DNV

WHEN TRUST MATTERS

Announcement Comment Draft Report

NORWAY GREENLAND HALIBUT

Marine Stewardship Council fisheries assessments

Conformity Assessment Body (CAB):	DNV Business Assurance
Assessment team	Geir Honneland, Lucia Revenga, Giuseppe Scarcella
Fishery client	Norges Fiskarlag
Assessment Type	Initial Assessment
[Date]	25.11.21

Introduction

This template details the information required from Conformity Assessment Bodies (CABs) when creating following assessment reports:

- Announcement Comment Draft Report (FCP v2.2 Section 7.10)
- Client and Peer Review Draft Report (FCP v2.2 Section 7.19)
- Public Comment Draft Report (FCP v2.2 Section 7.20)
- Final Draft Report (FCP v2.2 Section 7.22)
- Public Certification Report (FCP v2.2 Section 7.24)

If any discrepancies are noted between this template and the MSC Fisheries Standard, CABs and teams shall use the wording of the MSC Fisheries Standard. CABs or teams may make amendments to the scoring tables to reflect multiple Units of Assessment or multiple scoring elements (e.g. extra rows under each scoring issue). CABs and teams shall ensure it is clear which Unit of Assessment or scoring element is being referenced. CABs shall provide rationale for all Units of Assessment and scoring elements and may group rationales when addressing multiple Units of Assessment or scoring elements.

For reassessments, CABs shall report clearly in the Conditions Section to all parties which conditions have been closed at the end of the certification, and whether any remain open and why.

Please complete all unshaded fields. For all notes and guidance indicated in *italics*, please delete and replace with your specific information. All grey boxes containing instructions may be deleted, e.g. the 'Introduction' section.

Unless otherwise indicated in the notes and guidance, CABs shall draft all sections in the reporting template at the Announcement Comment Draft Report stage. CABs shall update each section as necessary as per the Fisheries Certification Process at each subsequent reporting stage. CABs shall complete all sections at the Final Draft Report stage. CABs shall finalise each section at the Public Certification Report stage as per FCP v2.2 Section 7.24.

CABs shall inform the reader why some sections are blank and when they will be populated.

1 Contents

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2 Glossary

2.1 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
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
SAM	State-space assessment model
SG	Scoring Guidepost
SMH	Sensitive marine habitat

TAC	Total Allowable Catch
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

2.2 Stock assessment reference points

B_0	The (spawning) biomass expected if there had been no fishing (assuming recruitment as estimated through stock assessment).
B_{lim}	Spawning biomass limit reference point, sometimes used as a trigger within harvest control rules, or defined as the point below which recruitment is expected to be impaired or the stock dynamics are unknown
B_{msy}	Spawning Biomass at which the maximum sustainable yield is expected (sometimes expressed as SB_{msy})
B_{targ}	Spawning biomass target reference point
F_{lim}	Exploitation rate limit reference point, often taken as Fmsy based on UNFSA
F_{msy}	Fishing mortality rate associated with the achieving maximum sustainable yield
F_{targ}	Fishing mortality target reference point
MSY	Maximum Sustainable Yield
MSY $B_{trigger}$	Trigger point (SSB) for stock, If SSB is below management action to reduce target fishing mortality is required

3 Executive summary

Draft determination to be completed at Public Comment Draft Report stage

This report provides information on the initial assessment of the Norway Greenland halibut fishery against Marine Stewardship Council (MSC) Fisheries Standard. The report is prepared by DNV for the client Norges Fiskarlag.

The assessment was carried out using MSC Fisheries Certification Process v2.2. For the assessment, the default assessment tree in Annex SA from the MSC Fisheries standard v2.01, without any changes, was used.

The assessment covers 4 UoAs targeting Greenland halibut with demersal trawl, longline, gillnets and Danish seine. The Greenland halibut is indigenous to the Norwegian and Barents Sea and no enhancement takes place.

The ACDR report is based on desk review of information.

The assessment process was initiated by the announcement on the MSC web-side on the xx.xx.xxxx and the site visit was conducted on the xx.xx.xxxx in (city, country).

A comprehensive programme of stakeholder consultations was carried out in xx as part of this assessment, complemented by a full and thorough review of relevant literature and data sources.

*A rigorous assessment of the MSC Principles and Criteria was undertaken by the assessment team and detailed and fully referenced scoring rationales are provided through the assessment tree scoring tables provided in chapter **Error! Reference source not found.**-of this report.*

The Eligibility Date for this assessment is the date of the publication of the PCDR.

3.1 Main strengths

Table 1 **Main strengths**

Principle	Performance Indicator	Comment
Principle 1	1.1.1 – 1.2.3 – 1.2.4	The Greenland halibut stock status is in a relatively good shape. It has been above Bpa for many years and has increased in the last seven years. The data collection process is well established both in Russia and in Norway. ICES provides a robust assessment process for the stock.
Principle 2	2.1.3, 2.4.3, and 2.5.3	There are many research institutions working in the area and much information regarding commercial stocks, benthic habitats and ecosystems involved.
Principle 3	3.1.1, 3.1.2, 3.2.2 and 3.2.3	The fishery operates within a well-established and effective legislative and management framework, with extensive consultation mechanisms and a comprehensive enforcement system.

3.2 Main weaknesses

Table 2 **Main weaknesses**

Principle	Performance Indicator	Comment
Principle 1	1.2.1 – 1.2.2	The harvest strategy and harvest control rules have not limited exploitation effectively, taking into account that catches have been higher than the recommended TAC for many years.
Principle 2	2.4.2	Client needs to take into consideration management measures applied by other MSC certified fleets in the area.
Principle 3	N/A	No particular weaknesses have been identified at ACDR stage.

3.3 Draft Determination

The draft principle scores are summarised in **Error! Reference source not found.**.

The Norway Greenland halibut fishery 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 Norway Greenland halibut fishery achieved a score of below 80 against x scoring indicators and was set x conditions and x recommendations for (continuing) certification that the client is required to address.

Based on the review, analysis and evaluation of available data for the fishery presented in this report the assessment team did not identify any issues that prevent the assessment of the xxx fishery and the assessment team recommends the certification of the fishery.

4 Report details

4.1 Authorship and peer review details

Peer reviewer information to be completed at Public Comment Draft Report stage

Table 3 Assessment team

Name	**Lucia Revenga**
Role	Team leader
Qualifications: Lucia Revenga is a marine scientist, specialized in Fisheries Biology who holds degrees in Marine Sciences and in Environmental Sciences from Cadiz University (Spain). For 5 years she worked with TRAGSA for the Spanish General Marine Secretariat, conducting research on the biology and stock status of different species, such as bluefin tunas, skipjack tunas, albacores, mackerels, sardines, eels, prawns, Norway lobsters, halibuts. She has also taken part in oceanographic surveys focused on the search of vulnerable marine ecosystems. From 2011 to 2015 she worked for IFAPA (Institute for Research and Training in Fisheries) as a Fisheries biology teacher for fishermen. She also conducted research in fishery local activities with the aim of increasing community awareness of the conservation of coastal ecosystems and encouraging sustainable fishing practices. From 2015 to 2020 she worked full time as an independent consultant, covering the roles of P2 assessor and team leader for different CABs and assessments. In 2020 she joined DNV as part of DNV MSC Fishery Global Unit. She has participated in several assessments for fisheries in the Barents Sea. Her full CV is available upon request. Her qualifications meet the competence criteria defined in Annex PC for the Team-member with expertise in the impact of fisheries on aquatic ecosystems and RBF, management systems and country knowledge: • She has an appropriate university degree • She has passed the MSC team member training • She has passed the RBF training module • She has over 3 years’ experience in research in the impact of fisheries on aquatic ecosystems • He has over 3 years’ experience as a practising fishery manager and/or fishery/policy analyst • She has no conflicts of interest in relation to the fishery under assessment. Lucia’s qualifications also meet the competence criteria defined in Annex PC for the Team-Leader and Chain of custody responsible: • She has an appropriate university degree • She has passed the MSC team leader training • She has passed the MSC Traceability training module • She has passed the MSC RBF training module • She meets ISO 19011 training requirements • She has undertaken two fishery assessments as a team member in the last five years, and • She has experience in applying different types of interviewing and facilitation techniques and is able to effectively communicate with clients and various stakeholder groups. • She has no conflicts of interest in relation to the fishery under assessment.	
Name	**Giuseppe Scarcella**

Role	Principle 1 expert

Qualifications:

Giuseppe Scarcella is an experienced fishery scientist and population analyst and modeller, with wide knowledge and experience in the assessment of demersal stocks. He holds a first degree in Marine Biology and Oceanography (110/110) from the Unversità Politecnica delle Marche, and a Ph.D. in marine Ecology and Biology from the same university, based on a thesis "Age and growth of two rockfish in the Adriatic Sea". After his degree, he was offered a job as project scientist in several research programs about the structure and composition of fish assemblage in artificial reefs, off-shore platform and other artificial habitats in the Italian National Research Council – Institute of Marine Science of Ancona (CNR-ISMAR), now Institute for Biological Resources and Marine Biotechnologies (IRBIM). During the years of employment at CNR-ISMAR first and CNR-IRBIM later he has gained experience in benthic ecology, statistical analyses of fish assemblage evolution in artificial habitats, fisheries ecology and impacts of fishing activities, stock assessment, otholith analysis, population dynamic and fisheries management. Since 2018 Dr. Scarcella is in the permanent staff od CNR-IRBIM as researcher. During the same years, he attended courses of uni-multivariate statistics and stock assessment. He is also actively participating in the scientific advice process of FAO GFCM in the Mediterranean Sea as well as in the Euroepean context. He was member of the Scientific, Technical and Economic Committee for Fisheries for the European Commission (STECF) from 2012 to 2019 and is chair of the STECF-EWG Assessment of balance indicators for key fleet segments and review of national reports on Member States efforts to achieve balance between fleet capacity and fishing opportunities.

He is author of more than 50 scientific paper peer reviewed journals and more than 150 national, and international technical reports, most of them focused on the evolution of fish assemblages in artificial habitats, stock assessment of demersal species and evaluation of fisheries management plans. For some years now, Dr Scarcella has been working in fisheries certification applying the Marine Stewardship Council standard for sustainable fisheries, currently concentrating on Principle 1 of the Standard. Furthermore, Dr Scarcella holds the credential as Fishery team leader (MSC v2.0). Giuseppe Scarcella has passed the most updated MSC training and has no Conflict of Interest in relation to this fishery. Full CV available upon request.

His qualifications meet the competence criteria defined in Annex PC for the Team-member with expertise in Fish stock assessment and biology:

- he has an appropriate university degree
- he has passed the MSC team member training
- he has passed the RBF training module
- he has over 3 years' experience in stock assessment techniques comparable with techniques used by the fishery under assessment
- he has over 3 years' experience in the biology and population dynamics of the species with similar biology.
- he has over 3 years' experience as a practising fishery manager and/or fishery/policy analyst

Name	**Lucia Revenga**
Role	Principle 2 expert

Qualifications: See above.

Name	**Geir Honneland**
Role	Principle 3 expert

Qualifications:

Geir Honneland holds a PhD in political science from the University of Oslo and an LL.M. in the law of the sea from the Arctic University of Norway. He has studied international fisheries management (with main emphasis on enforcement and compliance issues), international environmental politics and international relations in Polar regions for more than 25 years. He has been affiliated with the Fridtjof Nansen Institute in Oslo as PhD student and research fellow (1996-2006), research director (2006-2014), director (2015-2019) and now adjunct professor. Among his fisheries-related books is Making Fishery Agreements Work (Edward Elgar, 2012; China Ocean Press, 2016). Before embarking on an academic career, he worked five years for the Norwegian Coast Guard, where he was trained and certified as a fisheries inspector. Geir has been involved in MSC assessments since 2009 and has acted as P3 expert in more than 50 full assessments and re-assessments, as well as a number of pre-assessments and surveillance audits. His experience from full assessments includes a large number of demersal, pelagic and reduction fisheries in the Northeast Atlantic, the North Pacific and Southern Ocean, including crustaceans, as well as inland, bivalve and enhanced salmon fisheries. In the Northeast Atlantic, he has covered the international management regimes in the Barents Sea, Norwegian Sea, North Sea, Skagerrak, Kattegat and the Baltic Sea, and the national management regimes in Norway, Sweden, Denmark, Iceland, Faroe Islands, Greenland, Finland, Russia, Poland, the UK, the Netherlands and Germany, as well as the EU level.

His qualifications meet the competence criteria defined in Annex PC for the Team-member with expertise in management systems and country knowledge:

- he has an appropriate university degree
- he has passed the MSC team member training
- he has over 3 years' experience as a practising fishery manager and/or fishery/policy analyst
- he has no conflicts of interest in relation to the fishery under assessment.
- he has local knowledge of the country, language and local fishery context.

His full CV is available upon request.

4.1.2 Peer Reviewers

Peer reviewer information to be completed at Public Comment Draft Report stage

Peer reviewers used for this report are:

The Peer reviewers were shortlisted by the MSC Peer Review college and listed on the MSC website. A summary CV for each is available in the Assessment downloads section of the fishery's entry on the MSC website.

4.2 Version details

Table 4 Fisheries program documents versions

Document	Version number
MSC Fisheries Certification Process	**Version 2.2**
MSC Fisheries Standard	**Version 2.01**
MSC General Certification Requirements	**Version 2.4.1**
Default Assessment tree MSC Fisheries Standard v 2.01- Annex SA	**Version 2.01**
MSC Reporting Template	**Version 1.2**

5 Unit(s) of Assessment and Unit(s) of Certification and results overview

5.1 Unit(s) of Assessment and Unit(s) of Certification

5.1.1 Unit(s) of Assessment

The fishery is, to the knowledge of the assessment team, within the scope of the MSC Fisheries standard according to the following determinations:

- The target species is not an amphibian, reptile, bird or mammal.
- The fishery does not use poisons or explosives.
- The fishery is not conducted under a controversial unilateral exemption to an international agreement.
- The client or client group does not include an entity that has been successfully prosecuted for a forced or child labour violation in the last 2 years.
- The client or client group does not include an entity that has been convicted for a shark finning violation in the last 2 years.
- The fishery has mechanisms for resolving disputes and disputes do not overwhelm the fishery.
- The fishery is not enhanced or based on an introduced species.

The Unit of Assessment defines the full scope of what is being assessed and includes the Unit of Certification and any other eligible fishers.

The Unit of Assessment includes the target stock (s), the fishing method or gear type/s, vessel type/s and/or practices, and the fishing fleets or groups of vessels, or individual fishing operators pursuing that stock, including any other eligible fishers that are outside the Unit of Certification.

The Units of Assessment for this fishery assessment are specified below.

Table 5 Units of Assessment

UoA 1	Description
Species	Greenland halibut (Reinhardtius hippoglossoides)
Stock	Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic)
Fishing gear type(s) and, if relevant, vessel type(s)	Demersal trawl
Client group	Norges Fiskarlag (NFA)
Other eligible fishers	Yes. Russian and 3rd country operators are eligible fishers.
Geographical area	**FAO area:** 27. ICES I and II. **Common name of the body of water:** Barents Sea and Norwegian Sea **Local fisheries management area:** Norway Ministry of Industries, Fisheries and Innovation. Subject to the joint Norwegian/Russian Fisheries commission. **Stock region:** Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic).
Management	Subject to the joint Norwegian/Russian Fisheries commission. Managed nationally by the Norwegian Ministry of Industries, Fisheries and Innovation and in accordance with the Directorate of Fisheries, with advice from IMR and ICES.

UoA 2	Description
Species	Greenland halibut (Reinhardtius hippoglossoides)
Stock	Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic)
Fishing gear type(s) and, if relevant, vessel type(s)	Longline
Client group	Norges Fiskarlag (NFA)
Other eligible fishers	Yes. Russian and 3rd country operators are eligible fishers.
Geographical area	**FAO area:** 27. ICES I and II. **Common name of the body of water:** Barents Sea and Norwegian Sea **Local fisheries management area:** Norway Ministry of Industries, Fisheries and Innovation. Subject to the joint Norwegian/Russian Fisheries commission. **Stock region:** Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic).
Management	Subject to the joint Norwegian/Russian Fisheries commission. Managed nationally by the Norwegian Ministry of Industries, Fisheries and Innovation and in accordance with the Directorate of Fisheries, with advice from IMR and ICES.
UoA 3	**Description**
Species	Greenland halibut (Reinhardtius hippoglossoides)
Stock	Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic)
Fishing gear type(s) and, if relevant, vessel type(s)	Gillnet
Client group	Norges Fiskarlag (NFA)
Other eligible fishers	Yes. Russian and 3rd country operators are eligible fishers.
Geographical area	**FAO area:** 27. ICES I and II. **Common name of the body of water:** Barents Sea and Norwegian Sea **Local fisheries management area:** Norway Ministry of Industries, Fisheries and Innovation. Subject to the joint Norwegian/Russian Fisheries commission. **Stock region:** Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic).
Management	Subject to the joint Norwegian/Russian Fisheries commission. Managed nationally by the Norwegian Ministry of Industries, Fisheries and Innovation and in accordance with the Directorate of Fisheries, with advice from IMR and ICES.
UoA 4	**Description**
Species	Greenland halibut (Reinhardtius hippoglossoides)
Stock	Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic)

Fishing gear type(s) and, if relevant, vessel type(s)	Danish seine
Client group	Norges Fiskarlag (NFA)
Other eligible fishers	Yes. Russian and 3rd country operators are eligible fishers.
Geographical area	**FAO area:** 27. ICES I and II. **Common name of the body of water:** Barents Sea and Norwegian Sea **Local fisheries management area:** Norway Ministry of Industries, Fisheries and Innovation. Subject to the joint Norwegian/Russian Fisheries commission. **Stock region:** Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic).
Management	Subject to the joint Norwegian/Russian Fisheries commission. Managed nationally by the Norwegian Ministry of Industries, Fisheries and Innovation and in accordance with the Directorate of Fisheries, with advice from IMR and ICES.

5.1.2 Unit(s) of Certification

The Unit of certification is the unit entitled to receive the MSC certificate.
The proposed Unit of Certification includes the target stock (s), the fishing gear type(s) and, if relevant, vessel type(s) and the fishing fleets or groups of vessels or individual fishing operators pursuing that stock including entities initially intended to be covered by the certificate.

The proposed Units of Certification are provided in the Table below.

Table 6 Units of Certification

UoC 1	Description
Species	Greenland halibut (Reinhardtius hippoglossoides)
Stock	Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic)
Fishing gear type(s) and, if relevant, vessel type(s)	Demersal trawl
Client group	Norges Fiskarlag (NFA)
Geographical area	**FAO area:** 27. ICES I and II. **Common name of the body of water:** Barents Sea and Norwegian Sea **Local fisheries management area:** Norway Ministry of Industries, Fisheries and Innovation. Subject to the joint Norwegian/Russian Fisheries commission. **Stock region:** Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic).
Management	Subject to the joint Norwegian/Russian Fisheries commission. Managed nationally by the Norwegian Ministry of Industries, Fisheries and Innovation and in accordance with the Directorate of Fisheries, with advice from IMR and ICES.
UoC 2	Description

Species	Greenland halibut (Reinhardtius hippoglossoides)
Stock	Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic)
Fishing gear type(s) and, if relevant, vessel type(s)	Longline
Client group	Norges Fiskarlag (NFA)
Geographical area	**FAO area:** 27. ICES I and II. **Common name of the body of water:** Barents Sea and Norwegian Sea **Local fisheries management area:** Norway Ministry of Industries, Fisheries and Innovation. Subject to the joint Norwegian/Russian Fisheries commission. **Stock region:** Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic).
Management	Subject to the joint Norwegian/Russian Fisheries commission. Managed nationally by the Norwegian Ministry of Industries, Fisheries and Innovation and in accordance with the Directorate of Fisheries, with advice from IMR and ICES.
UoC 3	Description
Species	Greenland halibut (Reinhardtius hippoglossoides)
Stock	Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic)
Fishing gear type(s) and, if relevant, vessel type(s)	Gillnet
Client group	Norges Fiskarlag (NFA)
Geographical area	**FAO area:** 27. ICES I and II. **Common name of the body of water:** Barents Sea and Norwegian Sea **Local fisheries management area:** Norway Ministry of Industries, Fisheries and Innovation. Subject to the joint Norwegian/Russian Fisheries commission. **Stock region:** Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic).
Management	Subject to the joint Norwegian/Russian Fisheries commission. Managed nationally by the Norwegian Ministry of Industries, Fisheries and Innovation and in accordance with the Directorate of Fisheries, with advice from IMR and ICES.
UoC 4	Description
Species	Greenland halibut (Reinhardtius hippoglossoides)
Stock	Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic)
Fishing gear type(s) and, if relevant, vessel type(s)	Danish seine
Client group	Norges Fiskarlag (NFA)
Geographical area	**FAO area:** 27. ICES I and II. **Common name of the body of water:** Barents Sea and Norwegian Sea

	Local fisheries management area: Norway Ministry of Industries, Fisheries and Innovation. Subject to the joint Norwegian/Russian Fisheries commission. **Stock region:** Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic).
Management	Subject to the joint Norwegian/Russian Fisheries commission. Managed nationally by the Norwegian Ministry of Industries, Fisheries and Innovation and in accordance with the Directorate of Fisheries, with advice from IMR and ICES.

5.2 Assessment results overview

5.2.1 Determination, formal conclusion and agreement

To be drafted at Public Comment Draft Report stage

The xxxx fishery 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 fishery has x conditions against xx scoring indicators and x recommendations.
Based on the evaluation of the fishery presented in this report the assessment team recommends the certification of the xxxx fishery for the client xxx.

5.2.2 Principle level scores

To be drafted at Client and Peer Review Draft Report stage

Table 7 Principle level scores

Principle	UoA 1	UoA 2	UoA 3	UoA 4
Principle 1 – Target species	≥80			
Principle 2 – Ecosystem impacts	≥ 80	≥ 80	≥ 80	≥ 80
Principle 3 – Management system	≥ 80			

5.2.3 Summary of conditions

To be drafted at Client and Peer Review Draft Report stage

The CAB shall include in the report a table summarising conditions raised in this assessment. Details of the conditions shall be provided in the appendices. If no conditions are required, the CAB shall include in the report a statement confirming this.

Reference(s): FCP v2.2 Section 7.18

Table 8 Summary of conditions

Condition number	Condition	Performance Indicator (PI)	Deadline	Exceptional circumstances?	Carried over from previous certificate?	Related to previous condition?
				Yes / No	**Yes / No / NA**	**Yes / No / NA**
				Yes / No	**Yes / No / NA**	**Yes / No / NA**

				Yes / No	Yes / No / NA	Yes / No / NA

5.2.4 Recommendations

To be drafted at Client and Peer Review Draft Report stage

If the CAB or assessment team wishes to include any recommendations to the client or notes for future assessments, these may be included in this section.

Table 9 Summary of recommendations

Recommendation number	Recommendation	Performance indicator
1	It is recommended that the fishery implements a recording system for non-fatal interactions with out-of-scope species and ETP species.	2.2.2.a

6 Traceability and eligibility

6.1 Eligibility date

Products from the certified fishery will be eligible to be sold as MSC certified or bear the MSC ecolabel from the eligibility date, set as the date of publication of the Public Comment Draft Report.

The traceability and segregation systems in the fishery shall be implemented by the eligibility date.

6.2 Traceability within the fishery

The systems of tracking and tracing within the fishery should ensure that there are no substitution risks that can be caused by vessels using non-certified gears, fishing outside the UoA/UoC, other non-certified fisheries fishing the same stock or any other risk of substitution that may occur between point of harvest and point of sale, such as transhipment, sale via auctions, etc.

There is a sufficiently effective system of tracking, tracing and segregation in the Greenland halibut fishery so as to ensure that all Greenland halibut products originating from the certified fishery and sold as certified could be identified prior to or at the point of landing.

6.2.1 Management of fishery activities: monitoring, control and surveillance:

Licenses are issued by the Directorate of Fisheries and specify details of the vessels, permissions, etc. Norwegian vessels are required to report to the Directorate of Fisheries (DOF) with ERS in accordance with Regulations on position reporting and electronic reporting for Norwegian fishing vessels.
Monitoring, control and surveillance is a shared responsibility with 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.
Real time VMS monitoring of catch area is mandatory. All vessels are monitored by the Directorate of Fisheries through VMS data and every catch is identified by catch area thereby validating certified status of catch. DoF has access to real-time catch data through the electronic logbooks.

The Directorate of Fisheries also 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. In accordance with the regulation implemented in 2015, catches are recorded using an “app” on smartphones, which also provide fishing location in a similar way to VMS on the larger vessels.

All Norwegian vessels in this fishery are therefore obliged to carry VMS on board the vessels and to log in the electronic logbook when the fishing operation begins. The Directorate of Fisheries monitors this data and can distinguish, real time, not only where the vessels are but also if the vessels are fishing or not as well as catch details, including catch locations. Norges Fiskarlag can request anonymized tracking data from the Directorate of Fisheries, if required. All vessels are also required to complete pre-filled delivery notes and set correct quantity and size distribution in accordance with requirements from Directorate of Fisheries.

6.2.2 Fishery activities

All methods of harvesting, in this fishery, are covered in this assessment and therefore using gears that are not part of the UoC does not occur.
Vessels included in the UoC rarely fish outside the UoC geographic area on the same trip. Even if it does occur the frequency is negligible. They may, in other parts of the year or according to their own priorities, participate in other fisheries outside the UoC geographical area.

Vessels report start of catch with catch estimates via ERS to DoF while at sea. The sales organizations have the authority (specified in the Regulations) to stop/divert fishing operations already at this stage, if not found complaint to Regulations. The risk of mixing between certified and non-certified catch during storage on board the vessels is very low.

6.2.3 Risk of fishing outside the unit of certification

There is no risk of vessels fishing outside the unit of certification. This risk is negligible.

A system for separating catches inside or outside 12 nm is already well-established in the Norwegian reporting system. All catches are marked on landing notes and sales notes according to whether they are caught in the “ocean” (outside 12 nm) or “coast” (inside 12 nm). This allows for segregation in subsequent supply chains.

All vessels are monitored by the Directorate of Fisheries through VMS data. The client has access to tracking data on request, 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.

6.2.4 Risk of substitution

The good traceability systems implemented minimise any risk of substitution.

6.2.5 At-sea processing

At sea processing on-board the Norwegian vessels, from this fishery, and included in the scope of certification is mainly the production of whole chilled fresh fish, headed and gutted frozen fish, salted and dried fish, frozen blocks, frozen fillets and by-products (bellyflaps, heads, tongues, cheeks, roe, liver and trimmings). All of the on-board processing results in products which are clearly identified with batch numbers, identifying the vessel, area of catch and the species. Thus, the risk of mixing between certified and non-certified product during processing and storage on board is nearly negligible.

