
- The initial certification set out a Condition (which remains in place) which included the coastal cod.
- Coastal cod was accepted as IPI species following a variation requested by the CAB after the initial assessments were completed, in November 2011, and has therefore not been in effect for a full certification period.

Our recent discussions with the client have confirmed to us that the client, whilst having been

made aware of the IPI designation, did not fully understand the implications and consequences of that IPI status. Nevertheless considerable progress has been made in addressing the Condition which does feed positively into an eventual satisfactory outcome for the quantitative assessment of the Coastal cod stock.

The level of scientific sampling of the inshore commercial landings is satisfactory, but there is a need to improve the estimation of the quantity of cod caught in the recreational fishery. In this context the client is in discussion with both the Norwegian fisheries ministry and scientists to seek a way forward. It is a strong evidence of the commitment of the client to satisfactorily resolve these issues that they have now appointed a staff member with a full time remit of involvement with the MSC process. He has only been in post for four weeks but we have already had a meeting with him to discuss this IPI issue and he is fully aware of the need to make progress.

Progress has already been made at the national level with the formulation of a coastal cod rebuilding plan which has been evaluated and endorsed by ICES as provisionally consistent with the precautionary approach. Whilst this plan is working well to reduce fishing mortality and stabilise the stock it is currently only a trends based stock assessment using catch data and a single survey abundance index. We do not at present consider this stock assessment to be a sound basis for a Principle 1 assessment of coastal cod. The client, the Norwegian fisheries ministry and IMR need more time to improve the reliability of the total catch data in particular to be able to better quantify the recreational catch.

3. Implications for assessment (required for fisheries assessment variations only)
Allowing defined and limited proportions of Coastal cod catches to enter into certified chains of custody and use the MSC ecolabel for the suggested defined period would not impact the assessment of the Norway North East Arctic cod fishery. On the contrary; it would create incentives for the client to continue the work to promote the Coastal cod management to a status where the stock is certifiable against Principle 1.

4. Have the stakeholders of this fishery assessment been informed of this request? (required for fisheries assessment variations only	No – stakeholders will be informed if the variation is granted.

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Guro Meldre Pedersen

Global seafood coordinator

DNV GL - Business Assurance

Veritasveien 1, Høvik 1363

Norway

Sent by email

Date: 26 November 2014

Subject: Request for variation to the MSC Certification Requirement CR CH 4.1 for the Norway North East Arctic Cod fishery

Dear Guro

I write with reference to your submission on 20th November, 2014 of a request for variation to the MSC Certification Requirement CR CH 4.1 to allow fish and fish products to be considered as coming from IPI stocks – Norwegian coastal cod –to enter into chains of custody for an additional full certification period, pending a successful re-assessment.

As you are aware, the CR procedures relating to IPI stocks are integral to ensuring all MSC accredited Conformity Assessment Bodies operate in a consistent and transparent manner. The MSC intends that these requirements be met across all fisheries and CoC certificate holders, except in exceptional, well-justified circumstances, as part of the MSC programme.

MSC notes the factors presented in your letter supporting your request, including:

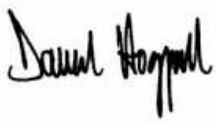
- That a variation to enter Coastal cod into CoC as an IPI species was accepted after the initial assessments were completed, in November 2011, and has therefore not yet been in effect for a full certification period.
- That considerable progress has been made since then, which does feed positively into an eventual satisfactory outcome for the quantitative assessment of the Coastal cod stock.
- The client is in discussions with the Norwegian fisheries ministry and scientists improve the estimation of the quantity of cod caught in the recreational fishery
- Progress has also already been made at the national level with the formulation of a coastal cod rebuilding plan which has been evaluated and endorsed by ICES as provisionally consistent with the precautionary approach.
- DNV do not at present consider this stock assessment to yet be at a sound basis for a Principle 1 assessment of coastal cod. The client, the Norwegian fisheries ministry and IMR therefore need more time to improve the reliability of the total catch data in particular to be able to better quantify the recreational catch.

Given the rationale provide, the MSC is willing to grant a variation to the CR in this case subject to the following conditions:

- That all stakeholders are notified that the IPI status of coastal cod will remain in effect for another certification period, pending the successful re-assessment of the Norway NEA Cod fishery.
- MSC will <u>not</u> grant any further variation to this effect, to extend the allowance beyond the next certification period. This means that by the next re-assessment, the fishery will have to either include coastal cod as a P1 species, or have mechanisms in place to reduce their catches below 2% of the total catch, or find means to effectively separate their catches on landing.
- Following Annex CH, the team should place a recommendation on this fishery to achieve one of these goals and progress against this recommendation should be properly accounted for in the annual surveillance reports.