Greenland halibut from this fishery is also landed as unprocessed catch. All catches are subject to controls at landing.

The risk of mixing between certified and non-certified product during storage is nearly negligible as the products are well labelled.

If production of fish-oil and fishmeal on- board the vessels takes place, this would be from unspecified fish and would require separate CoC certification.

6.2.6 Transport

Most vessels handle other non-certified species during transport, storage, processing, landing and sale. The risk of mixing between certified and non-certified product during transport and handling activities is low as the other species are identifiable and the products are appropriately labelled.

6.2.7 Transhipment

There is no transhipment at sea activities involved in the Norway Greenland halibut fishery.

6.2.8 Sale

All sales of Norway Greenland halibut, for catches by vessels in the Norwegian fleet and covered by this certification, is done through the sales organizations. Direct sales from vessel to buyer is also done through the sales organization, as they get a permit and all the paperwork goes through the sales organizations. Fish is sold either through auctions organized by the sales organizations or directly from the vessel to the buyer. In both cases the same requirements for reporting apply.

The sales organizations are required to record all landings of fish in Norway. All relevant information on catch is provided to the sales organizations on a pre-delivery note. 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. MSC fishery certificate number is provided on invoices which are issued by the sales organizations. The fish changes ownership from vessel or freezer storage to processing plant or traders.

Sales organizations are responsible for invoicing and settlement to fishermen based on electronically signed delivery notes which are made available to the sales organizations after landing. Purchaser name is included in these delivery notes.

The sales organizations perform all transactions which are logged and publicly available but the sales organizations do not take ownership of the product or handle the products. They act solely as an intermediary between the vessel owners and the buyers. The client, Norges Fiskarlag (The Norwegian Fishermen's Association) was founded on 1926 and is based on memberships in local and regional fishermen's associations. The association has a total of 110 local chapters and two semi-independent group organizations with approximately 4300 members from across the country. It has 7 regional associations and 2 group organizations all of which are part of the client group. The sales organizations are owned by fishermen and boat-owners (although details of the mechanisms that form the electoral basis may vary). The sales organizations are, therefore, all a part of the “MSC client group project” and are together with NFA (and the Norwegian Seafood Council) bound by contract to perform the certifications and provide financing for direct and indirect *costs.*

The sales organizations are :

- Norges Råfisklag
- Surofi
- Vest-Norges Fiskesalslag
- Fiskehav (Rogaland Fiskesalgslag & Skagerakfisk have merged into a single organization)

6.2.9 Points of landing

All catch is landed in Norway, with inspections by DoF and sales organization as described above.

Landing sites are the buyers/processing sites. Freezer storage facilities, that do not take ownership of the products, are common for frozen products. There is no tampering of the product in these facilities.

Landing vessels are identified for being covered by MSC certification at landing. Sampling is done at the landing ports once the fish is landed. All catches are subject to controls at landing. Vessels must complete the pre-filled delivery note and set correct quantity and size distribution in accordance with requirements from DoF.

The labels that identify the products with batch numbers, vessel Identification, catch area and species follow during storage on land before sale. The risk of mixing between certified and non-certified product during handling activities is therefore low.

After landing, the sales notes are issued immediately for fresh landings. For frozen landings a landing note is issued immediately as a temporary document and sales notes are issued later as and when the fish is sold.

For fresh landings, change of ownership takes place when the fish change ownership from vessel to processing plant, regardless of the fish being sold by the sales organizations or directly by the vessel.

For landings of frozen products to freezer storage, change of ownership takes place when a purchase at some point has been confirmed and sales notes have been issued. Up until this point, the fish remains the property of the fisher.

Freezer storage facilities, as landing sites for frozen products, do not tamper with the product- they are only box in- box out facilities.

The main buyers/processing sites are producers and traders in Norway.

If the catch was to be landed outside Norway (which is not happening at present) landing information would be 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, 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.

6.2.10 Reporting

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.

For all landings, catches are delivered to landing sites accompanied by a “sluttseddel” (sales note) and landing note which specify catch area, recorded by the fishers and verified by the landing sites. MSC certified status is documented on the “sluttseddel” based on the species and catch area. This sales note is the basis for sales invoicing.
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 the Directorate of Fisheries.

Should landings outside Norway occur (although this situation is rare and negligible), the following steps are also documented:

i. Prior notification for Norwegian fishing vessels referred to in Commission Regulation No 1010/2009 Article 2 (2)- refers to catch certificate number.
ii. Pre-landing declaration for Norwegian fishing vessels referred to in Commission Regulation No 1010/2009 Article 3(1)- refers to catch certificate number & catch area (NO-4242)
iii. Landing note: This document provides detailed information about catch taken and reported by a specific Norwegian fishing vessel and refers to a catch certificate number.
iv. Landings of Greenland halibut outside Norway are regularly reported to DoF in accordance with the control agreements with the countries in question, landings are also reported directly to the sales organization
v. The sales organisations also assist direct landings outside Norway with NEAFC reporting. Both Norwegian and foreign control authorities are involved at these landings.

Table 10 Identification and traceability links in documents from fishery activities

		Label	Landing document	Sales document
1	Species	Yes	Yes	Yes
2	Catch date	Yes	Yes	Yes
3	Vessel name	Yes	Yes	Yes
4	Catch area	Yes	Yes	Yes
5	Production approval number	Yes	Yes	**No**
6	Gear	Yes	Yes	Yes
7	Product	Yes	Yes	Yes
8	Certified status	**No**	Yes	Yes

Table 11 Traceability within the fishery

Factor	Description
Will the fishery use gears that are not part of the Unit of Certification (UoC)?	There is no gear mixing for the vessels /trips in the fishery under assessment.

If Yes, please describe: If this may occur on the same trip, on the same vessels, or during the same season; How any risks are mitigated.	The certificate covers the entire Norwegian fleet fishing for Greenland halibut within the UoC
Will vessels in the UoC also fish outside the UoC geographic area? If Yes, please describe: If this may occur on the same trip; How any risks are mitigated.	All Norwegian vessels in this fishery are obliged to carry VMS on board and to log in the electronic logbook when the fishing operation begins. This data is monitored by the Directorate of Fisheries, who can distinguish, real time, not only where the vessels are but also if the vessels are fishing or not.
Do the fishery client members ever handle certified and non-certified products during any of the activities covered by the fishery certificate? This refers to both at-sea activities and on-land activities. Transport Storage Processing Landing Auction If Yes, please describe how any risks are mitigated.	Most members handle other non-certified species during all of these activities. All fishing vessels are required to keep logbooks for the recording of fishing by species, gear and area. Sampling is done at the landing ports once the fish is landed. All catch is landed in Norway. Robustness of these enforcement systems is expected to be high. All products on-board are clearly identified with batch numbers, identifying the vessel, area of catch and the species. These labels follow also during storage on land before sale. The risk of mixing between certified and non-certified catch during storage, transport and handling activities is low.
Does transhipment occur within the fishery? If Yes, please describe: If transhipment takes place at-sea, in port, or both; If the transhipment vessel may handle product from outside the UoC; How any risks are mitigated.	Transhipment does not take place in this fishery. This is monitored by the Directorate of Fisheries through the VMS.
Are there any other risks of mixing or substitution between certified and non-certified fish? If Yes, please describe how any risks are mitigated.	None identified.

6.3 Eligibility to enter further chains of custody

To be drafted at Client and Peer Review Draft Report stage

The scope of the MSC Fishery certification is up to the point of landing and Chain of Custody commences from the point of landing and sale.

Norway Greenland halibut fishery and its products landed by Norwegian vessels, involved in this fishery, 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 list of vessels will be described in an appendix at PCR stage.

Products produced on-board the vessels and included in the scope of certification include whole chilled fresh fish, headed and gutted frozen fish, salted and dried fish, frozen blocks, frozen fillets and by-products (bellyflaps, heads, tongues, cheeks, roe, liver and trimmings).

Should production of fish-oil and fishmeal occur on board the vessels, this would require separate CoC certification.

The main market are producers and traders in Norway.

The sales organizations are:

- Norges Råfisklag
- Surofi
- Vest-Norges Fiskesalslag
- Fiskehav (Rogaland Fiskesalgslag & Skagerakfisk have merged into a single organization).

Table 12 Eligibility to enter further chains of custody

Conclusion and determination	Norway Greenland halibut products, fished in the certified UoC, will be eligible to enter further certified chains of custody and be sold as MSC certified or carry the MSC ecolabel.
List of parties, or category of parties, eligible to use the fishery certificate and sell product as MSC certified	The entire Norwegian fleet targeting Greenland halibut in the defined geographical areas have been included in the unit of Certification and are eligible to use the fishery certificate and sell the product as MSC certified
Point of intended change of ownership of product	Point of change of ownership of product is when fish are landed from vessel to processing plant (landing site).
List of eligible landing points (if relevant)	Landing sites are in Norway, with inspections by DoF and sales organizations. Landing sites are listed in Section **Error! Reference source not found.**.
Point from which subsequent Chain of Custody is required	To be eligible to carry the MSC logo, fish must enter into separate MSC Chain of custody certification commencing sale which is point of change of ownership at landing site (processing plants).

6.4 Eligibility of Inseparable or Practicably Inseparable (IPI) stock(s) to enter further chains of custody

There are no IPI stocks for the fishery.

6.5 Risk- based methods for data-deficient fishery

Table 13 Risk based methods for data deficient fisheries

<table>
<tr><th>Performance Indicator</th><th>Criteria</th><th>Consideration</th><th>Notes</th></tr>
<tr><td rowspan="2">1.1.1 Stock status</td><td rowspan="2">Stock status reference points are available, derived either from analytical stock assessment or using empirical approaches.</td><td>Yes</td><td>Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.</td></tr>
<tr><td>No</td><td>Use Annex PF (RBF) for this PI.</td></tr>
<tr><td rowspan="2">2.1.1 Primary species outcome
and
2.2.1 Secondary species outcome</td><td rowspan="2">Biologically based limits are available, derived either from analytical stock assessment or using empirical approaches.</td><td>Yes</td><td>Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.</td></tr>
<tr><td>No</td><td>Use Annex PF (RBF) for this PI.</td></tr>
<tr><td rowspan="2">2.3.1 ETP species outcome</td><td rowspan="2">Can the impact of the fishery in assessment on ETP species be analytically determined?</td><td>Yes</td><td>Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.</td></tr>
<tr><td>No</td><td>Use Annex PF (RBF) for this PI.</td></tr>
<tr><td rowspan="2">2.4.1 Habitats outcome</td><td rowspan="2">In line with the MSC Fisheries Standard habitats guidance (GSA3.13.1.1), are both of the following applicable?

1. Information on habitats encountered is available.

2. Information on impact of fishery on habitats encountered is available.</td><td>Yes</td><td>Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.</td></tr>
<tr><td>No</td><td>Use Annex PF (RBF) for this PI.</td></tr>
</table>

2.5.1 Ecosystem outcome	Is information available to support an analysis of the impact of the fishery on the ecosystem?	**Yes**	Use default Performance Indicator Scoring Guideposts within default assessment tree for this PI.
		No	Use Annex PF (RBF) for this PI.

The fishery is not considered to be data deficient against any main scoring element. Therefore, there is no need to trigger the use of RBF for the Norway Greenland halibut fishery.

7 Scoring

7.1 Principle scores

7.1.1 Summary of Performance Indicator level scores

Table 14 Summary of Performance Indicator level scores

Principle	Component	Performance Indicator (PI)		UoA 1	UoA 2	UoA 3	UoA 4
1	Outcome	1.1.1	Stock status	**≥80**			
		1.1.2	Stock rebuilding	**N/A**			
	Management	1.2.1	Harvest strategy	**60-79**			
		1.2.2	Harvest control rules & tools	**60-79**			
		1.2.3	Information & monitoring	**≥80**			
		1.2.4	Assessment of stock status	**≥80**			
2	Primary species	2.1.1	Outcome	**≥80**	**≥80**	**≥80**	**≥80**
		2.1.2	Management strategy	**≥80**	**≥80**	**≥80**	**≥80**
		2.1.3	Information/Monitoring	**≥80**	**≥80**	**≥80**	**≥80**
	Secondary species	2.2.1	Outcome	**≥80**	**≥80**	**≥80**	**≥80**
		2.2.2	Management strategy	**≥80**	**≥80**	**≥80**	**≥80**
		2.2.3	Information/Monitoring	**≥80**	**≥80**	**≥80**	**≥80**
	ETP species	2.3.1	Outcome	**≥80**	**≥80**	**≥80**	**≥80**
		2.3.2	Management strategy	**≥80**	**≥80**	**≥80**	**≥80**
		2.3.3	Information strategy	**≥80**	**≥80**	**≥80**	**≥80**
	Habitats	2.4.1	Outcome	**≥80**	**≥80**	**≥80**	**≥80**
		2.4.2	Management strategy	**60-79**	**≥80**	**≥80**	**≥80**
		2.4.3	Information	**≥80**	**≥80**	**≥80**	**≥80**
	Ecosystem	2.5.1	Outcome	**≥80**	**≥80**	**≥80**	**≥80**
		2.5.2	Management	**≥80**	**≥80**	**≥80**	**≥80**
		2.5.3	Information	**≥80**	**≥80**	**≥80**	**≥80**

Principle	Component	Performance Indicator (PI)		UoA 1	UoA 2	UoA 3	UoA 4
3	Governance and policy	3.1.1	Legal &/or customary framework	**≥80**			
		3.1.2	Consultation, roles & responsibilities	**≥80**			
		3.1.3	Long term objectives	**≥80**			
	Fishery specific management system	3.2.1	Fishery specific objectives	**≥80**			
		3.2.2	Decision making processes	**≥80**			
		3.2.3	Compliance & enforcement	**≥80**			
		3.2.4	Monitoring & management performance evaluation	**≥80**			

7.2 Principle 1

7.2.1 Principle 1 background

Greenland halibut (*Reinhardtius hippoglossoides*) fishery in the Barents Sea

The Barents Sea Greenland halibut fishery is managed by the Joint Norwegian–Russian Fisheries Commission (JNRFC), which sets the total allowable catch (TAC) for the stock and splits the quota shares according to a fixed distribution key: 51 % to Norway, 45 % to Russia and 4 % to third countries (see protocol n. 38: http://www.jointfish.com/content/download/410/5773/file/38.pdf in Norwegian). The fishery takes place in the Norwegian Economic Zone (NEZ), the Russian Economic Zone (REZ) and the Fishery Protection Zone around Svalbard, where Norway exerts jurisdiction. The data regarding the fishing area is recorded in the vessels' logbooks and are submitted to the Barentsevo–Belomorskoe territorial department of Federal Agency for Fisheries as well.

Fisheries regulations are harmonised in all three zones, and Norwegian and Russian enforcement bodies in the Barents Sea cooperate tightly and exchange all available information on catches and landings.

The biology of Greenland halibut (*Reinhardtius hippoglossoides*)

The Greenland halibut (*Reinhardtius hippoglossoides* (Walbaum)) is a deep-water flatfish distributed throughout the entire rim of the North Atlantic (Nizovtsev 1989a; Bowering and Brodie 1995; Godø et Haug 1987; Vis et al. 1997). Recent studies of the structure of Greenland halibut stocks using mitochondrial DNA have also indicated that they are genetically homogeneous throughout the North Atlantic (Vis et al. 1997). This is not surprising given it's the highly migratory nature of the species over extreme distances, as deduced from tagging experiments (Nizovtsev 1974; Sigurdsson 1981; Boje 1994; Bowering 1984). Although it is now recognized that there is an extensive gene flow among populations of Greenland halibut in the North Atlantic, it has been concluded that studies of the distribution of local spawning components are still essential for effective management (Vis et al. 1997).

Bowering and Nedreaas (2001) made a useful comparison of Greenland halibut fisheries and distribution in the Northwest and Northeast Atlantic, which revealed both differences and features in common, and discussed the implications for fisheries management within the individual areas. A Nordic report (Boje et al. 1994) has reviewed the current status of Greenland halibut research and knowledge and made suggestions for future research that would be useful for management.

Nedreaas and Smirnov (2004) reviewed the knowledge about the characteristics of the Northeast Arctic Greenland halibut stock (e.g., its size, distribution, position in the food web, management unit), the history of the stock, its fishery and management system. Current management strategy, including scientific advice (e.g., stock monitoring, stock assessment and prognoses, precautionary reference points, form of advice), TAC decisions and international/national sharing of the TAC, the fishery (fishing methods, fleets), fisheries regulations (legal size, mesh size, selectivity measures, area closures), enforcement, control and collection of fisheries statistics are also described in this review.

Greenland halibut in the Northeast Arctic are distributed extensively from south of 62º N along the continental slope near the European Union (EU)-Norway border, continuously to the northeast of Spitzbergen beyond 82º N. They have also been observed as far east as the eastern coast of Franz Josefs Land at 73º E (Figure 1). Catches are highest along the edge of continental slope, although differences in fishing gear in the Northeast Atlantic surveys make it difficult to compare catches accurately. They are abundant in the deep channels running between the shallow fishing banks but are absent from the tops of the banks in the Barents Sea (Figure 1). Relatively large catches have been made northeast of Spitzbergen and are widely distributed east of Svalbard towards Franz Josef Land In the central part of the Barents Sea small quantities occur in catches as far to the east as the Goose Banks (47º E; Figure 1).

Nizovtsev (1989a), Bowering and Nedreaas (2001) conclude that Greenland halibut appear to be distributed with little or no break in the continuity of the distribution throughout both the Northwest and Northeast Atlantic Ocean. According to the results of earlier investigations, Greenland halibut in the Northeast Arctic spawn along the continental slope primarily between 71º N and 75º N (Nizovtsev 1989a) or between 72º N and 74º N (Godø and Haug 1989), i.e. about the mid-latitude of the distribution range (see Figure 1). Albert et al. (1998) also observed spawning Greenland halibut along the slope between 70º N and 75º N with peak spawning occurring in December. These authors, like Fedorov (1969), however, noted that some spawning occurred in adjacent areas more than six months later, although this was much less extensive.

The main nursery area in the Northeast Atlantic is reported also to be more to the northern end of the distribution surrounding the Spitzbergen archipelago (Godø and Haug 1989). Recent studies have shown that the areas north and east of Spitsbergen and eastwards to Franz Josef Land are important nursery areas. Since the northernmost areas are covered by ice during most of the year the northeastern border of the distribution could not be delineated (IMR/PINRO-report series no. 7, 2002). Young Greenland halibut may occasionally also occur in the eastern part of the Barents Sea towards Novaya Zemlya (Nizovtsev 1983; 1989a).

In the Northeast Atlantic there is no apparent change in individual mean size of Greenland halibut with depth along the continental slope area. However, to both the north and east of Spitzbergen surveys and the Svalbard and Barents Sea surveys indicate an increase in mean individual size in the catches in depths greater than 500 m (Figure 2). Greenland halibut catches exhibited a tendency to increase in size with depth, peak and then decline (Figure 3). However, no latitudinal depth trends in peak abundance could be established.

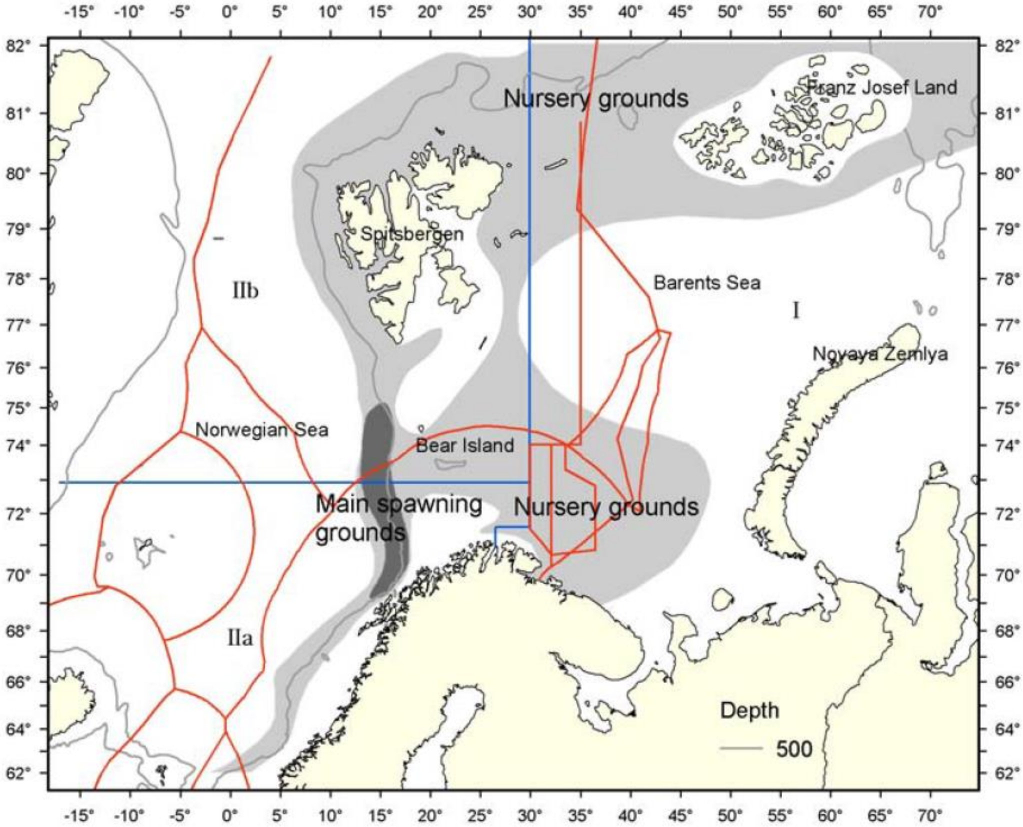

Figure 1: Schematic presentation of the geographic horizontal distribution of Greenland halibut. Nursery- and main spawning grounds are marked. National economic zones, the disputed border areas between Norway and Russian (i.e., the Grey Zone), the international Loophole, and the ICES areas are shown (Source: https://pdfs.semanticscholar.org/dc8c/0a030edbae458be3f61f96456dfe001ce856.pdf).

The affinity for young juvenile Greenland halibut to nursery areas in the north and larger fish to be in deep water along the continental slopes of the Northeast Atlantic might explain some of the variability apparent in the preferred depth range. For example, the distribution data from surveys along the slope of the Norwegian Sea did not demonstrate any change in mean individual fish size over the range of depths fished. Since this survey series includes the spawning area (Albert et al. 1998), young fish would have a tendency to be less abundant here; therefore, a change in mean individual size with depth would probably be less apparent. Age compositions from these surveys reported in Anon. (2002), in fact, indicated that very few Greenland halibut less than five years old were caught. On the other hand, unpublished survey and commercial catch rate data from the Institute of Marine Research show that from September onwards there seems to be a clear trend in mean individual size with depth. Larger mature fish appear to migrate to shallower depths and to some extent into regions of the Barents Sea as shallow as 200-metrese. Data from Russian long liners (Popov et al. 2003) demonstrate that some large post-spawning specimens in March - April may migrate to the central part of the Barents Sea (Grey Zone) and stay there at depths of 300-360 meters at least until the middle of summer, then leave this area gradually. This suggests a degree of seasonality in the distribution pattern, which might be associated with feeding or spawning behaviour.

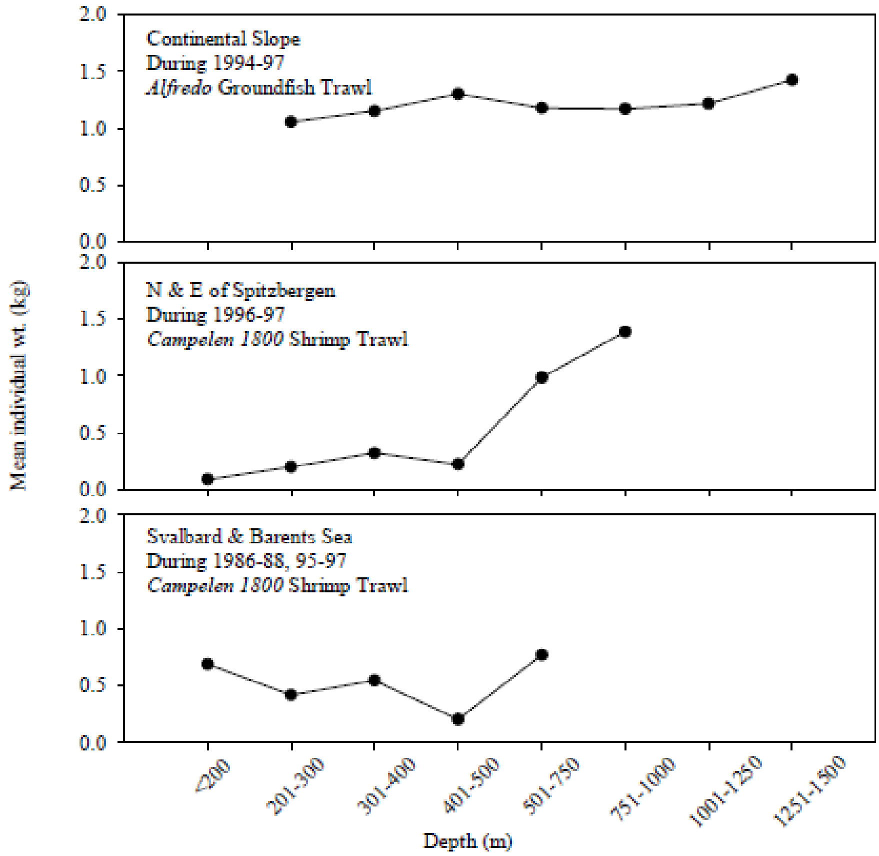

Figure 2: Individual mean size of Greenland halibut at various depths. Data from different years combined and presented for three different survey areas. All data are collected in August-September (source: Bowering and Nedreaas 2000).

Trends in distribution and relative abundance of Greenland halibut with respect to bottom temperature in the Northeast Atlantic surveys are more evident than in the Northwest Atlantic (Figure 2) (Bowering and Nedreaas 2000). In all the survey series presented, the average weight (kg) per set increases to peak within a bottom temperature range of 1.1º C to 2.0º C, beyond which the average weight (kg) per set declines.

A joint Northwest Atlantic Fisheries Organisation (NAFO) – International Council for the Exploration of the Sea (ICES) “Workshop on Greenland halibut Age Determination” was held in Reykjavik, Iceland in 1996 to deal with the age determination of Greenland halibut and standardization of methodology (Anon. 1997). Bowering and Nedreaas (2001B) based their review of age validation and growth upon the results and recommendations from this workshop. In most instances female growth rates are slightly higher than those of males after about six or seven years of age (Figure 3). The joint NAFO/ICES workshop only discussed otoliths, as these are the most widely used measure and are regarded as the most appropriate structures for age determination. PINRO and Russia, on the other hand, have routinely used scales for age determination. Also, on the basis of scale interpretation, females grow faster than males from an age of six to seven years.

Irrespective of geographical areas and method of age determination, it has been confirmed and agreed that females have a longer lifespan than males.

Bowering and Nedreaas (2001b) showed that Greenland halibut in the northeast Atlantic are generally larger at age, i.e., display higher growth rates, up to about eight year of age than those of the northwest Atlantic. However, the results suggest that the growth patterns between the two regions may have been converging on a more similar pattern in recent years.

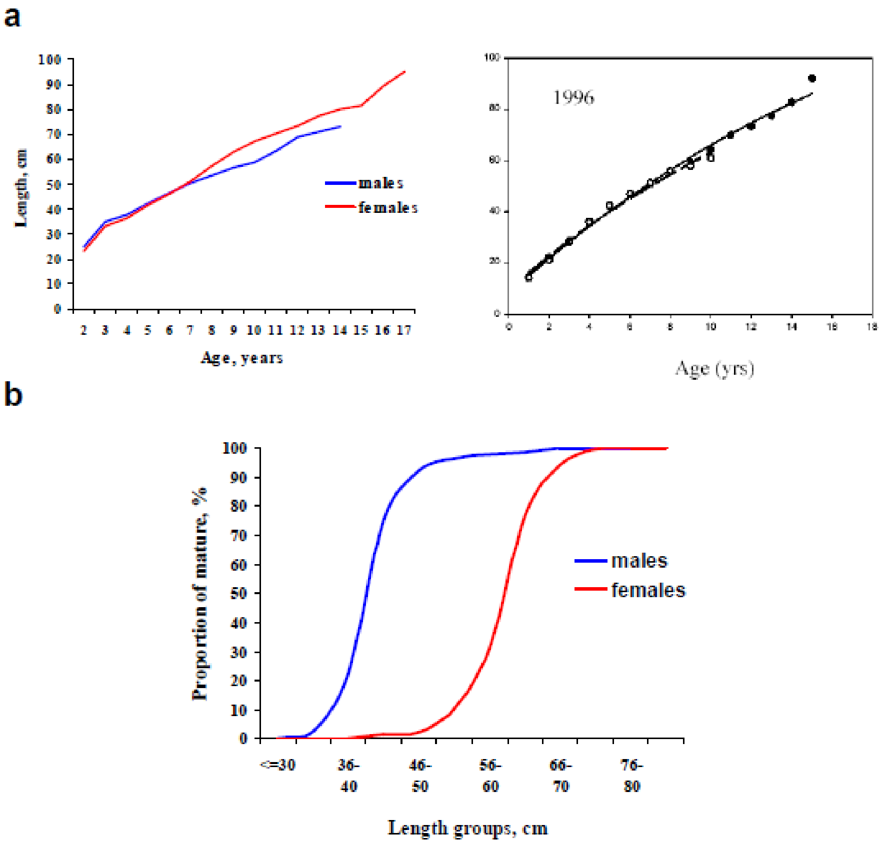

Figure 3: a)-left: Greenland halibut length at age determined by otolith growth rings (example from Bowering and Nedreaas (2001b). a)-right: Mean length at age for the years 1981-1997 as age determined by scales. b) Proportion mature at length (mean for 1984-1998) (Russian scale readings).

According to PINRO data, Greenland halibut in the Barents Sea reach a maximum length of 120 cm and an age of 20 years (Nizovtsev 1989a). Earlier investigations (Kovtsova and Nizovtsev 1985) showed higher growth and maturation rates in the 1970-80s than in the 1940-60s. The reduction of stock abundance is considered to be the main reason for this trend.

This increase in growth and maturation rates continued until the end of the 80s. In the 90s, the average annual length increments began to decrease.

In 2011 a workshop on age reading of Greenland halibut has been organized by ICES (WKARH 2011 - https://www.hi.no/filarkiv/2011/05/vigo_2011_summary.pdf/nb-no). The workshop concluded that the new methods used in the last years provide much higher longevity and approximately half the growth rate from 40-50 cm onwards compared to the traditional method. These typically produce age estimates around 20 years or more for 70 cm fish. Also, most accurate validation methods (release of known-age and marked fish into the wild; bomb radiocarbon to identify fish born in the 1950-60's and mark-recapture of chemically tagged wild fish after more than 1 yr at large) show that longevity of Greenland Halibut is much greater and growth rate less than half of that reported based on the traditional ageing method. Data on SrCl from the Northwest Atlantic and from OTC and tag recaptures from both the Northwest Atlantic and Northeast Atlantic are consistent with the bomb radiocarbon results. Based on all available evidence it appears that the traditional method underestimate ages for ages above 5 years. A more accurate ageing method was currently under development. Until such a method is accepted, stock assessments should note the likelihood that catch at age matrices based on the traditional ages are likely to be in error (too low ages). However, scientists from VNIRO, Moscow, and PINRO, Murmansk, did not agree with this conclusion. Stating that the traditional method of the Greenland halibut age reading by unstained cross-section of otoliths and scale is adequate for the purposes of reading age of the Greenland halibut of the Barents Sea and that the new method shall not be recommended as appropriate until firm validation is in place. Therefore, the assessment is conducted with a model that at the moment does not consider the ageing concluded in WKARH 2011 and is length based.

As with other fish species, the length and age at which Greenland halibut reach sexual maturity vary widely (Kovtsova and Nizovtsev 1985), but males become mature when they are younger and smaller than females. In the 80s and 90s, 50% of males had reached maturity at an average length of about 41 cm and at an age of five years, which is close to parameters observed in the 1970ies, and 50 % of the females – likewise at a length of about 59 cm and an age of eight years, which is a little bit earlier than in the 70s.

As Russian investigations show (Dolgov and Smirnov 2001), among the variety of fish, seabirds and marine mammals, Greenland halibut were found in the diet of just three species - Greenland shark (*Somniosus microcephalus*), cod (*Gadus morhua morhua*) and Greenland halibut itself. The killer whale (*Orcinus orca*), grey seal (*Halichoerus grypus*) and narwhal (*Monodon monoceros*) are other potential predators. However, the role of Greenland halibut in the diets of the above species was minor. Predators fed mainly on juvenile Greenland halibut up to 30-40 cm long.

The mean annual percentage of Greenland halibut in cod diets in 1984-1999 accounted for 0.01-0.35% by weight (0.05% in average). Low levels of consumption are related to the distribution pattern of juvenile Greenland halibut as they spend the first years of their life mainly in the outlying areas of their distribution, in the northern Barents Sea, where both adult Greenland halibut and other abundant predator species are virtually absent.

The level of cannibalism was highest in the 1960s (up to 1.2% by frequency of occurrence). In 80s, in Greenland halibut stomachs the frequency of occurrence of their own juveniles did not exceed 0.1 %. In the 90s, the portion of their own juveniles (by weight) was around 0.6-1.3%.

The composition of the food of the Greenland halibut in the Barents Sea includes more than 40 prey species (Nizovtsev 1989a; Dolgov and Smirnov 2001). The results of monitoring by PINRO of a wide area from the continental slope up to Novaya Zemlya show that the main food of the Greenland halibut consists of fish, mostly of capelin (*Mallotus villosus villosus*) and polar cod (*Boreogadus saida*) as well as cephalopods and shrimp (*Pandalus borealis*). In 1990’s an important place in the diet was occupied by waste products from the fisheries for other species (heads, guts etc.). With growth, a decrease in the importance of small food items (shrimp, capelin) in the diet and an increase in the proportion of large fish such as cod and haddock (*Melanogrammus aeglefinus*) were observed.

In a diet study carried out on the continental slope of the Norwegian Sea Michalsen and Nedreaas (1998) found a generally high proportion of empty stomachs, but with decreasing percentage of empty stomachs with increasing predator length. The cephalopod *Gonatus fabricii* was a very important prey item. Of the fish prey, herring and blue whiting were the most important. Much of the prey was pelagic, and few strictly bottom-living organisms were found.

Recent studies of diet composition and feeding behaviour of Greenland halibut have also been presented by Hovde et al. (2002) and Vollen et al. (2003). Hovde et al. (2002) found spatial and temporal components to have more influence on the variation in diet composition than biotic variables, although in smaller Greenland halibut (<50 cm) crustaceans and the cephalopod Gonatus fabricii were the prevailing prey, whereas for larger specimens (>50 cm) teleosts and fish offal were the dominant components.

With a Greenland halibut stock of nearly 100 000 tonnes, the total food consumption by their population comes to about 280 000 tonnes. The biomass of commercial species consumed (shrimp, capelin, herring, polar cod, cod, haddock, redfish (*Sebastes* sp.), long rough dab (*Hippoglossoides platessoides*) does not exceed 5 000-10 000 tonnes per species.

The Greenland halibut as a species thus has a negligible effect on the other commercial species of the Barents Sea, while at the same time it is not subject to their predatory influence.

Stock assessment and management of Greenland halibut (*Reinhardtius hippoglossoides*) in in subareas 1 and 2 (Northeast Arctic)

Historically, in the Northeast Atlantic there was little demand and poor prices for Greenland halibut compared to other groundfish such as cod, therefore it received little attention from enterprising fishermen. It was not until a trading relationship (known as the Pomor trade) developed between Russia and Norway during the 1760s that Norway began to fish this species commercially using longlines. Greenland halibut were more common in the Russian marketplace and the demand was sufficiently high to warrant the development of the fishery (Ytreberg 1942). The trading relationship eventually collapsed with the arrival of the Russian Revolution in 1917, and the fishery declined. After 1935 the longline fishery once again developed. Catches increased from about 1 000 tonnes at the beginning to 10 000 tonnes by the 1960s (Figure 4).

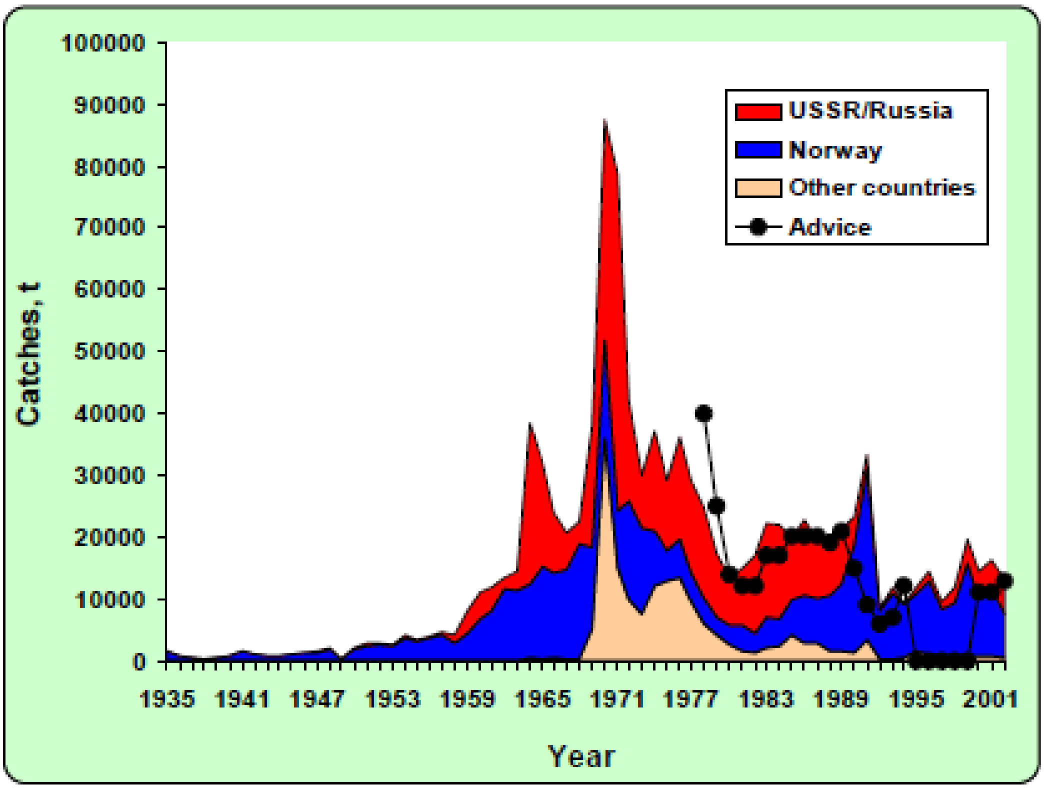

Figure 4: International landings of Greenland halibut from the Barents and Norwegian Seas, 1935-2002. (Source: https://pdfs.semanticscholar.org/dc8c/0a030edbae458be3f61f96456dfe001ce856.pdf).

In 1964, dense spawning concentrations of Greenland halibut were found to the west of Bear Island by Soviet fishermen testing new deep-water trawl equipment (Pechenik and Troyanovsky 1970; Nizovtsev 1989a). This provided an incitement for the prompt development of an international trawl fishery. With the introduction of international trawling fleets to the fishery during mid-1960s, catches increased rapidly to peak at 90 000 tonnes in 1970 before declining (Anon. 1998b). The fishery has been regulated since 1992, and from 1992 until 1997 catches averaged around 11 000 tonnes annually, the lowest since the early 1960s. The average annual official catches for 1998-2002 have been 15 000 tonnes. The fishery for Greenland halibut in the Northeast Atlantic has been conducted mainly along the continental slope of the Norwegian Sea between 68º N and 74º N in ICES Division IIa and along the continental slope of southern ICES Division IIb. High variability in catches is generally associated with those proportions taken in ICES Division IIb and it was here that the peak catches were made in 1970-71 (Godø and Haug 1989). The Greenland halibut fishery in the Norwegian and Barents Seas in 1970-1980s has primarily been carried out by fishing fleets from the former Soviet Union (about 50% on average), Norway (about 25%), the German Democratic Republic and the Federal Republic of Germany as well as Poland and the United Kingdom (Figure 4) (Anon. 2002). During 1992-1999, however, more than 80% of the catches have been taken by Norway, with Russia accounting for most of the remainder. In 2000-2002, the Norwegian share of the total official catches fell to about 60%.

ICES has provided annual scientific advice on catch levels for this stock since 1978; however, the fishery remained unregulated until 1992. Since most of the Greenland halibut stock is located within the Norwegian Exclusive Economic zone (NEZ) and Svalbard area, all regulations have been imposed and implemented by Norway. In view of the poor state of the stock, since 1992 the fishery has been regulated by permitting only vessels less than 28 m in length using longlines and gillnets to target Greenland halibut, with a small assigned quota that can only be fished during the month of June. In addition, catches by all other vessels and gears are restricted to by-catch only. The by-catch regulations have also become rather strict. This included a by-catch weight limit on Greenland halibut for other fisheries carried out in the area, which has varied between 5% and 12% since 1992 (Anon. 2002). ICES advised a zero catch for this stock during 1995-2002, on the basis of the low spawning stock and the apparent failure of several pre-recruit year-classes. However, because Greenland halibut is an allowable by-catch in other major groundfish fisheries such as cod and haddock, while a small targeted fishery is permitted, the actual catch substantially exceeded the advised TACs.

Stock evaluations of the Greenland halibut resource in the Northeast Atlantic indicate that the stock had been declining steadily since the 1970s, and by the early 1990s the spawning stock here had reached the lowest level observed (Anon. 1998b). This was mainly a result of excessive exploitation over the period, given that the fishery was unregulated until 1992. Recruitment failures were deduced from extremely low survey abundance indices of Greenland halibut at ages 0-4 from 1989 onwards. Later estimates of the abundance of these same year-classes aged five or more, on the other hand, suggest that these year-classes may not be nearly as weak as the earlier ages would suggest (Anon. 1998b). It seemed clear from recent studies and the data presented here that important areas for young Greenland halibut might be found further north and east of Svalbard than previously considered. These areas would have been outside the former surveyed areas from which the pre-recruit abundance indices were derived (Joint IMR/PINRO report 2002). Albert et al. (1997) also showed that the southwestern end of the distribution area of age one fish was gradually displaced northwards along west and north Spitzbergen in the period 1989-92 (partly outside the former surveyed areas) and southwards in 1994-96. These displacements seemed to have corresponded to changes in hydrography, i.e., a more northerly distribution when the temperature in the Barents Sea is high and a more southerly distribution when the temperature is low. It has been hypothesized that this may have caused the main concentrations of at least the 1989-1992 year-classes at early ages to move outside the areas formerly covered by the surveys. If this is correct, the implications for evaluating stock status are particularly worrisome for this resource, bearing in mind the fishery-independent database used in the assessments and advised TACs of recent years. Nevertheless, these year-classes as yet would have little effect on current estimates of the low spawning stock size, which alone would warrant the very strict scientific advice. On the other hand, if the estimates of the 1989-94 year-classes at older ages are confirmed as being more representative of year-class size, then improvements to the spawning stock could occur earlier than previously anticipated, provided that catches are kept low.

The Greenland halibut fishery was fully free until 1977 when exclusive economic zones were established in the Barents Sea and the Joint Russian-Norwegian Fisheries Commission (JNRFC) began to resolve questions concerning exploitation of the Greenland halibut stock. In 1978-1991 Norway allocated annual quotas for the Soviet Union (Russia) in the NEZ with volumes from 2.0 up to 12.5 thousand tonnes. From 1992, Norwegian and Russian authorities stopped all targeted fishery, except for Norway allowing a limited traditional non-trawl coastal fishery south of 71º30' N by vessels less than 28 m. The coastal fishery was to be kept at the historic annual level of ca. 2 500 tonnes, but with hindsight, the regulations have not fully succeeded in maintaining the coastal fishery at this low level. The allowable bycatch for other fisheries comes in additional this.

Both countries also catch certain amounts of Greenland halibut during the joint investigations confirmed by the RNFC. Catches taken for scientific purposes are limited by vessel numbers and by the length of time they are present on the fishing grounds. In 2000 restrictions on the catch volume for scientific purposes have been set. In 2002 each of the parties had the right to take 1.5 thousand tonnes, and in 2003 and 2004 - 3 000 tonnes each.

Based on data regarding Greenland halibut distribution and fishery and reference to the historical contribution to research on the stock, the Joint Russian-Norwegian Fisheries Commission (JNRFC) made a decision in 2009 on the future management utilization and international/national sharing of the TAC of this stock. Table 15 shows the recommended, agreed and official catches during the period 1987-2019. Since 2010 the TAC set by Joint Norwegian-Russian Fisheries Commission was always higher than the catch corresponding to the scientific advice (around 11-27% higher). Moreover, also the catches were always higher than the TAC set by the Joint Russian-Norwegian Fisheries Commission (around 2-30% higher). Finally, according to ICES (2018) discards are considered negligible, because according to the evidence showed during the site visit most of the fishing vessels (not only in the UoA) are equipped with tools (see section about gear description) avoiding the catches of fish below the minimum landing size (agreed by the JNRFC as 45 cm TL) and fish are always not damaged and discarded. Catches in 2017 exceeded the TAC and were 26 380 t. The total Greenland halibut landings in the Barents Sea and adjacent waters (ICES Subarea 1 and divisions 2.a and 2.b) in 2018 may thus be higher than the TAC of 27 000 t. However both the 47th and 48th Sessions of the Norwegian–Russian Fisheries Commission, (Appendix 3, available both in Norwegian and Russian) set the TAC as 25 000 t (source: http://www.jointfish.com/content/download/512/6950/file/48-norsk.pdf and http://www.jointfish.com/content/download/510/6397/file/47-norsk.pdf).

Table 15: Greenland halibut in subareas 1 and 2. ICES advice and official landings. All weights are in tonnes (Source: ICES, 2021)

Year	ICES advice	Catch corresponding to advice	Agreed TAC – Norway/JNRFC	TAC to Norway–EU zone in ICES subareas 2 and 6 ^	Official catches
1987	Precautionary TAC	-	-		19112
1988	No decrease in SSB	19000	-		19587
1989	F = F(87); TAC	21000	-		20138
1990	F = F(89); TAC	15000	-		23183
1991	F at F_{med}; TAC; improved expl. pattern	9000	-		33320
1992	Rebuild SSB(1991)	6000	7000*		8602
1993	TAC	7000	7000*		11933
1994	F < 0.1	< 12000	11000*		9226
1995	No fishing	0	2500**		11734
1996	No fishing	0	2500**		14347

1997	No fishing	0	2500**		9410
1998	No fishing	0	2500**		11893
1999	No fishing	0	2500**		19517
2000	No fishing	0	2500**		14297
2001	Reduce catch to rebuild stock	< 11000	2500**		16365
2002	Reduce F substantially	< 11000	2500**		13293
2003	Reduce catch to increase stock	< 13000	2500**		13447
2004	Do not exceed recent low catches	< 13000	2500**		18899
2005	Do not exceed recent low catches	< 13000	2500**		18834
2006	Do not exceed recent low catches	< 13000	2500**		17904
2007	Reduce catch to increase stock	< 13000	2500**		15453
2008	Reduce catch to increase stock	< 13000	2500**		13792
2009	Same advice as previous year	< 13000	2500**		12990
2010	Same advice as previous year	< 13000	15000***	350	15229
2011	Same advice as previous year	< 13000	15000***	350	16606
2012	No increase in catches	< 15000	18000***	350	20288
2013	No increase in catches	< 15000	19000***	824	22167
2014	No new advice, same as for 2013	< 15000	19000***	1000	23025
2015	Same as for 2014	< 15000	19000***	1000	24748
2016	Precautionary approach	< 19800	22000***	1100	24948
2017	Same advice as previous year	< 19800	24000***	1100	26380
2018	Precautionary approach	< 23000	27000***	1100	28438
2019	Same advice as previous year	< 23000	27000***	1250	28832
2020	Precautionary considerations	< 23000	27000***	1250	28713
2021	Same advice as previous year	< 23000	27000***	^^	
2022	Precautionary approach	≤ 19094			
2023	Precautionary approach	≤ 18494			

* Set by Norwegian authorities.
** Set by Norwegian authorities for the non-trawl fishery; allowable bycatch in the trawl fishery is additional to this.
*** Set by the Joint Norwegian–Russian Fisheries Commission (JNRFC).
^ UK after 2020
^^ Not available at the time of publication.

ICES in 2021 advised that when the precautionary approach is applied, catches in the year 2022 should be no more than 19 094 tonnes and catches in the year 2023 should be no more than 18 494 tonnes. This corresponds to a harvest rate of ≈ 0.035. In Table 16 are summarized the catch options estimated by ICES (2021), the harvest rate of 0.035 has been used to estimate the catches corresponding to the advice. All catches are assumed to be landed.

Table 16: Greenland halibut in subareas 1 and 2. Annual catch scenarios for 2023. All weights are in tonnes. (Source: ICES, 2021)

Basis	Total catch (2023)	HR_{total} (2023)	Biomass 45 cm+ (2024)	% Biomass 45 cm+ change *	% Advice change **
ICES advice basis					
HR_{pa} = 0.035	18494	0.035	523307	−2%	−3%
Other scenarios					
HR = 0	0	0	558282	4%	−100%
HR = 0.025	13590	0.025	532723	0%	−29%
$Catch_{2021}$	28713	0.055	504831	−6%	50%

* Biomass 45cm+ 2024 relative to 2023.
** Advice value for 2023 relative to the advice value in 2022.

The Norwegian and Russian authorities have agreed to monitor this stock as a joint stock. The stock is currently being monitored by the scientific surveys listed below, and biological sampling from the international bycatch fisheries and the Norwegian coastal fishery in June.

A major research and monitoring effort was being devoted to this stock through the three-year (2002-2005) Russian-Norwegian research programme for improvement of future management and advice. This programme is focusing on:

- Distribution and migrations
- Life history, reproductive biology, trophic relations
- Accuracy in determination of age and its influence on the stock assessment

- Improvement of time series by surveys and fishery
- Catchability of research trawls and comparative selectivity of research and fishing trawls and longlines
- Searching the ways of improvement of stock assessment on the basis of fulfilment of all projects
- Development of MSY biological reference points.

Since neither precautionary reference points nor explicit management objectives have been established for this stock, and until the joint Norwegian-Russian research programme is completed, the form of advice from ICES in the past was to let the stock size further increase. ICES further advised that additional management measures to control catches, e.g. TACs, area closures and reduced bycatch limits, needed to be introduced and enforced effectively.

The stock is estimated by the ICES Arctic Fisheries Working Group (AFWG) in spring using the XSA model in the past and, currently, with a Gadget model, every two years. The assessment is finally quality checked, and recommendations are subsequently provided by the ICES Advisory Committee on Fisheries Management (ACFM) at its June meeting.

The basic data for the estimations are the data on annual catches of various age groups (in numbers) and average individual (round) weights of specimens of various age groups. Maturity ogives are necessary for calculations of spawning stock. Moreover, trends in biomass and length distributions for four survey indices are used: the Norwegian slope survey (NO-GH-Btr-Q3), the Russian autumn survey (RU-BTr-Q4), and the newly derived EcoSouth and EcoJuv indices. Catch-in-tonnes and length distributions from four aggregated commercial fleets (Norwegian trawl and seine, Russian trawl and seine, Norwegian gillnet and longline, Russian gillnet and longline); and maturity-at-length data from the Norwegian slope survey (NO-GH-Btr Q3) are also used.

According with the assessment presented by ICES (2021), the fishable biomass (length ≥ 45 cm) increased from 1992 to 2013 and has been relatively stable thereafter. The harvest rate has been low since 1992 but has been increasing since 2009 and in 2020 was estimated to be above the precautionary harvest rate (HR_{PA}) (Figure 5).

The assessment uses an age–length-structured Gadget model (ICES, 2015). However, there is no agreement on age-reading methodology between Norway and Russia and the model is tuned using only length data. This gives uncertainty on the absolute levels of modelled biomass and F, and on the recruitment pattern. The peaks of recruitment identified by the model are corroborated by survey length distributions, but the weaker year classes may be poorly modelled. None of the surveys individually covers the complete stock distribution and there are discrepancies between the surveys, leading to high uncertainty and a marked retrospective pattern. Based on ICES procedures for stocks with sporadic recruitment and low exploitation rates, the lowest observed stock biomass with high recruitment is used as Bpa in the current advice (Bpa = 500,000 tonnes). There are indications of good recruitment from a lower stock size before the start of the period in the model; the Bpa is, therefore, likely to be on the conservative side and can be used as a proxy of PRI.