If you have any questions regarding this response, please do not hesitate to contact Robert Lefébure, the Fisheries Assessment Manager for this fishery either by email, Robert.lefebure@msc.org or phone +44 (0)20 7246 8935.

Best regards,



Dan Hoggarth, Fisheries Oversight director
Marine Stewardship Council

APPENDIX 10 VARIATION REQUEST AND RESPONSE – PARTIAL SITE VISIT

Marine Stewardship Council - Variation Request Form V1.3

Date submitted to MSC	16.06.2014
Conformity Assessment Body	Det Norske Veritas Certification AS
Fishery Name/CoC Certificate Number	Norway North East Arctic cod and Norway North East Arctic haddock
Lead Auditor/Programme Manager	Team leader: John Nichols Project manager: Guro Meldre Pedersen
Scheme requirement(s) to vary from	CR 27.9.3
Is this variation sought in order to undertake an expedited P1 assessment (CR annex CL)?	No

1. Proposed variation
The stakeholder consultations for the reassessment of the Norway NEA cod and haddock fisheries will take place in Bergen Monday 23 June 2014 (meetings with Institute for Marine Research and Directorate of Fisheries) and in Oslo Tuesday 24 June 2014 (meetings with Ministry for Trade, Industry and Fisheries and client representatives). Following stakeholder meetings, the team will stay in Oslo for scoring of the fisheries. The assessor for principle 3 will not participate in the meetings day 1.

2. Rationale/Justification
This request does not alter the conformity of the certificate holder with the relevant MSC standard. Required information gathering during the meetings day 1 will be ensured through prepared questions from the P3 assessor managed by the team representatives present. The team will report back to the P3 assessor on day 2 and ensure that he has been given a full briefing on all the information gathered. The P3 assessor will be present in stakeholder meetings with client and authorities, and in scoring meetings. Change in team composition was announced 17 June 2014. The new P3 assessor is unable to join the team on day 1 of the site visit on short notice due to previous commitments, but will join the team for day 2 stakeholder consultations and scoring meetings scheduled for the remaining of the week.

3. Implications for assessment (required for fisheries assessment variations only)
The impacts on the reassessment of the Norway NEA cod and haddock fisheries will be minimised through preparation of questions from the P3 assessor for necessary information gathering through the team members present during the stakeholder meetings to take place day 1. The P3 assessor will join the team for stakeholder consultations day 2 and scoring meeting the commencing days. The P3 will have the opportunity to contact entities consulted day 1 in the event of any outstanding issues. DNV GL would also like to point out the following factors that suggest that risk to this variation are low: - The fisheries undergoing reassessment have not had any conditions related to principle 3 in the previous assessments - The assessment team has endeavoured to schedule the P3 relevant stakeholder meetings to day 2, so that the P3 expert does not miss out on the essential meetings. - The P3 assessor will participate in meetings with the authorities and client to gather relevant information. - The full team will be gathered for scoring meetings.

4. Have the stakeholders of this fishery assessment been informed of this request? (required for fisheries assessment variations only	No, stakeholders will be informed if VR is granted.

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Guro Meldre Pedersen

Global seafood coordinator

DNV GL - Business Assurance

Veritasveien 1, Høvik 1363

Norway

Sent by email

Date: 20 June 2014

Subject: Request for variation to the MSC Certification Requirement CR 27.9.3 for the Norway north east Arctic Cod and Haddock fisheries

Dear Guro

I write with reference to your submission on 16th June, 2014 of a request for variation to the MSC Certification Requirement CR 27.9.3 to allow the newly appointed P3 expert to not participate in stakeholder meetings on Day 1 of the on-site assessment.

As you are aware, the CR procedures relating to team on-site assessments in 27.9.3 are integral to ensuring all MSC accredited Conformity Assessment Bodies operate in a consistent and transparent manner. The MSC intends that these requirements be met across all fisheries and CoC certificate holders, except in exceptional, well-justified circumstances, as part of the MSC programme.

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MSC notes the factors presented in your letter supporting your request, including:

- That change in team composition was not announced until 17 June 2014 and the P3 assessor will be unable to join the team on day 1 of the site visit on short notice due to previous commitments, but will join the team for day 2 for the remaining of the week.