The assessment is conducted every two years and advice is to be given this year for catches in 2022 and 2023. The stock abundance and biomass of is presented for fish larger than 45 cm, this corresponds to the minimum legal size and is slightly larger than L50 maturity for males. Both 45 cm+ abundance and biomass peaks in 2013 and show a slow downward trend since then. There is a retrospective trend to reduce the size of the peak in 2013, this is likely due to several surveys (especially the Russian survey) climbing very steeply for the peak, and then declining equally rapidly. The retrospective does not alter the overall trends in the model. The modelled recruitment is spiky, and it is likely that this is exaggerated due to the lack of age data. However, even though the real recruitment is likely more spread out, the modelled peaks show reasonably good agreement to the data from the juvenile survey. This stock is dominated by sporadic recruitment events, and the model does a reasonable job of capturing this.

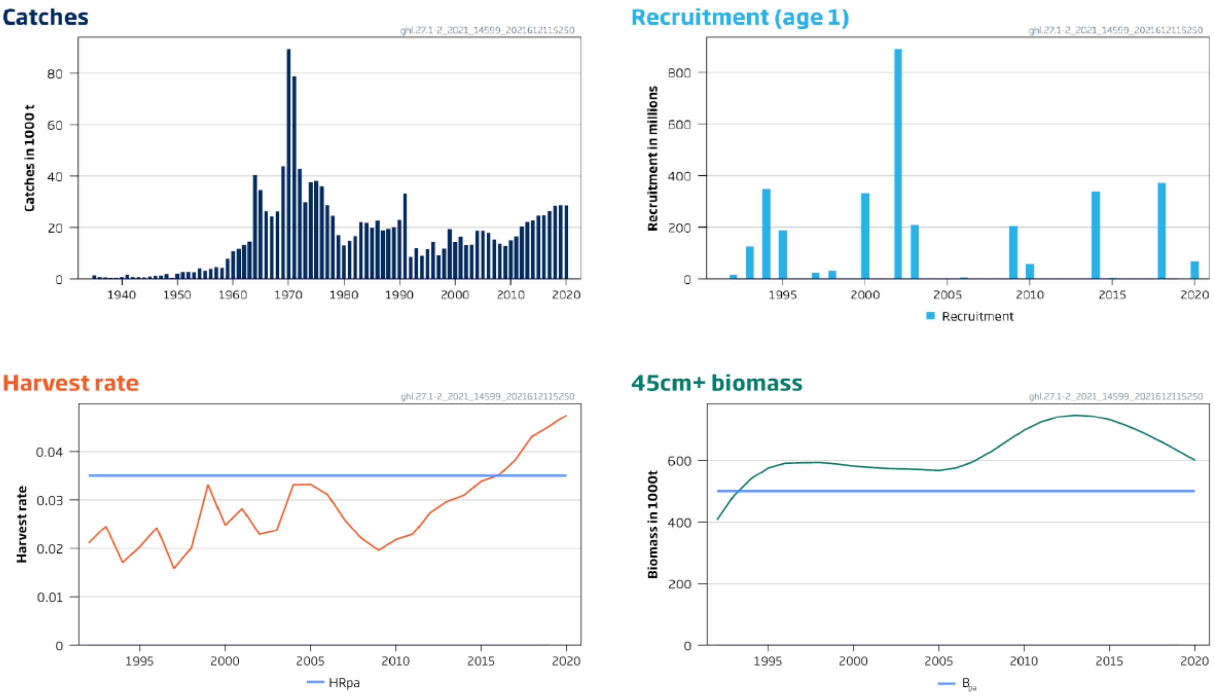

Figure 5: Greenland halibut in subareas 1 and 2. Summary of the stock assessment. Catches (thousand tonnes), harvest rate (defined as catch in a year divided by biomass at the start of the year), recruitment at age 1 (millions), and fishable (length ≥ 45 cm) biomass (thousand tonnes); Source: ICES 2021.

The model exhibits a retrospective pattern associated with the biomass peak around 2014. The two coastal shelf surveys (the ecosystem survey and the Russian surveys) showed a more rapid rise than the other surveys, and then a more rapid reduction. The Russian survey, in particular, had a very rapid rise and then rapid decline. The model therefore has a series of downward revisions as the peak has been passed, where the model now estimates that it had previously been over-optimistic about the size of the peak. It should be noted (ICES IBPHALI REPORT 2015; ICES CM 2015\ACOM:54) that there is an issue with this stock where different surveys give different signals and choosing one survey over the others could impact the biomass level by several hundred thousand tonnes. Given this, a retrospective pattern is probably to be expected as the different surveys evolve. The last two years (since the peak has passed) are rather stable. Note also that one of the surveys is run every two years (in odd-numbered years), this accounts for the grouping of lines in the retrospective pattern into pairs (Figure 6).

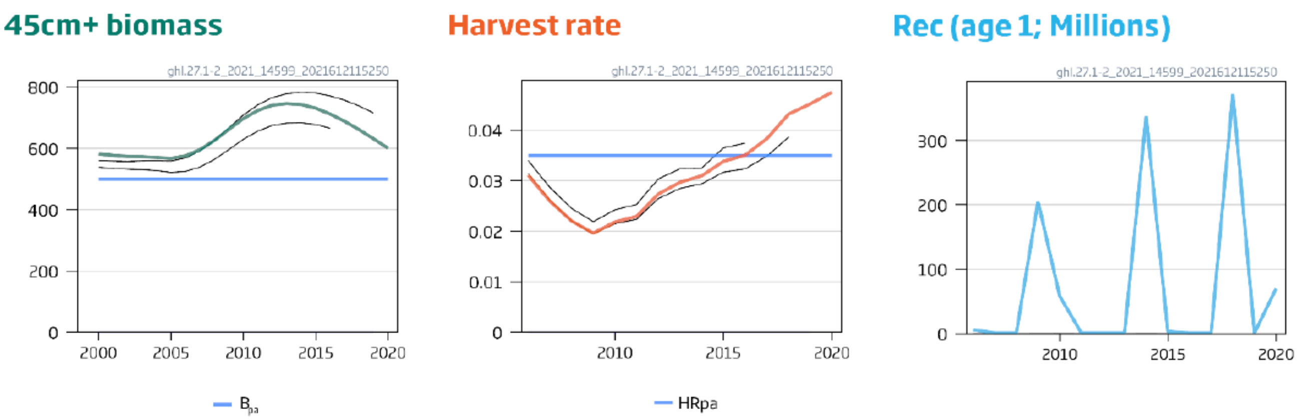

Figure 6: Greenland halibut in subareas 1 and 2. Historical assessment results. Assessment 2017 (red line) compared to 2017 and 2015 (black line). Source: ICES 2017a.

In the absence of a harvest control rule or MSY reference points, the advice is based on a precautionary approach where priority is given to keeping the HR below HR_{pa} and the stock biomass above B_{pa}. This HR_{pa} is a interim measure. Evaluation of reference points and an appropriate longer-term advice rule will take place at and following the next planned benchmark. The fishery has a history of both quotas being set at levels above those provided in scientific advice and catches being above the quota; this is not precautionary. Greenland halibut is a long-lived, low productivity species which requires low fishing pressure – and the stock is currently declining.

EU has set a joint TAC for Union waters of Division 2.a and Subarea 4 and for Union and international waters of Division 5.b and Subarea 6. For 2020 this TAC was 2500 tonnes, of which 1250 tonnes were allocated to Norway in subareas 2 and 6. Quotas should be set to apply only to subareas 1 and 2, as Greenland halibut in these subareas is a separate stock.

As the model is developed, it is likely that the basis of the advice will be revised. Reconstruction of pre-1992 stock and exploitation levels would provide a better basis for reference points and evaluation of MSY and harvest control rules. This is a long-lived, low productivity species which requires low fishing pressure and the stock is currently in a relatively stable state. There is, therefore, no need for annual updates to the advice. Furthermore, one of the key surveys is only conducted every two years. ICES provide advice for a two-year period.

Greenland halibut was also assessed using a Bayesian surplus production models (Bakanev in 2013, (WKBUT WD 14, see ICES, 2020). Different sets of abundance indices were used for tuning the model. The analysis of model run results has shown that K is estimated within the range of 810 to 1139 kilotonnes, BMSY of 405 to 570 kilotonnes and MSY of 23 to 47 kilotonnes. However, the model was sensitive to the choice of prior on K. Taking into consideration a high probability of the stock size being at the level which was quite a bit above BMSY, the risk of the biomass being below this optimal one was very small in 2002–2012 (<1%). The risk analysis of the stock size in the prediction years (2013–2020) under the catch of 0 to 30 kilotonnes indicated that the probability of the stock size being under the threshold levels (BMSY, Blim) was also minor (less than 1%). It was concluded that further work was needed on the historical CPUE series. Based on scrutiny of the CPUE series it was recommended to examine runs with the surplus production model for the period 1964—1991 and 1964—2005, in addition to runs for the whole 1964—2013 period. Fisheries CPUE series were considered less reliable to reflect stock dynamics than survey indices in the period after regulations of the fishery were introduced in 1992.

A production model was presented to the 2016 meeting (Mikhaylov, 2016, WD 14), although this model has not been reviewed at a benchmark, nor were biomass trends presented at this meeting. The model has been proposed as a possible method for estimation of long-term reference points. An update was presented to the 2019 meeting (Mikhaylov 2019, AFWG 2019 WD21). In the current version, the MSY would be around 34 ktonnes, the BMSY around 500 ktonnes and FMSY on the level 0.069. It should be noted that these values are not directly transferable to a different model with different biomass levels and in any case a long-term average. The WD concludes that, in general, the stock can withstand the current fishing load and the fishing regime is ap-proaching optimum, indicating that the results of the exploratory surplus production model are in general alignment with the assessment and advice presented here.

FMSY is not appropriate to this stock given the recent extended run of poor recruitment, and such values have not been evaluated for precautionarity. In a plenary, it was concluded that it would be useful for further development of the production model to conduct separate exploratory runs for CPUE split into before and after 1992 and run with CPUE only before 1992 and survey data after 1992. This production model was not updated for presentation at the current meeting.

At the 2018 meeting, AFWG results from SPiCT production model were presented (AFWG report 2018). In the run that is presented in this report, all available data up to 2016 were used. For run with default priors applied K = 995 421 t and deterministic reference points were BMSY = 419 955 t, F = 0.07 and MSY = 29 742 t. Stochastic reference points for this run were in a similar range. Run with default priors deactivated gives similar MSY estimate but otherwise rather different esti-mates; K = 2 504 006, BMSY = 609 410 t, F = 0.05 and MSY = 28 097 t. Further utilization of this ap-proach demands closer scrutiny of model settings in relation to diagnostics. The SPiCT model can be a flexible tool to examine production model approach to Greenland halibut, however, concerns highlighted below still apply.

In principle, a production model could be used in conjunction with the GADGET assessment model in order to extend the simulations back in time and provide better estimates for Blim. However, the inability of production models to follow variable recruitment, and especially runs of above or below average recruitment, limits their ability to give advice for this stock.

Some fishing for Greenland halibut has taken place in the northern part of Division 4.a during the past 20—30 years, varying between a few tonnes and up to 1670 t in 1995. From 2005 to 2011 this catch was mostly below 200 t, taken mostly by Norway, France and UK. Preliminary numbers show 1134 t in 2016, mainly due to contribution of the Norwegian trawl fleets. Although there is a continuous distribution of this species from the southern part of Division 2a along the continental slope towards the Shetland area, stock structure is unclear in this area and these landings have therefore not been added to the total from Subareas 1 and 2. Recent mark-recapture and genetic investigations indicate that the stock might have a more south and westward distribution then current ICES definition of stock boundaries (Albert and Vollen 2015; Westgaard et al. 2016).

The benchmark and data workshop process lead to an agreed analytic assessment in 2015. A benchmark meeting (WKBUT; ICES 2013/ACOM:44) was held for the Northeast Arctic (NEA) Greenland halibut in 2013, but the benchmark process was prolonged due to problems with data. A data workshop was conducted in November 2014 DCWKNGHD; ICES CM 2014/ACOM:65), followed by a benchmark by correspondence that ended in 2015.

In the Russian bottom-trawl surveys in October-December (ICES acronym: RU-BTr-Q4) are important since they usually cover large parts of the total known distribution area of the Greenland halibut within 100—900 m depth. However, it has been considered imprudent to use the 2002, 2003 and 2013 data from this survey series. During the 2002 survey, no observations were available from the Exclusive Economic Zone of Norway (NEEZ). In 2003, observations on the main spawning grounds were conducted three weeks later than usual because access to NEEZ was obtained too late. The number of trawl stations was also insufficient due to the same reason. Due to technical problems indices in 2013 were not obtained. Technical and practical changes were made in 2003. The biomass indices for this survey increased steeply from 2005 to 2011, fell again until 2014, but have shown steep increase then (Figure 7). Total biomass indices from the Norwegian autumn slope survey (ICES acronym: NOGH- Btr-Q3) showed an upward trend in biomass estimates between 1994 and 2003, then a downward trend until 2008 until it increased again in 2009 but levelled out again in 2011, 2013 and 2015 (Figure 7). The index for 2019 is the lowest since the start of the survey.

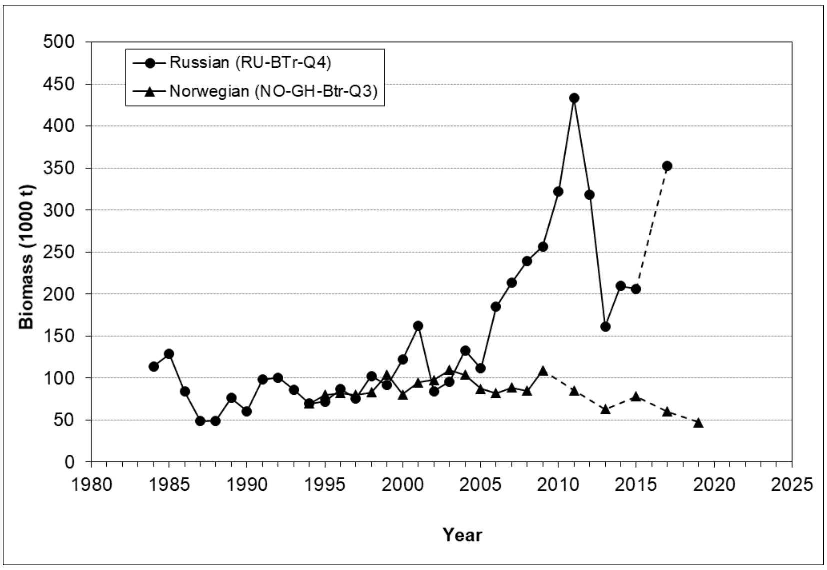

Figure 7: NEA Greenland halibut. Total biomass estimates from Russian autumn and the Norwegian slope survey. The Norwegian survey is run every other year since 2009. Uncertain estimate for 2013 from the Russian survey. Source: ICES 2020.

The Joint Winter Survey covers large part of the Barents Sea down to 500 m and concerning Greenland halibut it can be regarded to be in the areas where mainly juveniles and immature fish are found. Two indices for Greenland halibut are based on the Joint Ecosystem Survey in the Barents Sea and previous juvenile survey, one for juvenile areas denoted Eco-juv index in the northernmost survey area, and another denoted Eco-south index for adults defined by the survey area south from 76.5°N and in addition west of Spitsbergen. The juvenile index indicates a highly variable recruitment success with years between good year classes. The 2015 estimate is the lowest registered so far, with slight increase in 2016. The Eco-south index increased from 2001 to 2007 but has mainly shown a decreasing trend since then, but a slight increase is registered in 2016. The total indexes of abundance and biomass show a clear increasing pattern for the whole time series (1994-2019; Figure 7). It is important to stress that such survey dates are not used in the Gadget model.

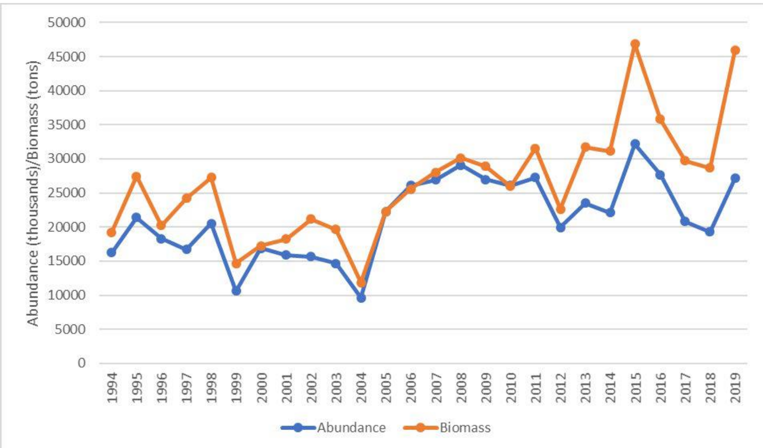

Figure 8: Joint winter survey in the Barents Sea; Greenland halibut abundance and biomass estimates. Source: ICES 2020.

The ICES advisory service quality assurance program requested that a team of graduate students of University of Massachusetts (Dartmouth, School for Marine Science & Technology, New Bedford, Massachusetts, USA) and their professors (Robert Wildermuth (co-chair), Steve Cadrin (co-chair), Gavin Fay (co-chair)) serve as a review group, as specified in Guidelines for Review Groups (RG; ICES 2009). The group initially met on 27 April 2018 to review the ICES advisory process, RG guidelines, and to assign AFWG report (ICES, 2018) sections to each reviewer. RG members reviewed WG report sections independently and presented their summaries and reviews to the group in a series of meetings from 7-9 May 2018. The Greenland halibut in Barents Sea stock assessment was reviewed by the RG, and the RG evidenced that data, model choice, and specification were clearly explained and justified. In general, the RG concludes that the completed reports are technically correct and agrees with the WG interpretations and recommendations in relation to Greenland halibut in Barents Sea.

In 2020, the draft advice sheet was rejected by ADGANW (Advice Drafting Group for Arctic and North-Western fish stocks) and a roll-over advice was used for advice in 2020. ADGANW issued a request to repeat the advice process in 2020 with HRpa reference points for use in the 2021 advice (ICES 2017). A working document (Howel 2020, WD 15) was presented to address the definition of a HR_{pa} for the stock. However, due to the need for a simplified approach related to the 2020 corona virus outbreak ICES-ACOM decided, in agreement with Advice Requestors, that roll-over advice should be used in 2020 to provide advice on fishing opportunities in 2021.

The ongoing reduction in sex-split length samples in two survey indices, EcoJuv and EcoSouth required a change in methodology for computing the tuning indices used in the assessment. The change was implemented in the 2019 assessment. This increased the absolute biomass estimates by about 10% but did not affect the trend in biomass through years. This change has also acted to reduce the retrospective pattern differences in recent years, likely as a result of the model no longer chasing noise in the data. We stress once again that the absolute biomass levels for this model are rather uncertain. Without age data in the model tuning there is little information on total mortality (Z) at age (number-at-age x in year y minus number-at-age x-1 in year y-1 gives information on Z). Without this, there is little information for the model to translate catch infor-mation into F, and hence inform biomass levels. Furthermore, the conflicting survey signals translate into an uncertainty range of several hundred thousand tonnes (IBPHALI 2015). All the exploratory work suggests that the overall trends are robust, but that care should be taken in interpreting the absolute abundance estimates (and hence absolute estimates of harvest rate).

Although there is little retrospective pattern differences over the last four years, the model exhibits a retrospective pattern in earlier years associated with the biomass peak around 2014. The two coastal shelf surveys (the ecosystem survey and the Russian survey) showed a more rapid rise than the other surveys, and then a more rapid reduction. The Russian survey had a very rapid rise and then a rapid decline. The model, therefore, had a series of downward revisions as the peak was passed, where the model now estimates that it had previously been over-optimistic about the size of the peak. It should be noted (ICES IBPHALI REPORT 2015; ICES CM 2015\ACOM:54) that there is an issue with this stock where different surveys give different signals and choosing one survey over the others could affect the biomass level by several hun-dred thousand tonnes. Given this, a retrospective pattern is probably to be expected as the dif-ferent surveys evolve. Note also that one of the surveys is run every two years (in odd-numbered years), this accounts for the grouping of lines in the retrospective pattern into pairs.

To facilitate the calculation of spawning-stock biomass, maturity ogives from the Norwegian Slope survey were derived for years 1994–2015. These ogives give approximately identical length at 50% maturation (L50) for males compared L50 based on Russian fisheries data. L50 for females is higher in the Norwegian data due to new definition on when females are considered mature/immature in accordance to recent research (Kennedy et al., 2009, 2011 and 2014, Nunez et al., 2015). GLM fitted ogives can be used in future assessments.

Further development of the assessment is needed and, in consistency with conclusions of the IBPHALI benchmark and report of the external benchmark reviewer.

AFWG suggest a new benchmark on the stock in 2022, and intersessional work will commence on a possible issues list. Such a benchmark, especially if it can extend the model back in time to a period of lower stock biomass, would allow a more accurate determination of precautionary biomass reference points. It would, therefore, be a precursor to a potential MSE to generate an HCR for this stock and move away from precautionary advice. At ICES-ADGANW 2019 it was suggested that an inter benchmark process should be undertaken where a simple Fmsy proxy is developed as well as Btrigger, or failing that a Fpa to provide precau-tionary advice.

The working document (Howel 2020, WD 15) proposed an interim HRpa (harvest rate pa) until such time as the stock next undergoes a full benchmark followed by a HCR evaluation to come with a full management plan for this stock. Ideally, such a benchmark would take place in 2022.

The HRpa is based on the method proposed in the 2017 ICES fisheries management reference points for category 1 and 2 stocks (ICES 2017). This method involved projecting the stock forward under average recruitment to identify the fishing level Flim that drives the stock to Blim under equilibrium. This method was chosen because the lack of age tuning data makes the variability of recruitment unreliable, and using averages is a more robust approach. There is a modification to allow for the fact that in light of the lack of contrast in the data this stock has Bpa set equal to Blim, and hence the method gives HRpa directly, and there is no need to first compute an HRlim and then adjust this for an HRpa. In using this approach it is necessary to select the recruitment average to use, and the method chosen was to use the

full-time series of recruitment, but exclud-ing the extra high peak in 2003, with the justification that such a recruitment peak has not been repeated since and therefore this level of recruitment cannot be expected to enter the fishery in the coming years.
The overall proposal from the WD is: The proposed HRpa for Greenland halibut in areas 1 and 2 is 0.035, with the provison that if a large recruitment event is observed in the surveys then the HRpa should be revised before the incoming good recruitment entering the fishery.
This solution for HRpa, if accepted by ACOM, would apply until a suggested benchmark. The meeting decided to revisit this at the 2021 AFWG meeting, to consider the use of this HRpa in advice for 2022 and 2023.

7.2.2 Catch profiles

The catch profiles for the target stock are presented in Figure 9.

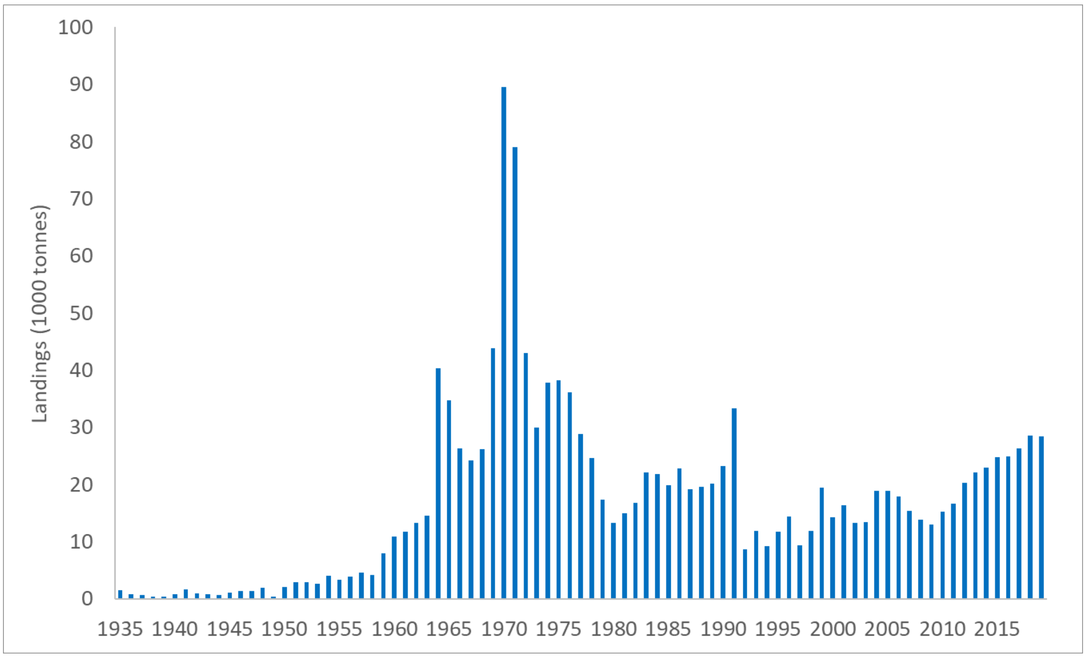

Figure 9: NEA Greenland halibut. Historical landings (Nedreaas and Smirnov 2003 and AFWG). Source: ICES 2020.

7.2.3 Total Allowable Catch (TAC) and catch data

Table 17 Total Allowable Catch (TAC) and catch data

TAC (all countries)	Year	2020	Amount	27000 T
Total catches (all countries)	Year	2020	Amount	28713 T
UoA share of total TAC	Year	2020	Amount	53,82%
Total green weight catch by UoC	Year (most recent)	2020	Amount	14532 T
Total green weight catch by UoC	Year (second most recent)	2019	Amount	14813 T

Estimations of total catches needs to be reviewed at initial audit.

7.2.4 Principle 1 Performance Indicator scores and rationales

PI 1.1.1 – Stock status

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	Stock status relative to recruitment impairment			
	Guide post	It is **likely** that the stock is above the point where recruitment would be impaired (PRI).	It is **highly likely** that the stock is above the PRI.	There is a **high degree of certainty** that the stock is above the PRI.
	Met?	**Yes**	**Yes**	**No**
Rationale				

The last observed year with good recruitment occurred in 1994 and 2020 at 500 000 tonnes fishable (45+ cm) biomass. There is evidence (in the estimated initial population for the assessment model) that an earlier good recruitment event occurred in the 1980s from a lower biomass, but the exact biomass level is unknown as this is before the model period.

The precautionary reference point is therefore taken at 500 000 tonnes, with a note that this is likely to be on the high (precautionary) side. Using 45+ cm biomass (rather than total or female SSB) avoids uncertainty around maturation sizes and the different distributions of males and females, and relates directly to the fishable stock, but does not directly relate to the most vulnerable or critical female SSB. The Bpa is set as fishable biomass in 1995 (= 500 000 tonnes), based on the lowest observed stock size for which good recruitment has been observed. Therefore, Bpa can be considered a good proxy of the PRI because is set above the point where there is an appreciable risk of recruitment failure according to the past observations of recruitment (ICES, 2021).

The stock has been above Bpa almost for the entire time-series and it has increased in the last 7 years. It's important to evidence that the Bpa proposed as PRI, has been set as the fishable biomass (length ≥ 45 cm) in 1995, based on the lowest observed stock size for which good recruitment has been observed. Taking into consideration that the fishable biomass is around 560,000 tonnes (in 2021) it is possible to conclude that it is highly likely that the stock is above the PRI. **Therefore SG60 and SG 80 are met**.

However, taking into account the low recruitment and the decreasing trend in the last year of survey data, it is not possible to conclude that there is a high degree of certainty that the stock is above the PRI. **Therefore, SG 100 is not met.**

b	Stock status in relation to achievement of Maximum Sustainable Yield (MSY)			
	Guide post		The stock is at or fluctuating around a level consistent with MSY.	There is **a high degree of certainty** that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	Met?		**Yes**	**No**
Rationale				

In ICES 2021 assessment the advice is based on a precautionary approach and values of MSY based reference points are not available. According to SA2.2.3 the use of proxy methods for estimating MSY is allowed. The guidance further confirms: "Where proxies are used that are not expressed as percentages of B0, teams should generally ensure that: 1) Any reference point used as a proxy for scoring the PRI is set above the point where there is an appreciable risk of recruitment failure; 2) Any reference point used as a proxy for the MSY level maintains the stock well above the PRI and at levels of production and stock sizes consistent with BMSY or a similar highly productive level. Where proxy reference points are defined in this way, teams should take account of the difference between the reference point and the required (PRI or MSY) levels in their scoring." Note that the underlined text allows that MSY may not always be reliably estimable, and it may be sufficient in these cases to ensure that the stock is fluctuating around a 'highly productive' level as is clearly evidenced above in SI a.

According to GSA 2.2.3.1 an SG80 can be reached if no decline has been observed in two proxies of biomass for one generation time and at least one proxy indicates that the stock is at a highly productive level.
In the case of the present stock it is possible to argue that the stock is clearly above the PRI and stock is at or fluctuating around a level consistent with MSY. The second conclusion is possible to be demonstrated by the fact that the fishable biomass is increasing and producing high recruitment for some years, demonstrating a high productive level. The second proxy is the joint Winter survey (Figure 8) showing an increasing pattern (ICES, 2020). **Therefore SG 80 can be reached**. Such positive trends are observed for more than one generation time (GT ≈ 20 years).
As stated in the certification requirements (GSA 2.2.3), in these cases, where higher scores are justified by the use of more than one proxy indicators, such proxies should be independent of each other and also reasonably be expected to be proxies of the quantity of interest (such as CPUE in the case of stock biomass). The proxy used in the present case are independent each other because the winter survey is not used in the Gadget model (see ICES 2018 page 382 – Future works) which provides the estimate of fishable biomass.Both estimates of biomass are acceptable proxies because the first is estimated from the most accurate model available (Gadget) and the second is covering most of the area distribution of the stock.
However, there is not strong evidence that there is a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years. Therefore, **SG 100 is not met**.

References

ICES. 2018. Report of the Arctic Fisheries Working Group (AFWG), 18–24 April 2018, Ispra, Italy. ICES CM 2018/ACOM:06. 859 pp.

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ICES. 2021. Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic). In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, ghl.27.1-2, https://doi.org/10.17895/ices.advice.7755.

Stock status relative to reference points

	Type of reference point	Value of reference point	Current stock status relative to reference point
Reference point used in scoring stock relative to PRI (SIa)	Bpa as a proxy of PRI	500,000 t	560,000/500,000 t = 1.12
Reference point used in scoring stock relative to MSY (SIb)	Not defined	-	-

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 1.1.2 – Stock rebuilding

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	Rebuilding timeframes			
	Guide post	A rebuilding timeframe is specified for the 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 stock.
	Met?	**NA**		**NA**
Rationale				

The stock is not depleted.

b	Rebuilding evaluation			
	Guide post	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is **evidence** that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.	There is **strong evidence** that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the **specified timeframe**.
	Met?	**NA**	**NA**	**NA**
Rationale				

The stock is not depleted.

References

The CAB shall list any references here, including hyperlinks to publicly-available documents.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**NA**
Information gap indicator	**-**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 1.2.1 – Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	Guide post	The harvest strategy is **expected** to achieve stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy **work together** towards achieving stock management objectives reflected in PI 1.1.1 SG80.	The harvest strategy is responsive to the state of the stock and is **designed** to achieve stock management objectives reflected in PI 1.1.1 SG80.
	Met?	**Yes**	**No**	**No**
Rationale				

The stock is shared mainly between Russia and Norway. The TAC is set based on ICES precautionary approach.

The JNRFC adopted a harvesting strategy for live marine resources in 2002; 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 shared stocks, as Greenland halibut. The reference points and code of conduct for the Precautionary Approach have subsequently been fine-tuned, based on experience and new knowledge gained.

During the period from 1991 to 2009, and with the exception of research catches and a limited level of direct fishing for the Norwegian coastal fishing fleet, there was a prohibition on direct fishing of Greenland halibut. In 2010, the parties reached their first agreement for a joint assessment of stocks, the establishment of a total quota and how it should be distributed.

The harvest strategy consists of ICES annual working group meetings to review the stock assessment and develop the scientific advice and information used to set the TAC. Taking into account the increasing trend of the stock biomass it is possible to conclude that the harvest strategy is expected to achieve MSY level. Therefore**, SG 60 is met**.

Scientific studies, including data collection and stock assessment have and are being used to evaluate the strategy since more than 10 years. The harvest strategy is responsive to the state of the stocks but aims to maintain the stock at levels consistent with the precautionary approach and not with the MSY level. Therefore, not all the elements of the harvest strategy and in particular the HCRs are working together towards achieving the MSY objectives and **SG80 is not met.**

b	Harvest strategy evaluation			
	Guide post	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?	**Yes**	**Yes**	**No**
Rationale				

The stock status is regularly monitored through the stock assessments carried out every 2 years, and the estimates of fishable biomass indicate that the harvest strategy has been achieving its objectives because the fishable biomass is above Bpa (ICES, 2021). The current strategy has been operating since 2003, including effective monitoring system and regular evaluation giving feedback to the decision-makers as the JNRFC. Therefore, **SG 60 and 80 are met**.

However, the success in implementation of the harvest strategy is not complete taking into account that catches are always higher than TAC and also the TAC is higher that the scientific catch advice. Therefore, **SG 100 is not met**.

c	Harvest strategy monitoring			
	Guide post	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	**Yes**		
Rationale				

Considerable data are collected on the fishery, including data on catches and stock abundance. These are sufficient to monitor the stock and catch by area and time. These, through review and various analyses, provide a strong basis to evaluate all parts of the harvest strategy. **SG 60 is met**.

d	Harvest strategy review			
	Guide post			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			**Yes**
Rationale				

ICES conducts inter benchmark process on Greenland Halibut in ICES areas I and II every 3-4 years (ICES, 2017a; b; 2018). Also, the JNRFC reviews frequently the HS during specific working groups as the working group for preparation of joint technical regulatory measures for fisheries on joint stocks in the Barents Sea and the Norwegian Sea. The purpose of this working group is to ensure transparency in the management of the joint fish stocks, in order to contribute towards improved compliance with the fishing regulations on the part of the fishermen and to simplify control measures. The working group was set up to analyse all prevailing technical regulatory measures for the joint fish stocks and to propose possible amendments and additions in order to ensure protection, natural exploitation and reproduction of the joint stocks, and maximum economic yield from fishing for both countries in the long term. When drawing up proposals for joint technical regulatory measures for the joint stocks, the working group shall make reference to the biological, economic and other relevant criteria applied when laying down the above-mentioned measures.(see http://www.jointfish.com/eng/THE-FISHERIES-COMMISSION/WORKING-GROUPS.html; IMR-PINRO 2014) Therefore, the HS is periodically reviewed both in the ICES and JNRFC framework, **SG 100 is met.**

e	Shark finning			
	Guide post	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?	**NA**	**NA**	**NA**
Rationale				

Not applicable to this target species.

f	Review of alternative measures			
	Guide post	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	**NA**	**NA**	**NA**
Rationale				

According to the ICES advice 2021 (ICES, 2021) discards are consided negligible. Therefore 1.2.1f is not scored in the ACDR.

However, during the site visit more evidence will be requested about the UoA-related mortality of unwanted catch of the target stock

References

ICES 2017a. Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic). ICES Advice on fishing opportunities, catch, and effort Arctic Ocean, Barents Sea, Faroes, Greenland Sea, Published 13 June 2017 Iceland Sea and Norwegian Sea Ecoregions Version 2: 26 September 2017 ghl.27.1-2 DOI: 10.17895/ices.pub.3048

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Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**60-79**
Information gap indicator	**More information sought** *More info about unwanted catches*

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 1.2.2 – Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
a	HCRs design and application			
	Guide post	**Generally understood** HCRs are in place **or available** that are **expected** to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	**Well defined** HCRs are **in place** that **ensure** that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock **fluctuating around** a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock **fluctuating at or above** a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, **most** of the time.
	Met?	**Yes**	**No**	**No**
Rationale				

The stipulation of the total quota for the various joint fish stocks has been and remains a key element of the annual negotiations between Norway and Russia. The negotiations are based on ICES scientific recommendations. Up to 1980, the ICES recommended one specific quota level for each stock. In 1981, a new scheme was introduced involving several alternative recommendations. The 1995 United Nations Fish Stock Agreement introduced the concept of the Precautionary Approach as a principle for fisheries management. In 1981 work started on developing joint harvesting strategies with related codes of conduct for the stipulation of total quotas for this fish stock as Greenland halibut. Taking into account such evidences and considering that the stock has been always higher than the Bpa (considered as the PRI) it is possible to conclude that generally understood HCRs are in place and are expected to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached. Therefore, the HCRs in place are clearly working to reduce exploitation when the stock goes below Bpa and **SG 60 is met**.
However, it is clearly stated in ICES 2020 and 2021 that harvest control rule based on MSY reference points are absent and the advice is based on a precautionary approach where priority is given to keeping the stock biomass above Bpa. Therefore, **SG 80 is not met**.

b	HCRs robustness to uncertainty			
	Guide post		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a **wide** range of uncertainties including the ecological role of the stock, and there is **evidence** that the HCRs are robust to the main uncertainties.
	Met?		**Yes**	**No**
Rationale				

The HCRs are mainly based on the stock assessment outcome carried out by ICES. Taking into consideration that ICES uses a no error free model to provide the advice (Gadget; as evidenced during the site visit) it is possible to conclude that the HCR is robust the main uncertainties as in catch and stock abundance. Therefore **SG 80 is met**.

However, taking into account the doubts in stock configuration and in the ageing and consequently the use of a length-based model it is not possible to conclude that the HCRs take into account a wide range of uncertainties Therefore, **SG100 is not met**.

c	HCRs evaluation			
	Guide post	There is **some evidence** that tools used **or available** to implement HCRs are	**Available evidence indicates** that the tools in use are appropriate and effective	**Evidence clearly shows** that the tools in use are effective in achieving the

		appropriate and effective in controlling exploitation.	in achieving the exploitation levels required under the HCRs.	exploitation levels required under the HCRs.
	Met?	**Yes**	**No**	**No**
Rationale				

The proxy indicators and reference points used to evaluate the effectiveness of HCRs can be considered acceptable to reach MSY level because there is evidence that a good recruitment event occurred in the 1980s from a lower biomass than the one observed in 1995 (see ICES 2018, page 380). The precautionary reference point is therefore taken at 487 000 tonnes, with a note that this is likely to be on the high (precautionary) side. Moreover, using 45+ cm biomass (rather than total or female SSB) avoids uncertainty around maturation sizes and the different distributions of males and females, and relates directly to the fishable stock, but does not directly relate to the most vulnerable or critical female SSB.
The tools in use for implementing the HCR are primarily the TAC, which is adjusted in relation to a precautionary approach based on the proxy indicators and reference points previously commented. Moreover, other tools as minimum landing size and additional measures aimed at the protection of juveniles are implemented and monitored. Taking into account the evidence that discards is not a problem (see ICES 2018) and that according to Spict model the fishing mortality is below FMSY since the 1990s when an agreed TAC was implemented it is possible to conclude that there is some evidence that tools used to implement HCRs are appropriate and effective in controlling exploitation. Therefore, **SG60 is met**.

Although the HCR are appropriate in controlling exploitation (SG60) they have not limited exploitation to levels as required under the HCR (SG80). There has been overshoot of the TAC above the target level in all the period. Although there was a clear improvement in the last years in achieving the recommended TAC, the evidence over recent years shows that current management actions used to share the scientifically advised annual TAC are not completely effective in achieving the exploitation levels required under the harvest control rules. Therefore, the fishery **does not meet the SG 80.**

References

ICES 2017a. Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic). ICES Advice on fishing opportunities, catch, and effort Arctic Ocean, Barents Sea, Faroes, Greenland Sea, Published 13 June 2017 Iceland Sea and Norwegian Sea Ecoregions Version 2: 26 September 2017 ghl.27.1-2 DOI: 10.17895/ices.pub.3048
ICES. 2017b. Report of the Arctic Fisheries Working Group (AFWG), 19–25 April 2017, ICES HQ, Copenhagen, Denmark. ICES CM 2017/ACOM:06. 486 pp.
ICES. 2018. Report of the Arctic Fisheries Working Group (AFWG), 18–24 April 2018, Ispra, Italy. ICES CM 2018/ACOM:06. 859 pp.
ICES. 2020. Arctic Fisheries Working Group (AFWG). ICES Scientific Reports. 3:58. https://doi.org/10.17895/ices.pub.8196.

ICES. 2021. Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic). In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, ghl.27.1-2, https://doi.org/10.17895/ices.advice.7755.

IMR-PINRO Joint Report, 2014.: McBride, M. M., Filin, A., Titov, O., and Stiansen, J. E. (Eds.) 2014. IMR/PINRO update of the “Joint Norwegian-Russian environmental status report on the Barents Sea Ecosystem” giving the current situation for climate, phytoplankton, zooplankton, fish, and fisheries during 2012-13. IMR/PINRO Joint Report Series 2014(1), 64 pp. ISSN 1502-8828.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**60-79**
Information gap indicator	**More information sought** *More info about the HCRs and TAC*

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 1.2.3 – Information and monitoring

PI 1.2.3		**Relevant information is collected to support the harvest strategy**		
Scoring Issue		SG 60	SG 80	SG 100
a	**Range of information**			
	Guide post	**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 are available to support the harvest strategy.	A **comprehensive range** of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

Information is comprehensive across fleet, stock distribution, catch for all the countries involved in the fisheries (discards are considered negligible, see ICES 2018). Considerable stock related information (maturity, ageing, fecundity) and environmental information are collected, which are relevant to the population dynamics of the stock. Also, an ecosystem survey monitors the state of the Barents Sea Ecosystem to support scientific research and management advice (http://www.imr.no/tokt/okosystemtokt_i_barentshavet/en). Therefore, **SG 60, SG80 and SG100 are met**.

b	**Monitoring**			
	Guide post	Stock abundance and UoA removals are monitored and **at least one indicator** is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA 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?	**Yes**	**Yes**	**Yes**
Rationale				

The authorities of the countries involved in the fishery regularly monitor the UoA removals, taking into account that in Norway there are detailed fisheries statistics programmes that cover all removals by commercial fisheries. The stock abundance is regularly monitored by the scientific institutions in Russia and Norway with trawl surveys conducted every year. These are used in the assessment to estimate yearly level of harvest ratio and biomass relative to reference point employed in the estimation of the TAC. Therefore, **SG 60 and SG80 are met**.

In ICES 2020, a good description of the stock structure and connectivity between the main fishing areas is provided. More evidences are available for biological information on spawning and nursery grounds for the juveniles and biomass indices over the entire assessment area are are available. Further, recent tagging experiments in the Barents Sea and ageing studies are also available (ICES, 2020). Considering such evidences, it is possible to argue that there is a good understanding of uncertainties in the information and the robustness of assessments and management to this uncertainty. Therefore, **SG 100 is met**.

More information will be requested during the site visit about the monitoring of UoA removals.

c	**Comprehensiveness of information**

	Guide post		There is good information on all other fishery removals from the stock.	
	Met?		**Yes**	
Rationale				

All the other fisheries removals (in Russia) are well monitored with the data collection regulation in EU and non-EU countries. **This meets SG80**.

References

ICES 2017a. Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic). ICES Advice on fishing opportunities, catch, and effort Arctic Ocean, Barents Sea, Faroes, Greenland Sea, Published 13 June 2017 Iceland Sea and Norwegian Sea Ecoregions Version 2: 26 September 2017 ghl.27.1-2 DOI: 10.17895/ices.pub.3048
ICES. 2017b. Report of the Arctic Fisheries Working Group (AFWG), 19–25 April 2017, ICES HQ, Copenhagen, Denmark. ICES CM 2017/ACOM:06. 486 pp.
ICES. 2018. Report of the Arctic Fisheries Working Group (AFWG), 18–24 April 2018, Ispra, Italy. ICES CM 2018/ACOM:06. 859 pp.
ICES. 2020. Arctic Fisheries Working Group (AFWG). ICES Scientific Reports. 3:58. https://doi.org/10.17895/ices.pub.8196.

ICES. 2021. Greenland halibut (Reinhardtius hippoglossoides) in subareas 1 and 2 (Northeast Arctic). In Report of the ICES Advisory Committee, 2021. ICES Advice 2021, ghl.27.1-2, https://doi.org/10.17895/ices.advice.7755.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**More information sought** *More info about the monitoring of UoA removals*

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 1.2.4 – Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	Appropriateness of assessment to stock under consideration			
	Guide post		The assessment is appropriate for the stock and for the harvest control rule.	The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.
	Met?		**Yes**	**No**
Rationale				

The ICES AFWG is the scientific working group responsible for the assessment and review of this stock.

The assessment uses an age–length-structured Gadget model (ICES, 2015). However, there is no agreement on age-reading methodology between Norway and Russia and the model is tuned using only length data. This gives uncertainty on the absolute levels of modelled biomass and F, and on the recruitment pattern. The peaks of recruitment identified by the model are corroborated by survey length distributions, but the weaker year classes may be poorly modelled. None of the surveys individually covers the complete stock distribution and there are discrepancies between the surveys, leading to high uncertainty and a marked retrospective pattern. This gives uncertainty on the absolute levels of modelled biomass and F, and on the recruitment pattern. The peaks of recruitment identified by the model are corroborated by survey length distributions, but the weaker year classes may be poorly modelled. Based on ICES procedures for stocks with sporadic recruitment and low exploitation rates, the lowest observed stock biomass with high recruitment is used as Bpa in the current advice. Taking into account the features of Gadget model, which allows uncertainties in the input data is possible to conclude that the assessment model is appropriate for the stock and the HCRs (ICES, 2020; 2021). Therefore, **SG 80 is met.**

The model does not attempt to describe all the biological processes accurately (as the growth and stock recruitment relationship) but attempts to measure average rates of harvest and biomass during a certain period in the time series. Therefore, **SG 100 is not met**.

b	Assessment approach			
	Guide post	The assessment estimates stock status relative to generic reference points appropriate to the species category.	The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.	
	Met?	**Yes**	**Yes**	
Rationale				

The Gadget model received support from the AFWG and the method with a length-based GADGET model was benchmarked in 2015 (ICES 2017b; 2021) and accepted by ACOM the same year. The stock assessment is appropriate for the available data and the harvest control rule. It is estimating stock status relative to precautionary approach-based reference points (Bpa and HRpa). Therefore, **SG60 and SG80 are met**.

c	Uncertainty in the assessment			
	Guide post	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.
	Met?	**Yes**	**Yes**	**No**

Rationale

The assessment uses a probabilistic approach that uses non error-free catches and abundance indexes in the model. So, it takes into account the uncertainties of input data (ICES 2018; 2020; 2021). Therefore **SG 60 and 80 are met.**

The model does not report the risk in the advice (e.g. decision tables, risk-based reference points etc.). So, **it does not meet SG100.**

d	Evaluation of assessment			
	Guide post			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			**Yes**
Rationale				

The stock assessment has been tested and shown to be robust looking at the retrospective analyses. The GADGET model is a robust methodology, which takes into accounts the uncertainty in input data. Although there is little retrospective pattern over the last four years, the model exhibits a retrospective pattern in earlier years associated with the biomass peak around 2014. The two coastal shelf surveys (the ecosystem survey and the Russian surveys) showed a more rapid rise than the other surveys, and then a more rapid reduction. The Russian survey had a very rapid rise and then a rapid decline. The model, therefore, had a series of downward revisions as the peak has been passed, where the model now estimates that it had previously been over-optimistic about the size of the peak. These kinds of investigations conducted by ICES WGs are clearly showing that the methodology is robust. Other assessment approaches have been rigorously explored such as production model (ICES 2018; 2020; 2021). Therefore, **SG 100 is met**

e	Peer review of assessment			
	Guide post		The assessment of stock status is subject to peer review.	The assessment has been **internally and externally** peer reviewed.
	Met?		**Yes**	**Yes**
Rationale				

In the ICES AFWG internal and external peer reviewers are involved **meeting SG80 and SG100** (ICES 2018; 2020).

References

The CAB shall list any references here, including hyperlinks to publicly-available documents.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

7.3 Principle 2

7.3.1 Principle 2 background

The Directorate of Fisheries has provided the assessment team with catch data per gear type for the past 5 years. This data shows that there are no main primary nor secondary fish species to consider. Tables below show catch composition per UoA.

Table 18 Catch composition for UoA 1 (demersal trawl). Source: DoF. There are no main primary nor main fish secondary species to consider.

Catch composition for UoA 1	2016	2016%	2017	2017%	2018	2018%	2019	2019%	2020	2020%	Average 2016-2020	% Average
Greenland halibut	2798,5	95,1	3067,0	98,4	3533,0	99,8	3357,4	97,6	3518,5	99,5	3254,90	98,16
NEA cod	0,0	0,0	1,5	0,0	0,6	0,0	32,1	0,9	0,0	0,0	6,84	0,21
Hadddock	0,1	0,0	0,1	0,0	0,2	0,0	1,4	0,0	0,0	0,0	0,36	0,01
Saithe	9,1	0,3	42,9	1,4	4,8	0,1	0,0	0,0	17,0	0,5	14,76	0,45
Tusk	81,6	2,8	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	16,33	0,49
Ling	25,9	0,9	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	5,21	0,16
Beaked redfish (Snaubeler)	1,4	0,0	1,1	0,0	2,6	0,1	42,0	1,2	0,9	0,0	9,58	0,29
Golden redfish (uer vanlig)	23,3	0,8	0,1	0,0	0,0	0,0	3,2	0,1	0,0	0,0	5,34	0,16
Roughhead grenadier	0,3	0,0	1,1	0,0	0,0	0,0	3,8	0,1	0,0	0,0	1,05	0,03
Blue ling	0,0	0,0	0,0	0,0	0,0	0,0	0,6	0,0	0,0	0,0	0,12	0,00
Hake	0,0	0,0	3,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,63	0,02
Spotted wolfish	2,3	0,1	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,48	0,01
Atlantic halibut	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,03	0,00
Pollack	0,0	0,0	0,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,07	0,00
Roundnose grenadier	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,07	0,00
Bag crab	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,01	0,00
European plaice	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,00	0,00
TOTAL	2943,1	100,0	3117,5	100,0	3541,1	100,0	3440,7	100,0	3536,5	100,0	3315,8	100,0

Table 19 Catch composition for UoA 2 (longlines). Source DoF. There are no main primary nor main secondary fish species to consider.

Catch composition for UoA 2	2016	2016%	2017	2017%	2018	2018%	2019	2019%	2020	2020%	Average 2016-2020	% Average
Greenland halibut	5819,2	94,9	6371,0	94,1	6552,0	94,3	6299,6	96,7	6326,4	95,19	6273,63	95,03
NEA cod	0,0	0,0	142,5	2,1	154,4	2,2	19,1	0,3	138,0	2,08	90,80	1,38
haddock	86,5	1,4	66,5	1,0	37,2	0,5	20,6	0,3	22,8	0,34	46,71	0,71
Saithe	34,7	0,6	11,1	0,2	8,9	0,1	23,2	0,4	34,7	0,52	22,52	0,34
Tusk	125,7	2,1	93,6	1,4	70,6	1,0	52,3	0,8	38,5	0,58	76,16	1,15
Ling	0,1	0,0	26,6	0,4	7,6	0,1	3,0	0,0	1,4	0,02	7,75	0,12

Catch composition for UoA 2	2016	2016%	2017	2017%	2018	2018%	2019	2019%	2020	2020%	Average 2016-2020	% Average
Beaked redfish (Snabeluer)	29,5	0,5	0,0	0,0	0,0	0,0	0,2	0,0	0,0	0,00	5,95	0,09
Golden redfish (Uer (vanlig))	7,5	0,1	15,4	0,2	17,4	0,3	8,9	0,1	4,5	0,07	10,72	0,16
Spotted wolffish	11,1	0,2	2,7	0,0	48,5	0,7	7,9	0,1	16,2	0,24	17,29	0,26
Roughhead grenadier	2,6	0,0	7,3	0,1	29,7	0,4	53,0	0,8	32,6	0,49	25,05	0,38
Roundnose grenadier	0,9	0,0	0,1	0,0	9,5	0,1	13,8	0,2	8,5	0,13	6,58	0,10
Atlantic halibut	0,0	0,0	0,2	0,0	1,6	0,0	1,2	0,0	0,7	0,01	0,75	0,01
Blue ling	2,2	0,0	0,5	0,0	0,7	0,0	1,1	0,0	1,2	0,02	1,13	0,02
Angler	4,5	0,1	14,2	0,2	0,0	0,0	0,0	0,0	0,0	0,00	3,75	0,06
Pollack	0,3	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,00	0,09	0,00
King crab	0,4	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,00	0,07	0,00
Porbeagle	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,00	0,00	0,00
American plaice	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,00	0,00	0,00
Northern wolffish	0,0	0,0	17,5	0,3	7,0	0,1	0,0	0,0	5,3	0,08	5,96	0,09
Atlantic wolffish	0,0	0,0	0,2	0,0	0,6	0,0	1,0	0,0	3,9	0,06	1,14	0,02
Common dab	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,00	0,00	0,00
Greater forkbeard	0,0	0,0	0,0	0,0	0,0	0,0	1,1	0,0	0,4	0,01	0,30	0,00
Rabbit fish	0,0	0,0	0,0	0,0	0,0	0,0	0,7	0,0	0,8	0,01	0,30	0,00
European plaice	0,0	0,0	0,0	0,0	0,0	0,0	0,3	0,0	0,0	0,00	0,05	0,00
Atlantic pomfret	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	1,9	0,03	0,39	0,01
Blue skate	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,00	0,02	0,00
Starry ray	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,00	0,01	0,00
Turbot	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,00	0,01	0,00
Thornback ray	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,5	0,01	0,10	0,00
Hake	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,00	0,02	0,00
Blackmouth catshark	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,2	0,00	0,05	0,00
Other skates and rays	4,6	0,1	2,8	0,0	1,9	0,0	4,5	0,1	7,4	0,11	4,24	0,06
TOTAL	6130,0	100,0	6772,3	100,0	6947,9	100,0	6511,6	100,0	6646,0	100,0	6601,6	100,0

Table 20 Catch composition for UoA 3 (gillnets). Source: Directorate of Fisheries. There are no main primary nor secondary fish species to consider.