- Required information gathering during the meetings day 1 will be ensured through prepared questions from the P3 assessor managed by the team representatives present. The team will report back to the P3 assessor on day 2 and ensure that he has been given a full briefing on all the information gathered

- The P3 assessor will also have the opportunity to contact stakeholders consulted day 1 in the event of any outstanding issues.

- In addition, the fisheries undergoing reassessment have not had any conditions related to principle 3 in the previous assessments and the team has endeavoured to schedule the P3 relevant stakeholder meetings to day 2, so that the P3 expert does not miss out on the essential meetings.

Given the rationale provide, the MSC is willing to grant a variation to the CR in this case subject to the following conditions:

- That all stakeholders are notified of these changes to on-site team presence.

If you have any questions regarding this response, please do not hesitate to contact Robert Lefébure, the Fisheries Assessment Manager for this fishery either by email, Robert.lefebure@msc.org or phone +44 (0)20 7246 8935.

Best regards,

Dan Hoggarth

Fisheries Oversight director

Marine Stewardship Council

APPENDIX 11: CLIENT REVIEW OF PRELIMINARY DRAFT REPORT

NORGES FISKARLAG
FISKARLAGETS SERVICEKONTOR AS

Det Norske Veritas
v/ Guro Meldre Pedersen

Vår dato	Vår referanse	Vår sakbehandler	Deres referanse
26.11.2014	2014/00456-2	Tor Bjørklund Larsen/	

Client Review Reassessment of NEA Cod and Haddock

The Norwegian Fisherman's Association (NFA) has now read the client draft version of the Reassessment report for the Norway North East Arctic cod and haddock fishery, and would like to submit our comments. First, we would like to congratulate Det Norske Veritas and the expert team on a thorough and well-written report. It is the opinion of NFA that the report as a whole gives a very accurate description of the Norwegian cod and haddock fisheries, and that it clearly demonstrates the team's in-depth scientific knowledge in the field. For this reason, we have few areas where we wish to give substantive feedback or corrections to the report. We have come across the expected share of minor typos, formatting mistakes and similar. For example, fixing the page numbering, so it runs in one sequence throughout the whole report, would make it easier to reference. Due to time constraints and lack of importance, we will not address such minor issues any further.

NFA would like to address two issues that also have consequences for conditions set on the fishery.

1)Tusk bycatch in the longline fleet.
References: Condition 1, PI 2.1.1, table 16, 17, 18.

The MSC criterion for "main retained species" is that the species catch must exceed 5 % of total volume or value. Table 17 shows aggregate numbers from the Directorate of Fisheries. This places tusk caught by the longline fleet at 6,5 % of the total volume, thus pushing it over the 5 % threshold and leading the assessment team to consider it a "main retained species".

First off, NFA would like to point out that the assessment team has made no incorrect conclusions from the information they were presented by NFA and the Directorate at the initial site visit. However, it seems obvious to NFA that the assessment team has based this conclusion on an incomplete data basis and/or verbal input. We would therefore like to provide additional information, as this seems to have critical influence on the setting of condition 1.

The fact of the matter is that a major portion of the reported 8,894 MT of tusk in table 17/18 originates from a distinctly separate fishery, separated by time and space from the cod and haddock fisheries under certification. Removing the catch from this targeted ling/tusk fishery from the cod and haddock fishery bycatch figures, places the tusk significantly below the 5 % threshold.

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Organisasjonsnr.: Norges Fiskarlag 938 500 290 Fiskarlagets Servicekontor 984 152 094

Qualitative evidence

The principal cod fishery takes place outside the Lofoten Islands and northwards in Q4 and Q1. However, outside of the cod fishing season, or when cod quotas are caught, many longliners will specifically target ling and tusk along the Norwegian shelf edge "Eggakanten" from Vesterålen and southwards beyond 62° into EU waters outside the British Isles. This fishery is done by offshore longliners, as well as coastal longliners (fishing in the Nordland area), mainly in Q2 and Q3.

This can be confirmed anecdotally by the Norwegian Fisherman's Association as the client, and this fishery is also regarded by those involved to be a fairly "clean" ling and tusk fishery, although we expect there is a certain overlap with the cod and haddock fisheries in season and geography.

Statistical evidence

When presented with more detailed statistics from the Directorate of Fisheries, the separation of the tusk/ling and the cod/haddock fisheries becomes evident.