Catch composition for UoA 3	2016	2016%	2017	2017%	2018	2018%	2019	2019%	2020	2020%	Average 2016-2020	%Average
Greenland halibut	2639,13	96,81	2677,00	97,21	2822,00	92,54	3138,19	94,30	2838,26	95,62	2822,91	95,21
NEA Cod	0,00	0,00	14,35	0,52	96,98	3,18	17,62	0,53	8,26	0,28	27,44	0,93
Haddock	11,48	0,42	1,63	0,06	1,98	0,06	0,73	0,02	1,49	0,05	3,46	0,12
Saithe	4,31	0,16	9,38	0,34	21,07	0,69	28,50	0,86	15,53	0,52	15,76	0,53
Beaked redfish (Snabeluer)	0,23	0,01	0,00	0,00	0,00	0,00	0,01	0,00	0,65	0,02	0,18	0,01
Golden redfish (Uer (vanlig))	6,01	0,22	24,43	0,89	40,62	1,33	17,33	0,52	23,40	0,79	22,36	0,75
Tusk	17,05	0,63	6,38	0,23	4,33	0,14	2,69	0,08	2,31	0,08	6,55	0,22
Ling	0,00	0,00	0,05	0,00	22,14	0,73	15,34	0,46	11,76	0,40	9,86	0,33
Atlantic halibut	3,56	0,13	6,59	0,24	1,14	0,04	0,93	0,03	0,92	0,03	2,63	0,09
Pollack	1,11	0,04	0,02	0,00	0,05	0,00	0,79	0,02	0,26	0,01	0,45	0,02
Spotted wolffish	18,69	0,69	1,13	0,04	0,03	0,00	0,02	0,00	0,00	0,00	3,97	0,13
Roughhead grenadier	19,32	0,71	9,89	0,36	16,50	0,54	76,55	2,30	35,39	1,19	31,53	1,06
Angler	0,27	0,01	0,01	0,00	4,96	0,16	7,08	0,21	6,22	0,21	3,71	0,13
Blue ling	0,86	0,03	1,54	0,06	9,48	0,31	4,42	0,13	9,75	0,33	5,21	0,18
Atlantic wolffish	1,41	0,05	0,18	0,01	0,28	0,01	0,01	0,00	0,11	0,00	0,40	0,01
Northern wolffish	0,80	0,03	0,08	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,18	0,01
Roundnose grenadier	0,16	0,01	0,50	0,02	7,02	0,23	13,52	0,41	9,92	0,33	6,22	0,21
Porbeagle	0,08	0,00	0,15	0,01	0,08	0,00	0,00	0,00	0,00	0,00	0,06	0,00
Lesser silver smelt	0,09	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,00
Rabbit fish	0,02	0,00	0,00	0,00	0,00	0,00	0,18	0,01	0,22	0,01	0,09	0,00
Hake	0,00	0,00	0,00	0,00	0,04	0,00	1,42	0,04	0,27	0,01	0,34	0,01
European plaice	0,00	0,00	0,05	0,00	0,03	0,00	0,59	0,02	0,27	0,01	0,19	0,01
Turbot	0,00	0,00	0,02	0,00	0,05	0,00	0,00	0,00	0,07	0,00	0,03	0,00
Lemon sole	0,00	0,00	0,00	0,00	0,01	0,00	0,00	0,00	0,06	0,00	0,01	0,00
Velvet belly	0,00	0,00	0,00	0,00	0,00	0,00	0,06	0,00	0,00	0,00	0,01	0,00
Blue skate	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,00	0,00
King crab	0,00	0,00	0,00	0,00	0,00	0,00	0,05	0,00	0,00	0,00	0,01	0,00
Bag crab	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,00	0,00
Spurdog	0,00	0,00	0,00	0,00	0,00	0,00	0,02	0,00	0,00	0,00	0,00	0,00
Lumpfish	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	1,06	0,04	0,21	0,01

Catch composition for UoA 3	2016	2016%	2017	2017%	2018	2018%	2019	2019%	2020	2020%	Average 2016-2020	%Average
Greater forkbeard	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,08	0,00	0,02	0,00
Witch flounder	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,07	0,00	0,01	0,00
Other fish	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,09	0,00	0,02	0,00
Other skates and rays	1,40	0,05	0,47	0,02	0,66	0,02	1,74	0,05	1,77	0,06	1,21	0,04
TOTAL	**2725,98**	**100,00**	**2753,83**	**100,00**	**3049,47**	**100,00**	**3327,83**	**100,00**	**2968,15**	**100,00**	**2965,05**	**100,00**

Table 21 Catch composition for UoA 4 (Danish seine). Source: Directorate of Fisheries. There are no main primary nor secondary fish species to consider.

Catch composition for UoA 4	2016	2016%	2017	2017%	2018	2018%	2019	2019%	2020	2020%	Average 2016-2020	% Average
Greenland halibut	649,83	98,44	679,00	99,36	842,00	98,38	1118,40	97,17	1043,64	96,59	866,57	97,79
NEA cod	0,00	0,00	2,02	0,30	7,66	0,89	0,33	0,03	2,06	0,19	2,41	0,27
Haddock	0,24	0,04	0,19	0,03	2,09	0,24	0,36	0,03	3,62	0,33	1,30	0,15
Saithe	1,26	0,19	0,24	0,03	0,00	0,00	21,62	1,88	0,83	0,08	4,79	0,54
Tusk	7,75	1,17	0,26	0,04	0,36	0,04	1,17	0,10	0,15	0,01	1,94	0,22
Ling	0,00	0,00	0,03	0,00	0,00	0,00	0,36	0,03	0,01	0,00	0,08	0,01
Spotted wolffish	0,13	0,02	0,03	0,00	0,97	0,11	0,14	0,01	0,00	0,00	0,26	0,03
Beaked redfish (Snabeluer)	0,92	0,14	0,00	0,00	0,63	0,07	0,04	0,00	0,03	0,00	0,32	0,04
Golden redfish (Uer (vanlig))	0,00	0,00	0,66	0,10	0,77	0,09	1,19	0,10	0,28	0,03	0,58	0,07
Roughhead grenadier	0,00	0,00	0,79	0,12	0,06	0,01	1,18	0,10	22,29	2,06	4,86	0,55
Northern wolffish	0,00	0,00	0,09	0,01	0,60	0,07	0,00	0,00	0,00	0,00	0,14	0,02
Other skates and rays	0,00	0,00	0,02	0,00	0,00	0,00	0,18	0,02	0,85	0,08	0,21	0,02
European plaice	0,00	0,00	0,03	0,00	0,00	0,00	0,00	0,00	0,66	0,06	0,14	0,02
Roundnose grenadier	0,00	0,00	0,00	0,00	0,70	0,08	5,60	0,49	5,93	0,55	2,45	0,28
Angler	0,00	0,00	0,00	0,00	0,01	0,00	0,01	0,00	0,04	0,00	0,01	0,00
Blue ling	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,02	0,00	0,01	0,00
Atlantic halibut	0,00	0,00	0,00	0,00	0,00	0,00	0,06	0,00	0,00	0,00	0,01	0,00
Pollack	0,00	0,00	0,00	0,00	0,00	0,00	0,37	0,03	0,00	0,00	0,07	0,01
Atlantic wolffish	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,04	0,00	0,01	0,00
TOTAL	**660,14**	**100,00**	**683,34**	**100,00**	**855,85**	**100,00**	**1151,00**	**100,00**	**1080,43**	**100,00**	**886,15**	**100,00**

Primary species

According to catch data from the Directorate of fisheries, there are no main primary fish species to consider.

Secondary species

Main secondary species are those species in the catch which comprise more than 5% of the catch (or more than 2% for less resilient species) and with no associated management measures as well as out of scope species which are not categorised as ETP species. According to catch composition tables facilitated by the Directorate of Fisheries for years 2016-2020, there are no main secondary fish species to consider in any UoA. As regards out of scope secondary species, catch composition table show no interactions with these species. Information from IMR reference fleet also show that these interactions are highly unlikely. More information on the population status, research and expected interactions with out- of-scope species is given below (in the ETP section).

As regards minor secondary species, these are unmanaged fish species present in the catch. There are no reference points for these stocks and they should be evaluated by using the RBF framework, however been categorised as minor the assessment team will score them only up to SG80.

Most of the following background information on ETP species, habitats and ecosystem has been taken from the MSC Public Certification Report on Norway NEA offshore cod fishery, by Chaudhury et al, 2021.

ETP species

According to MSC FS v2.01, SA 3.1.5, the team shall assign ETP (endangered, threatened or protected) species as follows:

- *Species that are recognised by national ETP legislation (such as Norwegian Regulation J-250-2013 protecting basking sharks, spurdogs, porbeagle and silky sharks. It shall be highlighted here that Norway has a Norwegian red list of endangered species which demands the protection of certain species in the Norwegian territory, but which has no specific regulation nor enforcement measures related. Therefore, species enlisted are not necessarily considered as ETP species for the MSC assessment).*
  Note that UoA 3 (gillnets) has some level of interactions with portbeagles and spurdogs*.*

- *Species listed in the binding international agreements given below:*
  - *Appendix 1 of the Convention on International Trade in Endangered Species (CITES), unless it can be shown that the particular stock of the CITES listed species impacted by the UoA under assessment is not endangered.*
  - *Binding agreements concluded under the Convention on Migratory Species (CMS), including: ii. Annex 1 of the Agreement on Conservation of Albatross and Petrels (ACAP);*
  - *Table 1 Column A of the African-Eurasian Migratory Waterbird Agreement (AEWA);*
  - *Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS);*
  - *Annex 1, Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS);*
  - *Wadden Sea Seals Agreement;*
  - *Any other binding agreements that list relevant ETP species concluded under this Convention*
- *Species classified as 'out-of scope' (amphibians, reptiles, birds and mammals) that are listed in the IUCN Redlist as vulnerable (VU), endangered (EN) or critically endangered (CE).*

Norway has signed several international agreements and conventions on species protection and management of relevance to the Norway Greenland halibut fishery:

- *The Convention on Biological Diversity (CBD);*
- *The Convention on International Trade in Endangered Species of Wild Animals (CITES)*
- *The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention / CMS).*
- *The Agreement on North Atlantic Marine Mammal Commission (NAMMCO).*
- *The OSPAR Agreement, Annex V ("on the protection and conservation of the ecosystems and Biological Diversity in the maritime area"), listing threatened and declining species in the Barents Sea.*
- *Report No. 8 (2005-2006) for species management in the Barents Sea – Lofoten area.*

Given these guidelines, ETP species to consider are listed in Table 22 ***Error! Reference source not found.****below, which lists ETP species in relation to the Norway Greenland halibut fishery in the Barents and Norwegian Seas. Information on the status of those species in the Norwegian red list of species and in the Russian red book of the Murmansk region is given as an indication of the species status and consideration by the affected jurisdictions but does not define the MSC consideration of ETP species.*

Table 22: ETP species in the Barents Sea and Norwegian coastal waters (LC: Least Concern; NT: Near Threatened). Species in bold are specifically protected by Norwegian Regulation J-250-2013. Source: DNV-GL.

SCIENTIFIC NAME	COMMON NAME	2015 Norwegian red list	Russian red book of the Murmansk region	OSPAR	IUCN red list	CITES Appendix I
INVERTEBRATES						
Arctica islandica	Ocean quahog	N/A	N/A	**Yes**	N/A	No
Nucella lapillus	Dog whelk	LC	N/A	**Yes**	N/A	No
SEABIRDS						
Fratercula arctica	Atlantic puffin	Vulnerable	N/A	N/A	**Vulnerable**	No
Pagophila eburnea	Ivory gull	Vulnerable	N/A	**Yes**	NT	No
Polysticta stelleri	Steller's eider	Vulnerable	Yes	**Yes**	**Vulnerable**	No
Rissa tridactyla	Black-legged kittiwake	Endangered	N/A	**Yes**	LC	No
Somateria mollissima	Common eider	N/A	Yes	No	**Vulnerable**	No
Uria lomvia	Thick-billed murre (or Brünnich's guillemot)	Critically Endangered	N/A	**Yes**	LC	No
FISH						
Acipenser sturio	Sturgeon	N/A	N/A	**Yes**	**Critically Endangered**	**Yes**
Alosa alosa	Allis shad	N/A	N/A	**Yes**	LC	No
Anguilla anguilla	European eel	Vulnerable	N/A	**Yes**	**Critically Endangered**	No
Carcharhinus falciformis	**Silky shark**	N/A	N/A	No	NT	No
Cetorhinus maximus	**Basking shark**	Endangered	N/A	**Yes**	**Vulnerable**	No
Coregonus lavaretus	Lavaret	LC	N/A	**Yes**	**Vulnerable**	No
Dipturus batis	Common skate	Critically Endangered	N/A	**Yes**	**Critically Endangered**	No
Lamna nasus	**Porbeagle**	Vulnerable	N/A	**Yes**	**Vulnerable**	No
Petromyzon marinus	Sea lamprey	NT	N/A	**Yes**	LC	No
Raja clavata	Thornback ray	LC	N/A	**Yes**	NT	No
Salmo salar	Salmon	LC	N/A	**Yes**	LC	No
Squalus acanthias	**Spurdog**	Endangered	N/A	**Yes**	**Vulnerable**	No
MARINE MAMMALS						
Balaena mysticetus	Bowhead whale	Critically Endangered	N/A	**Yes**	LC	**Yes**

SCIENTIFIC NAME	*COMMON NAME*	*2015 Norwegian red list*	*Russian red book of the Murmansk region*	*OSPAR*	*IUCN red list*	*CITES Appendix I*
Balaenoptera acutorostrata	*Minke whale*	*LC*	*N/A*	*N/A*	*LC*	***Yes***
Balaenoptera borealis	*Sei whale*	*N/A*	*N/A*	*N/A*	***Endangered***	***Yes***
Balaenoptera musculus	*Blue whale*	*Vulnerable*	*N/A*	***Yes***	***Endangered***	***Yes***
Balaenoptera physalus	*Fin whale*	*LC*	*N/A*	*N/A*	***Endangered***	***Yes***
Cystophora cristata	*Hooded seal*	*Endangered*	*N/A*	*N/A*	***Vulnerable***	*No*
Eubalaena glacialis	*Northern right whale*	*Regionally extinct*	*N/A*	***Yes***	***Endangered***	***Yes***
Eschrichtius robustus	*Gray whale*	*LC*	*N/A*	*N/A*	*LC*	***Yes***
Hyperoodon ampullatus	*Northern bottlenose whale*	*LC*	*N/A*	*N/A*	*DD*	***Yes***
Megaptera novaeangliae	*Humpback whale*	*LC*	*N/A*	*N/A*	*LC*	***Yes***
Odobenus rosmarus	*Walrus*	*Vulnerable*	*N/A*	*N/A*	***Vulnerable***	*No*
Phocoena phocoena	*Harbour porpoise*	*LC*	*N/A*	***Yes (OSPAR regions 2 and 3)***	*LC*	*No*
Physeter macrocephalus	*Sperm whale*	*N/A*	*N/A*	*N/A*	***Vulnerable***	***Yes***

Among the fishes, all large elasmobranchs (sharks and rays) are listed at one level of concern or another by the IUCN. 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), can become enmeshed in gillnets and would be landed.

The Norwegian reference fleet collected data on interactions with all different species from years 2015-2018. This data shows that there are interactions with the different fishing gears with elasmobranchs, although not necessarily with protected species. The following table lists elasmobranchs interacted by the reference fleet in waters North 62º both in High seas and in coastal waters.

Table 23: Elasmobranchs species interacted by the different vessels in the reference fleet in years 2015-2018. Species considered as ETP species are highlighted in bold. Species are listed according to relative frequency of interactions.

Gear type	*Fishing area: High seas North 62º*	*Fishing area: Coastal waters North 62º*
Bottom trawls	*Starry skate* *Round skate* *Spinytail skate*	*N/A*
Hooks and lines	*Starry skate* *Blackmouth dogfish* *Arctic skate* *Velvet belly* *Blue skate* ***Spurdog***	*Velvet belly* *Blackmouth dogfish* ***Skates*** ** and rays* *Starry skate* ***Spurdog***
Gillnets	*Blackmouth dogfish* *Starry skate* ***Spurdog*** *Round skate*	*Blackmouth dogfish* *Starry skate* ***Spurdog*** *Velvet belly* ***Thornback ray***
Demersal seine	*Starry skate* ***Skates*** ** and rays* ***Spurdog***	***Thornback ray*** *Spotted ray*

** Given the uncertainty in relation to if recorded "Skates" refers to "Common skate" the assessment team has considered all skates recorded as common skates, ETP species.*

The vessels in the reference fleet (north of 62º North) have not reported any interaction with seabirds or marine mammals. The UoA has not reported such interactions too, nor interactions with protected elasmobranchs.

The abundance and distribution of seabirds and marine mammals are monitored as part of the annual IMR–PINRO ecosystem survey (Mauritzen & Klepikovsky, 2013). Both institutions collect information on the presence of ETP species in the Barents Sea through the combined research projects on board research vessels. Besides, PINRO has 5 scientific observers covering Russian vessels in the Barents Sea (with approximately 5% coverage) collecting information on ETP and benthic species in the catch, and IMR collects information through the reference fleet.

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 (both considered as ETP 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, 993, Mehlum et al., 1996). The seabird communities in south and west depend on juvenile gadoids, juvenile herring, sandeels (Ammodytes sp.) and capelin (e.g. Anker-Nilssen, 1992, Barrett & Krasnov, 1996, Barrett et al., 1997, Fauchald & Erikstad, 2002).

There is always concern with respect to interactions of static-gear fisheries and seabirds (Fangel et al.2011). The 2009 joint IMR–NINA survey 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). 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) 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). 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.

ICES JWGBIRD 2018 report summarizes the vulnerability of marine bird species and families to bycatch of different gear types, including all gears under assessment. Information on this report is broad and does refer to North East Atlantic however serves as an indicator to Norwegian waters too. According to this report, gillnets and/or hook gears (hand- and longlines) are reported to be the deadliest fishing gears for seabirds. Besides, Bærum et al. (2018) showed that coastal fisheries might represent a more general threat to a wider range of seabird species, as opposed to longline fisheries (e.g. Fangel et al. 2017). It is acknowledged that important gaps remain in the understanding of seabird bycatch (ICES JWGBIRD 2018).

The ICES Working Group on Bycatch of Protected Species (WGBYC) identified a number of data sources related to bycatch numbers and fishing effort, but these are often incomplete with regards to seabird bycatch. Specifically related to Norway, "the Norwegian Reference Fleet (NRF), a group of Norwegian fishing vessels contracted by the Institute of Marine Research (IMR), provides detailed information on their fishing activity, to improve stock assessments and fisheries management (https://www.hi.no/hi/tokt/referanseflaten-1). The self-reported data collected by the NRF include bycatch of marine mammals and seabirds. This has resulted in a 10-year long time series of seabird bycatch data related to the fishery data from a large fleet of small-scale vessels fishing with gillnets along the Norwegian coast, and enabled estimation of the total bycatch of seabirds in the Norwegian small-vessel gillnet fishery (Bærum et al. 2018). ***The NRF has proven an effective way of collecting seabird bycatch data****, yet caution is required when interpreting self-reported fisheries information".*

Detailed information on research and results by the Norwegian reference fleet, including information on species interacted, areas of research, and vessels in the reference fleet can be found at https://www.hi.no/hi/nettrapporter/rapport-fra-havforskningen-en-2020-8 .

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). 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). 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 24: Estimated annual fish consumption (thousand tonnes) by minke whale (1992–1995) and harp seal (1990–1996). 1. The prey species is included in the "other-fish" group. 2. Only Themisto spp. Source: 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

Marine mammal abundance is estimated through counting surveys by NAMMCO. The NAMMCO NASS 2015 surveys (see Figure 10 below) covered the Northern part of the North Atlantic. These surveys include areal sightings and vessel observations.

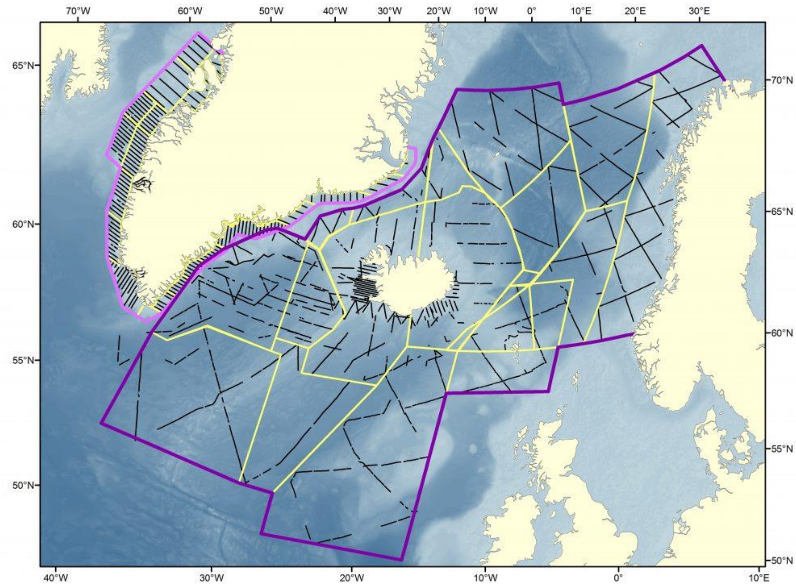


Figure 10 : Transects that were surveyed during NASS2015. Source: NAMMCO website.

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. Trophic competition for pelagic prey species (e.g. herring, 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: Stefansson et al., 1997; CEFAS, UK: Blanchard et al., 2002) and as part of the Barents Sea Management Plan (BSMP, 2006; Stiansen et al., 2009; Arneberg, 2013).

The 2014 NAMMCO report expresses concern about the number of harbour porpoise (Phocoena phocoena, ETP species in OSPAR regions II and III, see https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats) taken in the inshore cod (and monkfish) gillnet fishery in Norwegian coastal waters. The numbers of casualties resulting from interactions by those fisheries were at the time estimated to be around 6000–7000 individuals per year (C.V. 30%). In 2017 IMR reported that previous numbers were overestimated and that the current level of by-catch of harbour porpoise in the total Norwegian gill-net cod and monk fishery are around 3,000 individuals annually (Bjørge et al., 2016). The 2016 SCANS-III survey found that the harbour porpoise population was about 467,000 individuals, and in the Northern Norwegian areas (North of 62 N), the estimate was around 25,000 (Hammond et al., 2017). Catch statistics for the different UoAs for years 2017-2019 show no interactions with marine mammals.

The Research Council of Norway acts as an observer of the CRISP consortium. The purpose of CRISP (Centre for Research-based Innovation in Sustainable fish capture and Processing technology) is to establish a platform for cooperation where scientists, fishermen, fishing gear manufacturers, and electronic instrument producers will work together to solve these challenges. CRISP is formed by institutions such as the Institute of Marine Research, the University of Bergen, the University of Tromsø, Norges Sildesalgslag and Norges Råfisklag, among others. One of the pillars of this consortium is to work on the development of low-impact and selective fishing gears (http://crisp.imr.no/en/projects/crisp/about-crisp/project-overview). To reduce the impact of gillnets on marine mammals there is research undergoing on the use of deterrent pingers to reduce the undesirable catch of harbour porpoises and other marine mammals. To date, deterrent pingers have been tested in the Vestfjord fishery as a mean to minimise adverse fishery interactions but their utility is still discussed, as harbour porpoise bycatch seems to be reduced with the use of pingers but there seems to be an increase in the bycatch or harbour seals, which may be attracted to the pingers. Further investigation is needed (Bjørge and Moan, 2019).

In any case, NFA, IMR and the Fisheries Directorate are pressing to implement the use of pingers on a voluntary basis. Besides, a hearing for J-regulations for mandatory use of pingers in Vestfjorden was published in June 2020 (https://www.fiskeridir.no/Yrkesfiske/Dokumenter/Hoeringer/Forslag-til-tiltak-for-aa-redusere-bifangst-av-sjoepattedyr). Close date for comments was 8th September 2020. An update of this process will be requested at initial audit.

Habitats

The fishery takes place in the Norwegian and Barents Sea, using different gear types such as demersal trawling, longlines, gillnets and Danish seines.

The Barents Sea area is about 1 600 000 km2 (Carmack et al. 2006). This estimation includes the surface of the different islands in the area (i.e. Svalbard, Franz Joseph Land and the Novaya Zemlya archipelagos and other small islands), which account for more than 81 200 km2 (Terziev 1990).

First investigations on Barents Sea benthic species were made more than 200 years ago (Jakobsen T., Ozhigin V., 2011). Since then, both PINRO and IMR have undertaken research in the area through different means. Both institutions have a history of collaboration programs over the years. Since 2003, both institutions participate in an annual Joint Russian-Norwegian ecosystem survey using five research vessels and bottom trawlers. These surveys serve to gather information regarding the abundance of different fish species but also information on hydrographic conditions, endangered species or planktonic or benthic species. Information on the area can be found in the figures and maps below.

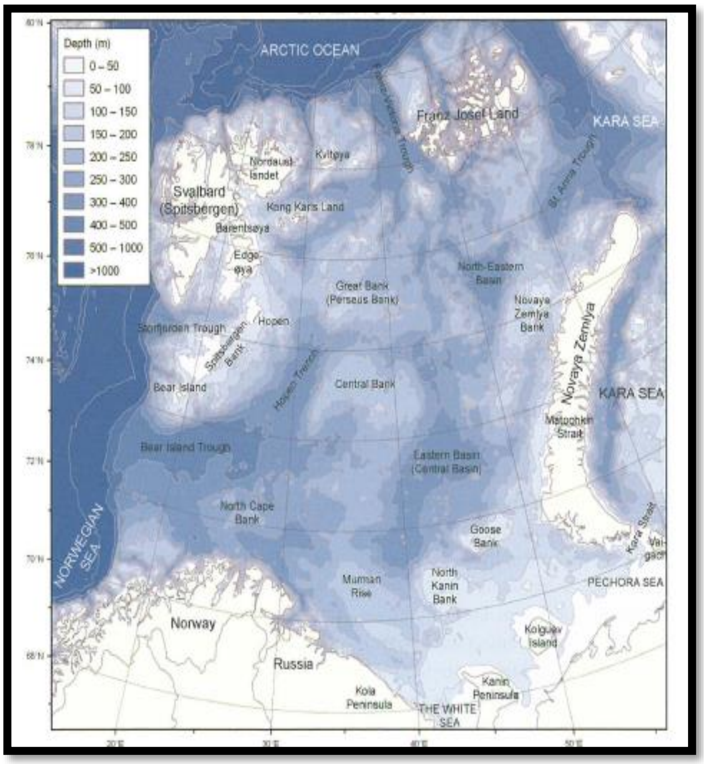


Figure 11: Barents Sea bottom topography and regional names. Source: Jakobsen T., Ozhigin V., 2011

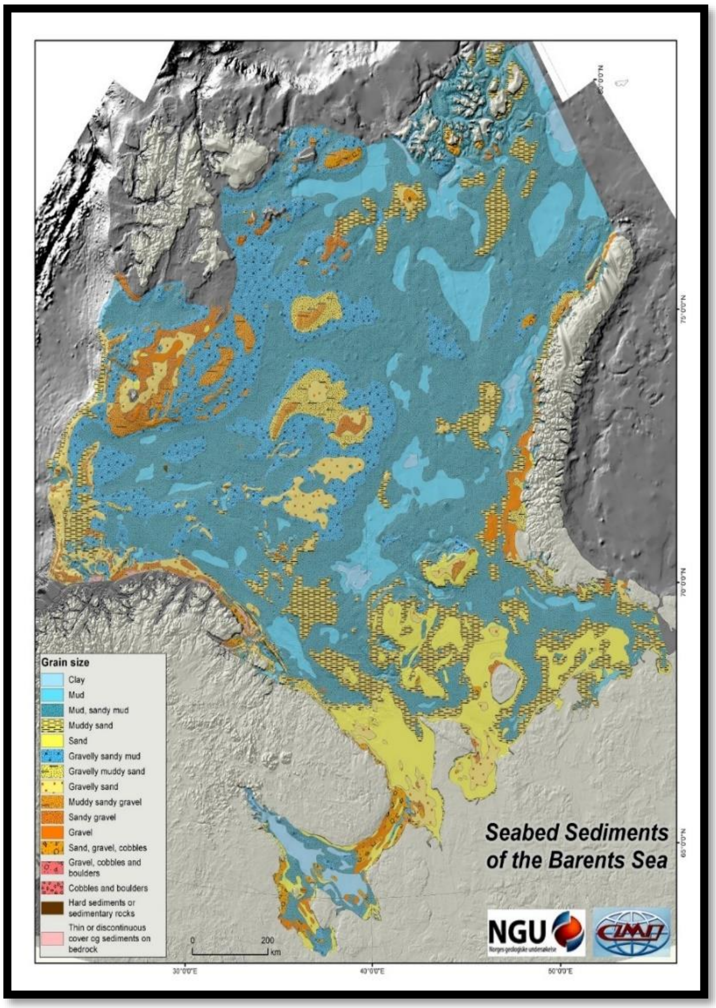


Figure 12: Seabed sediments of the Barents Sea. The area is dominated by soft sediments such as sandy mud or also by muddy sands, with occasional patches of gravels. There are no hard sediments in the area. Source: Lepland Aivo, Rybalko Aleksandr & Lepland Aave 2014: Seabed Sediments of the Barents Sea. Scale 1:3 000 000. Geological Survey of Norway (Trondheim) and SEVMORGEO (St. Petersburg).

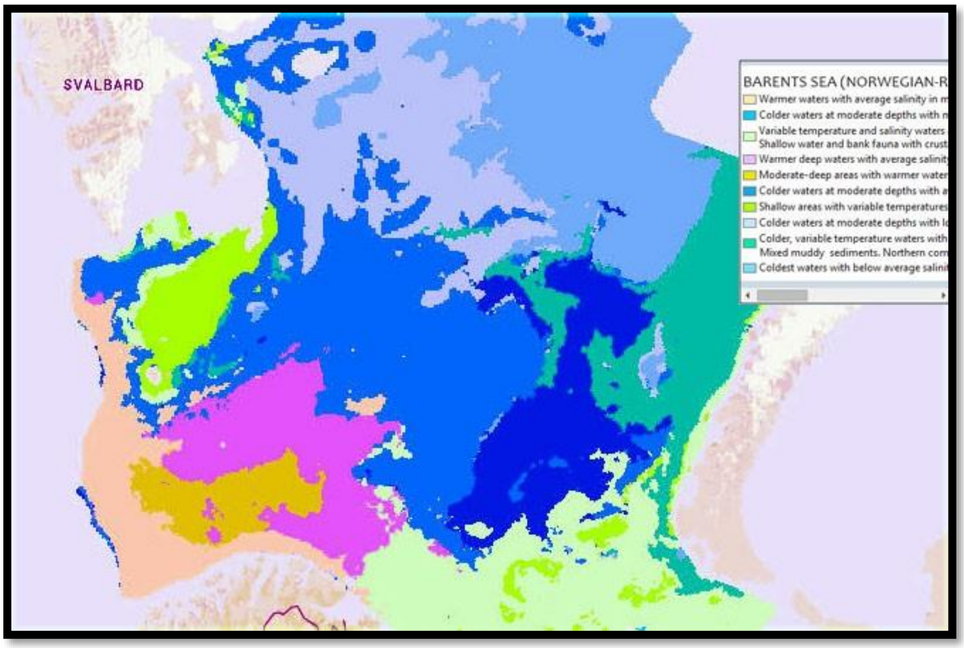


Figure 13: Biotopes of the Barents Sea. Blue areas represent cold water from the polar front while pink areas represent warmer waters from the Atlantic influx. (Source: www.ngu.no. Dolan, M.F.J., Jørgensen, L.L., Lien, V.S., Ljubin, P., Lepland, A. 2015: Biotopes of the Barents Sea. Scale 1:3 000 000. Geological Survey of Norway (Trondheim), Institute of the Marine Research (Bergen) and Polar Research Institute of Marine Fisheries and Oceanography (Murmansk)).

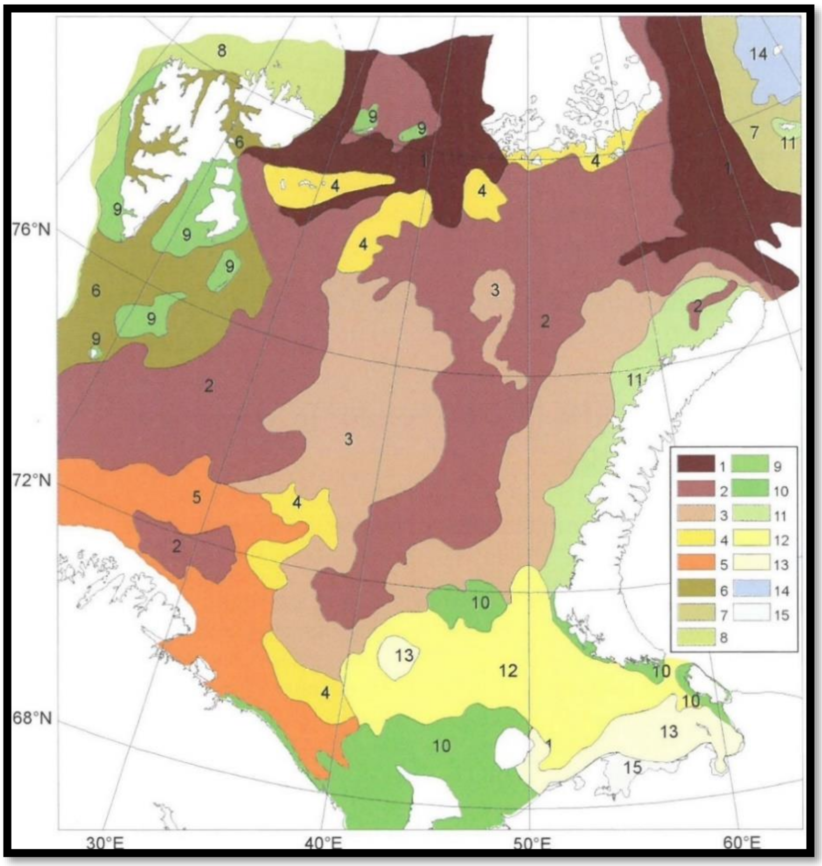


Figure 14: Distribution of benthic communities in the Barents Sea. Numbers from 1 to 15 represent communities dominated by different species. (Source: Jakobsen T., Ozhigin V., 2011)

1 - Ophiopleura borealis + Hormosina globulifera;
2 - Polychaeta + Sipunculoidea (Gofjingia spp.);
3 - Trochostoma spp.;
4 – Elliptica elliptica + Astarte crenata;
5 - Brisaster fragilis;
6 - soft-bottom community adjacent to Svalbard (Spitsbergen);
7 - community of St. Anna Trough slopes;
8 - Strongylocentrotus spp. + Ophiopholis aculeata;
9 - shallow-water coastal community of sessile filter-feeders adjacent to Svalbard;
10 - shallow-water coastal community of sessile filter-feeders on Lithothamnion spp.;
11 - shallow-water coastal community adjacent to western coast of Novaya Zemlya and Vise Island;
12 -Astarte borealis;
13 - Clinocardium ciliatum + Macoma calcarea + Serripes groenlandicus;
14- community of bivalves adjacent to Ushakov Island;
15 - Macoma balthica.

In 2013, over approximately 35 000 km2 of the Barents Sea were affected by bottom trawling by Norwegian vessels in the area, corresponding to circa 1.6% of the ecoregion's spatial extent. The proportion of swept seafloor increased by ca. 1% from 2009 until 2013. As seen below, bottom trawl activity concentrates close to the coastline and in the central Barents Sea. In the International waters of the Loop-hole there is overlap between snow crab pots and bottom trawlers which may bring conflict between fleets.

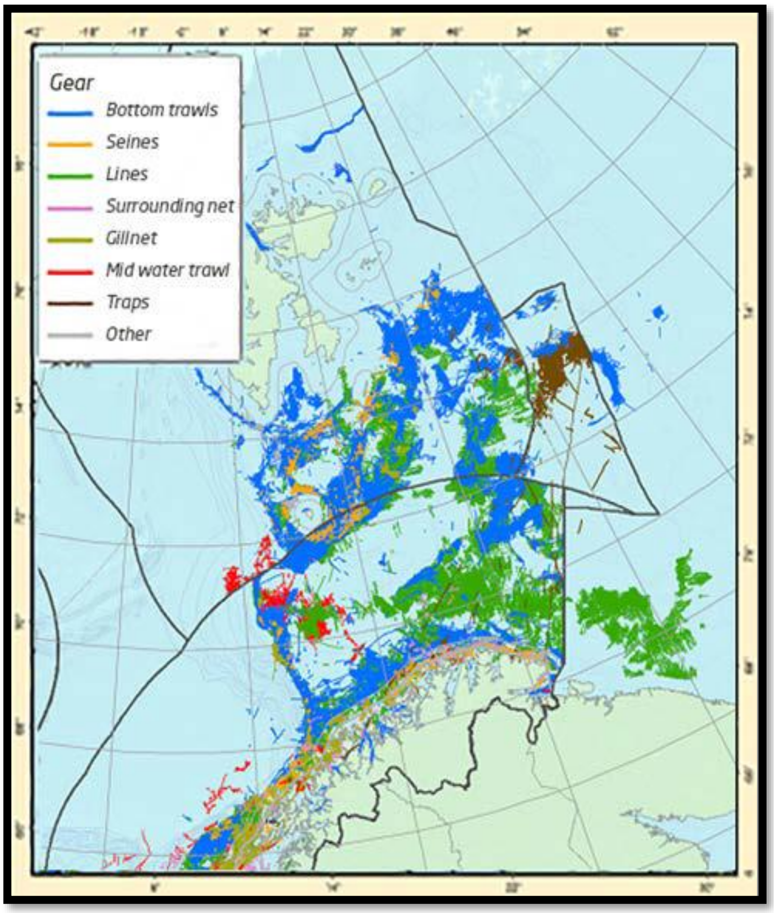


Figure 15: Location of Norwegian fishing activity in all waters, and non-Norwegian fishing activity within the Norwegian EEZ as reported (VMS) to Norwegian authorities. (Source: Jakobsen T., Ozhigin V., 2011)

According to ICES advice, there are certain habitats in the Barents Sea (and in the Northeast Atlantic) at a threatened or declining situation. For MSC certification purposes, these will be considered as Vulnerable marine ecosystems. These habitats include:

- *Coral gardens*
- *Cymodocea meadows*
- *Deep-sea sponge aggregations*

- *Intertidal mudflats*
- *Lophelia pertusa reefs*
- *Modiolus modiolus beds*
- *Ostrea edulis beds*
- *Seamounts*
- *Zostera beds.*

NEAFC Recommendation 09/2015 lists which species should be considered as VME indicators when encountered in large fields. These species are listed based on traits related to functional significance, fragility, and the life-history traits of components that show slow recovery to disturbance.
NEAFC VME habitat types include the following taxa:

1 - Cold water coral reef:
- *Lophelia pertusa reef*
- *Solenosmilia variabilis reef*

2 - Coral garden:
- *Hard-bottom coral garden*
  - *Hard-bottom gorgonian and black coral gardens: Anthothelidae, Chrysogorgiidae, Isididae, Keratoisidinae, Plexauridae, Acanthogorgiidae, Coralliidae, Paragorgiidae, Primnoidae, Schizopathidae.*
  - *Colonial scleractinians on rocky outcrops: Lophelia pertusa, Solenosmilia variabilis.*
  - *Non-reefal scleractinian aggregations: Enallopsammia rostrate, Madrepora oculata*
- *Soft bottom coral gardens*
  - *Soft-bottom gorgonian and black Chrysogorgiidae coral gardens*
  - *Cup-coral fields Caryophylliidae, Flabellidae*
  - *Cauliflower coral fields Nephtheidae*

3 - Deep sea sponge aggregations
- *Other sponge aggregations: Geodiidae, Ancorinidae, Pachastrellidae.*
- *Hard-bottom sponge gardens: Axinellidae. Mycalidae*
- *Glass sponge communities Rossellidae, Pheronematidae*

4 - Seapen fields: Anthoptilidae, Pennatulidae, Funiculinidae, Halipteridae, Kophobelemnidae, Protoptilidae, Umbellulidae, and Vigulariidae
5 - Tube dwelling anemone patches: Cerianthidae
6 - Mud and sand emergent fauna: Bourgetcrinidae, Antedontidae, Hyocrinidae, Xenophyophora, Syringamminidae.
7 - Bryozoan patches

The MAREANO program is a comprehensive research program which aims to map Norwegian EEZ seafloor. The program was first launched in 2005 and since then has increased the area covered year by year. Much information about vulnerable habitat types can be found on its website, however, so far, the program has focused on mapping the seabed along the coast of Norwegian mainland (see Figure 16). Mapping of the seafloor in the Barents Sea began some years ago, but the area covered is still small. The identification of certain vulnerable habitats such as coral reefs in the mainland coastline has led to the designation of new marine protected areas in the zone.

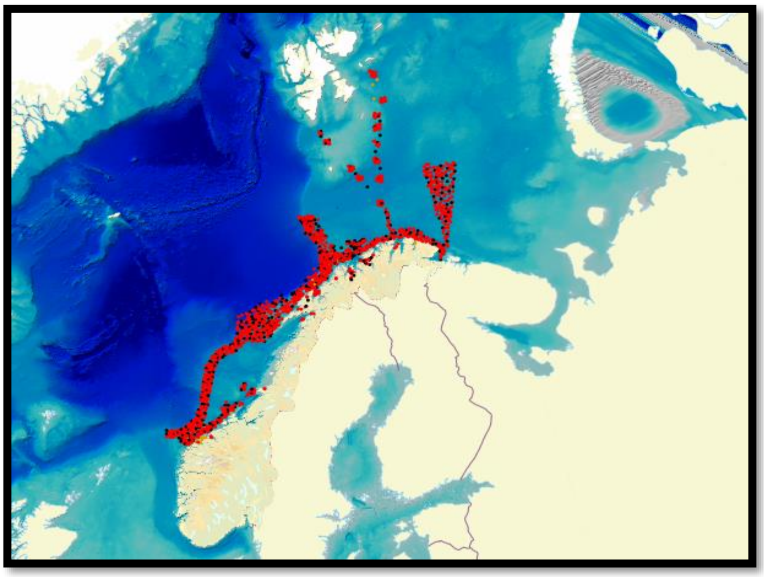


Figure 16: Area covered by the MAREANO program. Red dots show MAREANO stations. (Source: www.mareano.no)

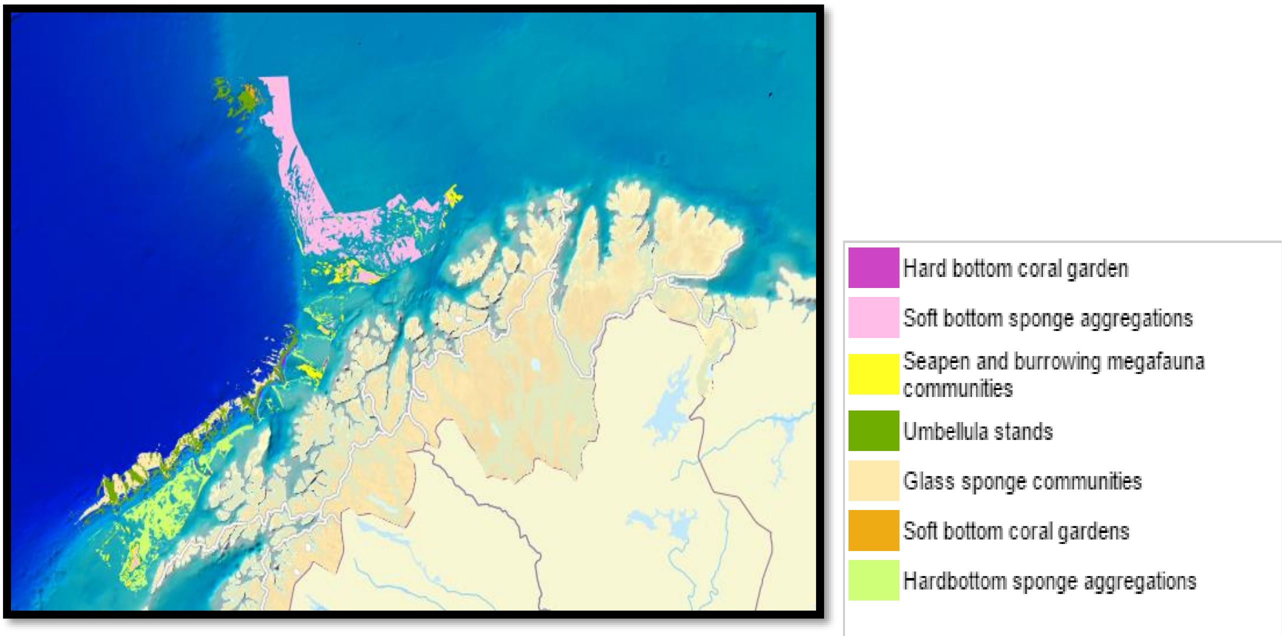


Figure 17. Vulnerable biotopes as identified by the MAREANO program. Source www.mareano.no

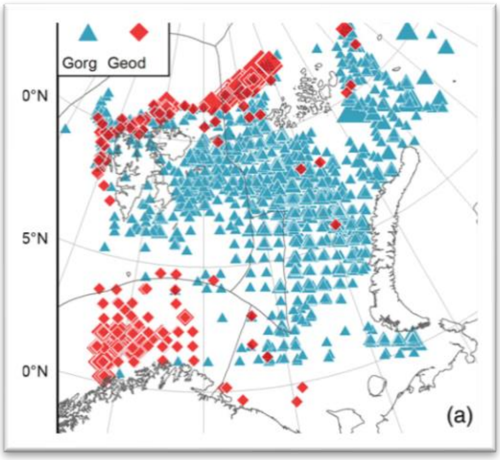
Benthic species in the Barents Sea have however been studied by other research institutions such as IMR. Jørgensen et al. (2015) studied data collected in 2011 by bottom trawlers to assess the vulnerability of benthic species to trawling, based on the risk of being caught or damaged by a bottom trawl. This work identified 347 different benthic species in the Barents Sea. Of those, 23 were classified by the research group as "high-risk" species, due to their "large weight and upraised" taxa and the ease of being caught by a bottom trawl. Jørgensen et al. (2015) research focuses on the distribution of these "high-risk" species, some of which are also considered as species indicators of VME by OSPAR and/or NEAFC.

Table 25: Benthic species present in the Barents Sea with a high risk of catchability, as identified by Jørgensen et al. (2015).

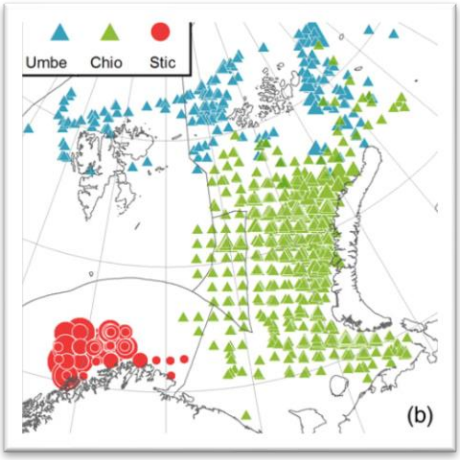
Arthropods	*Red king crab*	*Paralithodes camtschaticus*
	Snow crab	*Chionoecetes opilio*
	Sea spider	*Colossendeis spp.*
Cnidarian	*Sea pen*	*Umbellula encrinus*
	Nephtheidae soft corals	*Gersemia spp.* *Drifa glomerata*
Echinoderms	*Basket stars*	*Gorgonocephalus arcticus* *Gorgonocephalus eucnemis* *Gorgonocephalus lamarcki*
	Sea cucumbers	*Cucumaria frondosa* *Parastichopus tremulus*
	Sea lilies	*Heliometra glacialis* *Poliometra prolix*
Molluscs	*Cephalopods*	*Bathypolypus arcticus* *Benthoctopus spp.* *Rossia moelleri* *Rossia palpebrosa*
	Sea whelk	*Neptunea ventricosa*
Porifera	*Surface-dwelling sponges*	*Geodia barrette* *Geodia macandrewii*
	Other sponges	*Phakellia spp.* *Haliclona spp.* *Suberites spp.*

This study showed that Geodia sponges were dominant in the southwestern Barents Sea, basket stars (Gorgonocephalus) in the northern Barents Sea, sea pen (Umbellula encrinus) on the shelf facing the Arctic Ocean, and sea cucumber (Cucumaria frondosa) in shallow southern areas. Sea pens are associated with the shelf margin in the Arctic and lower slope in Norways EEZ. Of the species mentioned in Table 25 above, Porifera are considered by OSPAR as threatened and declining in the Barents Sea. NEAFC, in Recommendation 09:2015, considers both cnidarian and porifera species as representative of VME.

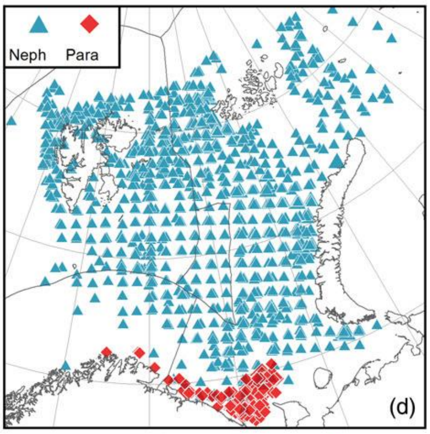
The following figures show the distribution of cnidarians and porifera as recorded by Jørgensen et al. (2015).



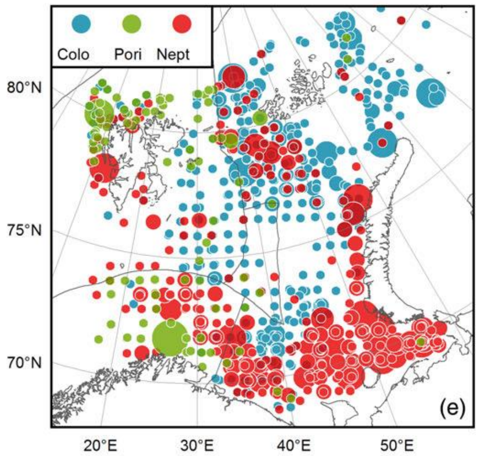
A: Geodia species are marked in red



B: Seapen species are marked in blue



D: Soft coral species are marked in blue



E: Porifera are marked in green.

Figure 18: Distribution (wet weight biomass after 15 min trawling) of benthic species in the Barents Sea. Of those, sponges, seapens and corals are considered as indicator species for vulnerable habitats by NEAFC. Source: Jørgensen et al. (2015)

(a) Basket star: Gorgonocephalus spp. (Gorg) and sponges: Geodia spp. (Geod); VME Species are marked in red.

(b) Seapens: Umbellula encrinus (Umbe), Snow crab: Chionocetes opilio (Chio), and sea cucumber: Parasticopus spp. (Stic); VME species are marked in blue.

(d) Soft coral: Nephtheidae (Neph) and red king crab: Paralithodes camtschaticus (Para); VME species are marked in blue.

(e) Sea spider: Colossendeis spp. (Colo), stalked Porifera (Pori: including C. gigantean, S. borealis, Cladohriza spp., Asbestopluma spp.), and Sea whelk: Neptunea spp. (Nept: including N. communis, N. despecta, N. ventricosa, and N. denselirata); VME species are marked in green.