Please note, that the data received from the Directorate only contains catches from 2012 and 2013. The data used by the assessment team is an average of 2011-2013. Total tusk catches in Norway have fallen during this 3-year period; 14.754MT (2011), 13.439 (2012), 11.432 (2013). In this argument, we will be using 2013 data, which is more than sufficient to show that the tusk should be exempt from the main retained species. 3-year average data can also be obtained from the Directorate with more time, and will only serve to increase this margin.

Table 1 in the attached spreadsheet shows the catches of tusk, ling, cod and haddock with the statistical catch areas sorted from high to low (statistical areas map attached). This shows that the top 5 catch areas for both ling and tusk are 05, 06, 07, 42 and 43. Only area 5 has significant overlap with cod and haddock.

Area 42 and 43 are south of 62° and must therefore naturally be exempt. But for the sake of the argument that this is a separate fishery, table 2 shows total catches in area 06, 07, 42 and 43. This shows that 84 % of the catches in this area consist of tusk and ling, together with 6 % cod and 10 % haddock.

Area 05 is important to investigate more closely, since it has the highest catches of tusk, as well as a significant overlap with cod and haddock in total catches. Table 3 shows the catches of tusk in area 5 by month. Figure 1 below plots these data in a chart, and this strongly supports what our member skippers tell us: tusk is targeted separately together with ling between the main seasons for cod and haddock. Table 4 and 5 show a similar pattern for areas 06 and 07, where there in any case is less overlap with cod and haddock year round.

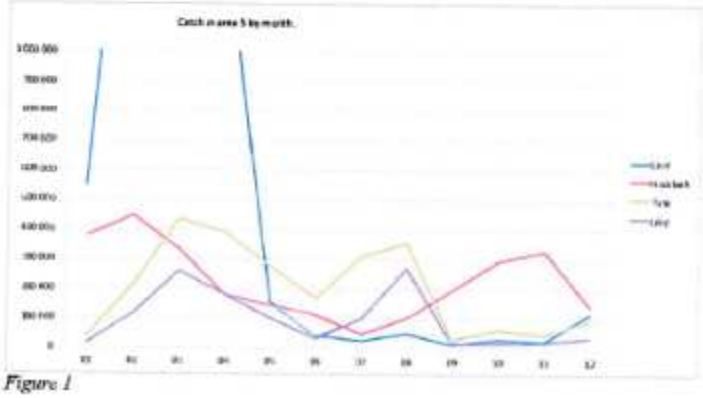

Figure 1

2

Through this, we have identified areas 05, 06, and 07 as the main geographical area for tusk catches north of 62°. Quite a deal of tusk is also caught in areas 04, 12 and 03, in directed fisheries. However, the influx of cod and haddock in these catch areas, makes it difficult to separate the fisheries in the statistics. We will therefore leave them out to further increase the safety margin of our argument. From NFA's knowledge of this fishery, we would like to mention that the majority of the tusk caught in areas 05, 06, and 07 are caught on separate trips by a separate "fishery" from cod and haddock. The purpose of this exercise is however to clearly demonstrate the separation of these fisheries using statistics. Table 6 shows the combined catches in areas 05, 06, and 07 by month. This is plotted in Figure 2 below, and strengthens the trend shown in figure 1.

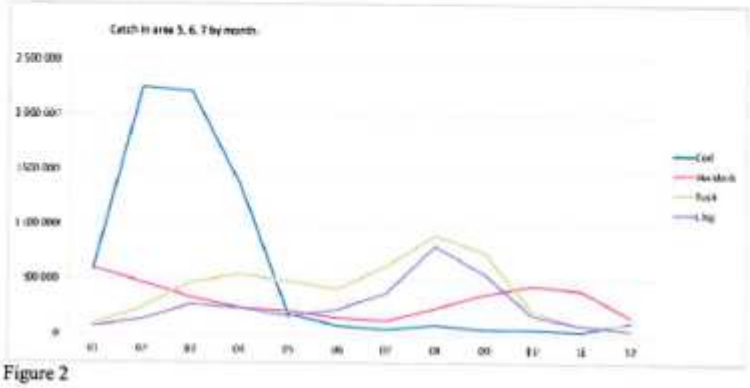

Figure 2

The graph can easily be interpreted that the ling and tusk fishery begins in march/april and is at its height in in the autumn, before quickly ending in October, giving way to the haddock fishery. The spring months of the fishery are "obscured" by parallel cod catches in March and April.

A very modest approach would then be to make an assumption that the tusk and ling fishery runs in areas 05, 06, and 07 from May to September. Tusk caught outside this period can be regarded as bycatch in the cod and haddock fisheries (although most of it in reality is not). Total catches in this area/period is shown in table 7 and illustrated in figure 3 below. The "directed" catch of tusk in 2013 is then 3.205MT

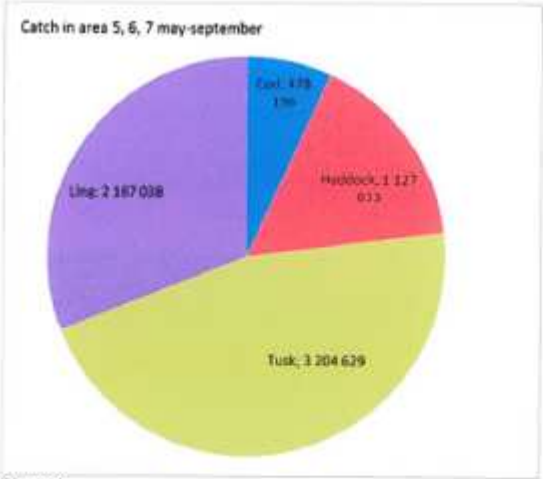

Figure 3

Conclusion

Table 17 and 18 in the client review draft report incorrectly notes a tusk bycatch averaging 8.894MT (2011-2013) in the cod and haddock longline fisheries. A large portion of this tusk catch is in fact from a distinctly separate fishery targeting tusk and ling. As we have demonstrated, you can safely subtract at least 3.205MT (using 2013 figures). This puts tusk bycatch at 4,2 %.

Consequently, we urge the assessment team to take this extra information into consideration and remove condition 1.

Notes

- As we have pointed out several times in this argument, very large margins of safety have been used in selection of all data. Applying a 2011-2013 average will also decrease the percent bycatch of tusk further. We have requested the 2011 and 2012 data from the directorate, and are happy to supply them if requested by the CAB.

- The same argument also applies to a large degree to other species in table 17 by various gear types, among others, Greenland halibut, lumpfish, flatfishes and hake. In this case all these fisheries are under the 5 % threshold, and the burden of making these tailored statistics, does not warrant us building the case for every single species, as it has no implications for the report. It is however an issue to be aware of in future certifications.

Attachments

Tusk ling fishery client review NEA cod and haddock.xls
-Statistical areas map

4

2)Porpoise bycatch – gillnet fishery

References: Condition 2 and 3, PI 2.3.1, 2.3.2

The extent of the porpoise bycatch, reported at a possible level of 6900 animals per year by Bjørge *et. al.* (2013). The assessment report lacks one nuance that was not made clear in their report. In the sample used: 17 % -20 % of the porpoises were caught in monkfish gillnets. As a result of this, the correct figure in the report for possible porpoise mortality in the inshore cod gillnet fishery should be approximately 5500-5700.

Whether it is 5500 or 6900 porpoises, the high figure surprises and puzzles the NFA. The basis of the data used for estimating the porpoise bycatch has many potential shortcomings. For instance, it extrapolates data from a small sample of fishing vessels. Nevertheless, such reports must be taken seriously, and looked at in more depth. This is also what the conditions call for.

Also, the reference fleet data cited in the report only identified cod and monkfish gillnets as potentially problematic with regards to porpoise bycatch (together with lumpsucker nets, which was omitted due to its marginal use). Condition 2 and 3 link both cod and haddock gillnetting to the bycatch. This should be clarified in the report.

In conclusion, we ask that the figure of porpoise bycatch is corrected in the report, and that it is clarified that the potential problem is related to cod gillnets. This set aside, the foundation of the conditions still seems justified to the NFA.

With kind regards
NORGES FISKARLAG/Norwegian Fisherman's Association

Erling Holmeset jr.

Tor Bjørklund Larsen

5

Note: Numbering of conditions was changed after the initial client review; the numbering referred to in the client review in Appendix 11 does not apply.

Appendix 11.1: Assessment team response to client comments

Based on client comments in Client review of the Preliminary draft report and on the new information provided by the client, the assessment team made the following changes to this report:

- Sections 3.4.9.4 Tusk and 3.4.9.5 Ling: the report body text was updated and tables and figures with additional information provided by the client included.
- Scoring rationale of PI 2.1.1 scoring issue a for Norway NEA cod and haddock longline fisheries amended and scoring at SG80 revised from N to Y. Total score changed to 80.
- Summary of scores and Principle level scores was amended accordingly.
- The overview of scoring elements in section 4.4.3 was amended to signify tusk as a retained species in the Norway NEA cod and haddock longline fisheries, not a main retained species.

About DNV GL

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