Jakobsen and Ozhigin (2011) agree that large aggregations of sponges (e.g. Geodia spp.) can be found along the continental slope from Tromsøflaket and north along the west coast of West Spitsbergen, north of Svalbard (Spitsbergen) and east to Franz Josef Land. Porifera also appears to dominate the communities in terms of biomass north of the Finnmark coast, including the Bear Island Channel, while cnidarians (mainly sea anemones and soft corals) and molluscs are more common the Eastern part of the Barents Sea.

Vulnerable bottom habitats in the Barents Sea north of 76°N and around Svalbard have been studied by IMR (Jørgensen, 2017) and described based on an evaluation of:

- *the complexity of the benthos community (number of species, biomass, number of individuals),*
- *the sensitivity of the benthos community for climate warming (mean temperature preference and temperature tolerance),*
- *how exposed the benthos community are toward being hit/caught by a bottom trawl (height, body weight and mobility of species), and the geographical distribution of possible vulnerable species/species group.*

The areas which are considered as vulnerable are:

- *The deep regions on the continental slope around Svalbard*
- *The Yermack Plateau with the slopes*
- *The areas east of Svalbard including*
    - *The area between Nordøstlandet and Kvitøya*
    - *The area around Kong Karls Land*

Along the delimitation line between Norway and Russian on the Central Bank.

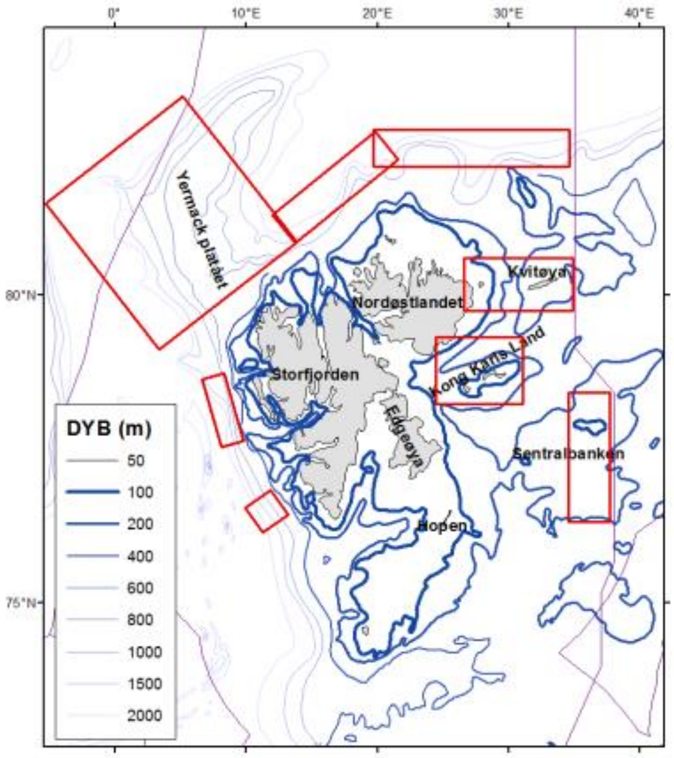


Figure 19: Vulnerable areas (in red) north of 76°N. The vulnerability is based on the complexity of the benthos-community, sensitivity toward increasing temperature and bottom trawling and the geographical distribution of vulnerable species/species-groups. Source: Jørgensen, L.L. (2017).

Denisenko et al (2013) concluded that the Lophelia pertusa coral reefs are mostly located in the south western part of the Barents Sea (Norway EEZ). The distribution of the species is affected by water temperature and hydrological conditions (which do not occur in the Russian EEZ). They agree that largest sponge aggregations are located in the southwest part of the shelf around Banks of Tromso, and that the biomass of sponges is insignificant in the central and Eastern part of the Barents Sea (Denisenko et al, 2013). Fossa et al. (2002) estimated that L. pertusa covered 1500–2000 km2 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 presence 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).

Soft corals are widely distributed in the Barents Sea. While most of these species (Gersemia fruticosa, G. rubiformis, Drifa glomerata and Duva florida) need a hard substratum to grow on, Gersemia fruticosa can also lodge on soft sediment. While soft corals are common in all waters in the Barents Sea and are generally taken as bycatch of bottom trawlers, they do not form mass settlements in the open waters of the Barents Sea.

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) 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). The western Barents Sea is well known for mass occurrences of sponges from numerous scientific and fishermen's sources (Klitgaard & Tendal, 2004); 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 and northern 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 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.

The distribution of seapens has been studied by the MAREANO program. Figure 20 below shows the relative abundance as observed during field surveys (2006-2017). Umbelulla incrinus forms dense aggregations on soft sediments in the northeastern part of the Barents Sea near Saint Anne's trench. Again, according to Denisenko et al (2013), benthic biomass in this southern region is considerably lower than in the northern region, however this does not affect food supply for fish species.

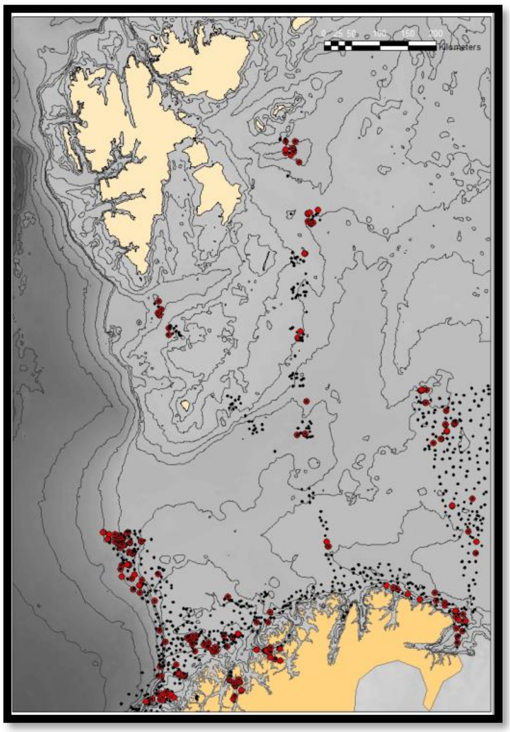


Figure 20: Relative abundance of sea pens (red dots) observed by MAREANO during field surveys from 2006 until 2017. Black dots indicate locations where the seabed has been surveyed and no seapen has been observed. (Source: www. MAREANO.no)

Sessile animals such as sea pens which project above the sediment surface are clearly likely to be damaged or uprooted by the passage of a trawl. As suspension-feeders, sea pens may require a certain degree of water movement, and more favourable conditions for growth may exist where local hydrography is modified by irregularities in the sea floor. In Loch Fyne, Virgularia was scarce on the deeper muds irrespective of whether or not these were trawled (Howson & Davies, 1991). At shallower depths where the species was more abundant, densities were similar at untrawled (3 - 4 individuals *m-2) and trawled (2 - 7 m-2) sites. Howson & Davies concluded that there was no clear evidence that trawling had affected Virgularia densities in Loch Fyne. The resilience of Virgularia to trawling is supported by the findings of Tuck et al. (1998), who found no changes in density in a sea loch following experimental trawling carried out repeatedly over an 18-month period http://www.ukmarinesac.org.uk/communities/seapens/sp5_1_1.htm#a3)*

There are a number of management measures which are already implemented in the Barents Sea in order to protect habitats:

- *Avoidance of coral reefs and sponges by the fishing industry, as towed-gear vessels avoid coral because of the damage it can do to the gear and sponges crush 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. Vessels engaged in the current fishery have the technology (high precision GPS navigation and ground-discrimination echo sounders which can distinguish between mud and sand or hard rock, coral and sponges) that enables them to skirt around and avoid known VME areas.*
- *Mandatory use of satellite monitoring (VMS – vessel monitoring system) which serves to verify that large vessels do not enter Marine Protected Areas (MPAs), as confirmed by the Norwegian Directorate of Fisheries.*
- *Trawling is forbidden within the majority of the 12- nautical mile limit from Norwegian baselines (in some instances, this limit is set at 6 nautical miles).*
- *Fishing below 1000 m within the Norwegian EEZ is banned in order to protect deep-water sensitive habitats and species.*
- *Norwegian regulation J-61-2019 regulating bottom gears to protect vulnerable marine ecosystems. (https://fiskeridir.no/Yrkesfiske/Regelverk-og-reguleringer/J-meldinger/Kommende-J-meldinger/J-61-2019)This regulation applies to all the Norwegian EEZ including waters in the Barents Sea;and establishes that when a trawl vessel catches more than 30 kgs of coral or 400 kg of sponges in a single haul, the vessel shall stop fishing and move position at least 2 nautical miles in order to avoid such catches. The incident must be reported to the Directorate of Fisheries. According to this regulation, when fishing in a "new fishing area" in the Norwegian EEZ or the Svalbard FPZ, vessels must have a special permit from the Directorate of Fisheries. These are only approved by the Directorate if the vessel has submitted for approval:*
  - *A detailed protocol for trial fishing which includes a fishing plan for fishing gear, fish stocks, by-catches, time and areas.*
  - *A plan to avoid damage to sensitive marine ecosystems.*
  - *A plan for journal entry and reporting.*
  - *And a plan for collecting data on vulnerable habitats.*
- *Regulation J-61-2019 also establishes the limits of 10 closed areas (MPAs) in order to protect VMEs. See Figure 21 below. Similar measures on the protection of corals and sponges is recommended in NEAFC waters, where Recommendation 19/2014 establishes threshold limits for bycatch of corals and sponges.*
- *NEAFC commission meets annually and decides, when necessary, on the establishment of area closures, as done in other NEAFC waters. To date, NEAFC has not identified any need for area closure in the Loophole area (http://www.fao.org/fishery/topic/16204/en).*
- *While not specifically designed for the protection of benthic habitats, Russian Regulation 414 (2014), articles 16 and 17, describes the position of 5 area closures in the Russian EEZ in order to protect juvenile fish.*

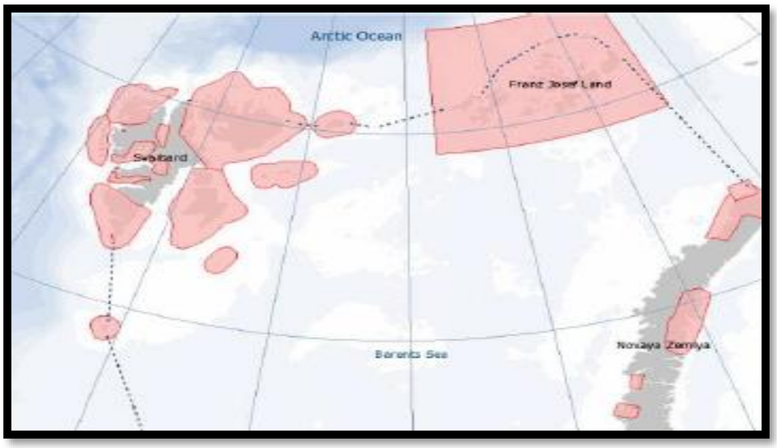


Figure 21: Marine Protected Areas in the Barents Sea. Source: www.barentsportal.com

The Norwegian Biodiversity Information Centre has designed a Red list of vulnerable ecosystems and habitats in Norway. This list includes 16 marine areas which are categorised from Data Deficient to Critically Endangered. Table 26 lists the vulnerable habitats as described by the Norwegian Biodiversity Information Centre.

Table 26: List of vulnerable and endangered marine habitats and ecosystems as categorised by the Norwegian Red List of vulnerable ecosystems and habitats. Source: https://www.artsdatabanken.no/rodlistefornaturtyper

Area	Type of area	Classification
Pigtail coral forest bottom	Marine deep water	Endangered
Bamboo coral forest bottom	Marine deep water	Endangered
Cold water basins	Marine shallow waters, Svalbard	Endangered
Arctic lagoon	Marine shallow waters, Svalbard	Data Deficient
Polar sea Ice	Marine shallow waters, Svalbard	Critically Endangered
Isskurt sublitoral bottom	Marine shallow waters, Svalbard	Vulnerable
Isskurt litoral bottom	Marine shallow waters, Svalbard	Vulnerable
Brakk hard bottom springs	Marine shallow waters, Svalbard	Data Deficient
Rulg bottom	Marine shallow waters, Svalbard	Data Deficient
Brakk sand and gravel floor	Marine shallow waters, Svalbard	Vulnerable
Shallow sandy bottom	Marine shallow waters, Svalbard	Data Deficient
Northern sugarcane forest	Marine deep water	Endangered
Southern sugarcane forest	Marine deep water	Endangered
Northern fingertip bottom	Marine deep water	Vulnerable
Exposed mussel bottom	Marine deep water	Vulnerable
Rugl bottom	Marine deep water	Data Deficient

According to Kaiser et al. (2006), bottom trawling does not irreversibly affect soft bottoms such as sandy and muddy grounds. However, there is still a clear and negative relation between fisheries-intensity and density of mega benthos (Jakobsen T., Ozhigin V., 2011).

Large epifauna species such as echinoderms, sponges, gorgonian corals, soft corals, large snails and bivalves are examples of groups of animals found in trawl bycatches. Sponges, seapens, ophiurids and sessile polychaetes remaining in the seafloor show a clear negative relationship between their biomass and trawling intensity in the area. Specifically, 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. Other species such as Asteroidea spp. show a positive response to trawling.
WWF Russia, developed, in 2013, a map of the minimum recovery time for habitats in the Barents Sea. The map was made based on the assumption that the duration of community recovery is determined by the average life expectancy of the most long-lived species in the community. On this basis, a community cannot be considered fully recovered prior to the time that the longest-living member completes its entire life cycle. According to the map, recovery after bottom trawling would take place within 5 years in most parts of the Barents Sea, but recovery would be up to 10 years or more in the areas where VMEs tend to occur.

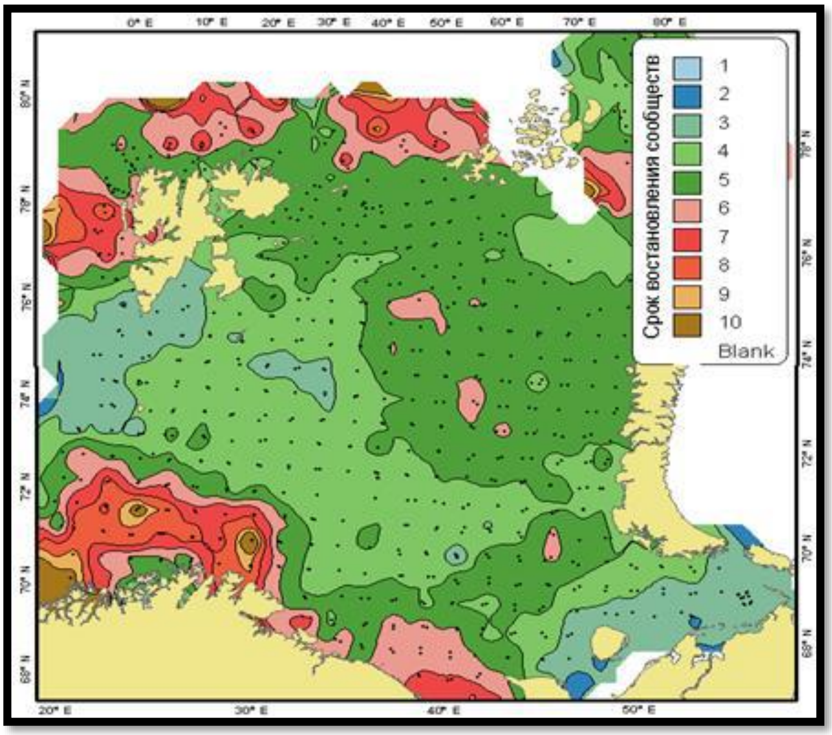


Figure 22: Map of the minimum recovery time (years) in the Barents Sea. Different colours show the community recovery time in years. (Source: Lubin 2013 (from Denisenko S.G. and Zgurovsky, K.A. 2013. Impact of trawl fishery on benthic ecosystems of the Barents Sea and opportunities to reduce negative consequences. Murmansk. WWF. 2013. 55pp.)

Other authors have also tried to estimate the recovery time for different species after trawling (Buhl-Mortensen et al., 2015). Benthic infauna communities might take at least 18 months to recover (Tuck et al. 1998). Macrobenthic invertebrates (molluscs, crustaceans, annelids and echinoderms) may take 1-3 years to recover (Desprez, 2000). Large sessile fauna takes from years to decades to recover. Indirect evidence (Pitcher 2000, and Sainsbury et al. 1997) suggests that large sponges probably take more than 15 years to recover.
However, some regions have already been trawled for more than a century, which has led to a loss of biodiversity in the modified areas where vulnerable species are less abundant.
Trawling impacts have also been accompanied by natural spatial and temporal variations in water temperature and ocean currents. Full recovery of vulnerable species in those habitats is not expected to take place in a short time frame but avoiding future damage in unexplored areas should be easier to control. In any case, trawl-modified habitats continue to offer nutrients for ecosystem needs, regardless showing lower biodiversity.

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; Lokkeborg, 2005). In recent years there have been a plethora of specific studies and examples have been reviewed by Hall (1999) and Kaiser & de Groot (2000).

Ecosystem

The Barents Sea is one of the shelf seas surrounding the Polar basin. It covers an area of approximately 1 600 000 km2 (Carmack et al. 2006), has an average depth of ca. 230 m, and a maximum depth of about 500 m at the western end of Bear Island Trough (ICES 2016 AFWG Report). It connects with the deeper Norwegian Sea to the west, the Arctic Ocean to the north, and the Kara Sea to the east (Figure 23 below). It is delimited by mainland Russia and Norway in the South, Svalbard Islands in the East, Novaya Zemlya Islands to the West, and the Franz Josef Land Islands to the North. Atlantic waters enter the central Barents Sea through the western troughs between the Svalbard archipelago and the Norwegian coastline.

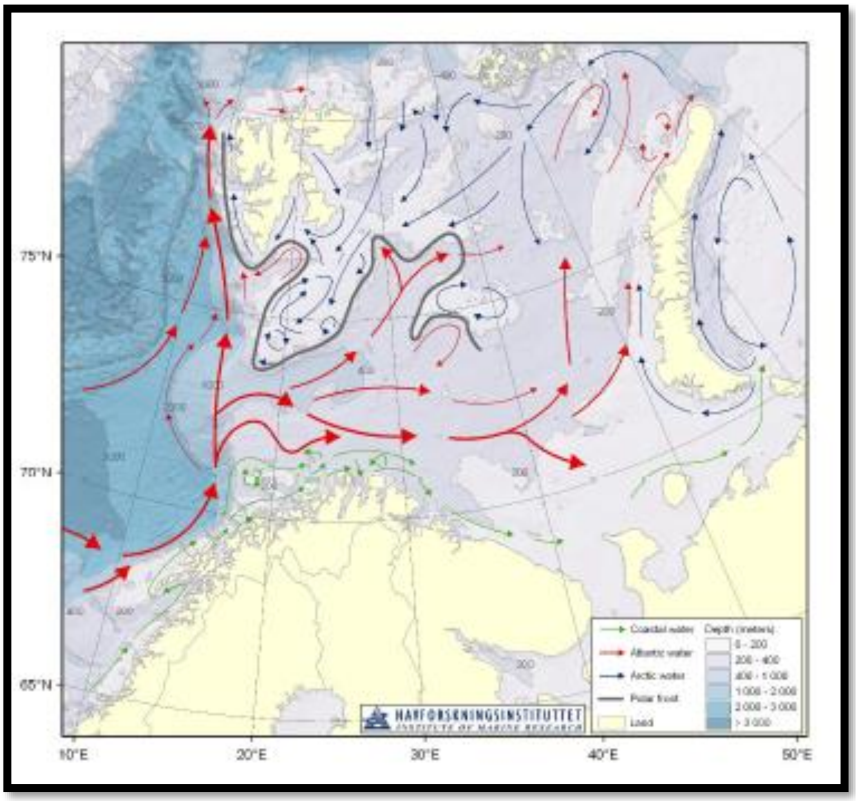


Figure 23: Water circulation in the Barents Sea. (Source: ICES AFWG REPORT 2016)

Ocean circulation in the Barents Sea is influenced by the region's topography and is characterized by inflow of relatively warm Atlantic water, and coastal freshwater from the west. Atlantic waters later divide into two branches, one going East and one going North. In the northern region, colder Arctic waters flow from northeast to southwest. Atlantic and Arctic water masses are separated by the Polar Front, which is characterized by strong gradients in both temperature and salinity. In the western Barents Sea the front position is stable, while in the eastern Barents Sea the front position varies seasonally and inter-annually. Variations in large-scale atmospheric circulation leads to changes in upper ocean circulation, ice extent and hydrographic properties of the water column. Ice cover also has a strong seasonal and inter-annual variation, ranging from almost ice-free conditions to covering more than half the sea. In the last 40 years, there has been a general decreasing trend in ice coverage in the Barents Sea. Distribution of phytoplankton, zooplankton and fish species have moved North as these waters get warmer. Other responses of the Barents Sea to climate change and ocean acidification are still to be observed.

The last decade was the warmest on record, with the highest temperatures in 2007 and 2012. In 2015 the surface temperature was on average 1.2°C higher than the long-term mean for the period 1931–2010 almost all over the Barents Sea Figure 24 below). Water masses get stratified during the springtime, and after that primary production increases leading to a spring bloom (ICES 2016 AFWG Report).

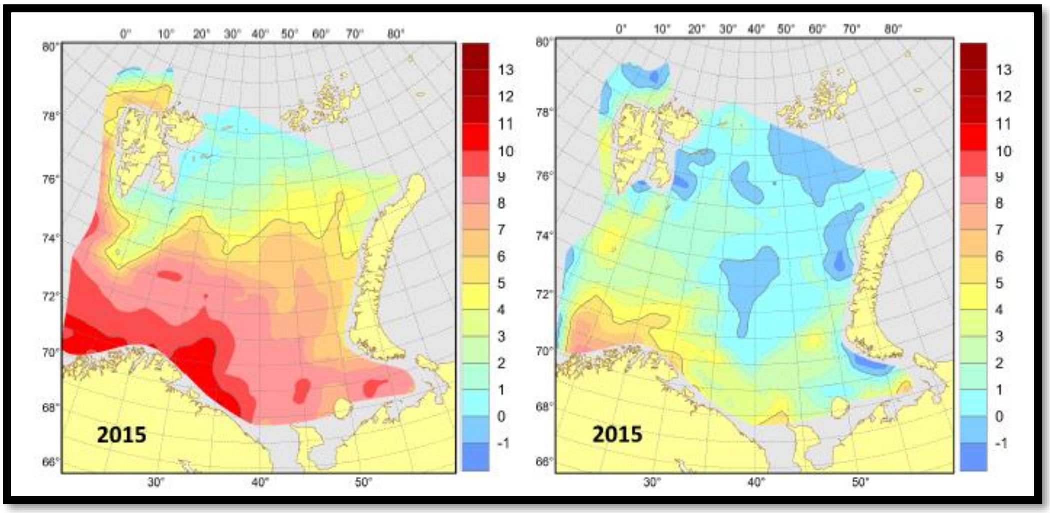


Figure 24: Surface (left) and bottom (right) water temperature (ºC) in the Barents Sea in August-October 2015. (Source: ICES AFWG REPORT 2016)

The Barents Sea region is influenced by different human activities such as fishing, transportation of goods, oil and gas, tourism and aquaculture. Hunting of marine mammals was a common activity which remains at lower rates.
As regards fishing activities, vessels from different nationalities target different species using different gears. The largest commercially exploited fish stocks (cod, capelin and haddock) are now harvested at fishing mortalities close to those in the management plan and have full reproductive capacity. Some of the smaller stocks (golden redfish Sebastes marinus and coastal cod in Norway) are overfished. Other species subject to targeted fisheries include Greenland halibut, Atlantic halibut, beaked redfish, deep-water shrimps, red king crabs, and snow crabs (both crab species are well established in the region, despite being invasive species).
Marine research institutions such as IMR and PINRO undertake different scientific surveys to monitor both physical and chemical parameters as well as sample the status of the stock of different species. Table 27 below summarizes the different scientific surveys regularly taken by these institutions.

Table 27: Overview of conducted monitoring surveys by IMR and PINRO in the Barents Sea, with observed parameters and species. Climate and phytoplankton parameters are: T-temperature, S-Salinity, N-nutrients, Chla-chlorophyll.

Survey	Institution	Period	Climate	Phyto-plankton	Zooplankton	Juvenile fish	Target fish stocks	Mammals	Benthos
Winter survey	Joint	Feb- Mar	T, S	N, chla	Intermittent	All commercial species and some additional	Cod, Haddock	-	-
Lofoten survey	IMR	Mar- Apr	T, S	-	-	-	Cod, haddock, saithe	-	-
Ecosystem survey	Joint IMR - PINRO	Aug- Oct	T, S	N, chla	Yes	All commercial species and some additional	All commercial species and some additional	Yes	Yes
Norwegian coastal surveys	IMR	Oct- Nov	T, S	N, chla	Yes	Herring, sprat, demersal species	Saithe, coastal cod	-	-
Russian Autumn-winter trawl-acoustic survey	PINRO	Oct- Dec	T, S	-	Yes	Demersal species	Demersial species	-	-

Survey	Institution	Period	Climate	Phyto-plankton	Zooplankton	Juvenile fish	Target fish stocks	Mammals	Benthos
Norwegian Greenland halibut survey	IMR	Aug, biennial	-	-	-	-	Greenland halibut, redfish	-	-
Russian young herring survey	PINRO	May	T, S	-	Yes		Herring	-	-

Interspecies trophic relations are also studied through different multispecies and ecosystem models, which identify the most important inter-species/ functional group links and sensitivity of the ecosystem to changes and serves to give scientific based management advice to the different fleets. Table 28 *below gives a summary of different multispecies and ecosystem models for the Barents Sea.*

According to Plagányi (2007), there are different approaches to modelling the ecosystem:

- *Whole ecosystem models: models that attempt to take into account all trophic levels in the ecosystem.*
- *Minimum Realistic Models (MRM): takes into account a limited number of species which are most likely to have important interactions with a target species of interest.*
- *Dynamic System Models (Biophysical): represent both bottom-up (physical) and top-down (biological) forces interacting in an ecosystem.*
- *Extensions of single-species assessment models (ESAM): They expand current single-species assessment models taking only a few additional inter-specific interactions into account.*

Table 28: Classification of the multispecies/ecosystem models for the Barents Sea. (Source: ICES AFWG REPORT 2016)

MODEL	NAME	STATUS (for the Barents Sea)
Whole ecosystem models (End to End models)		
EwE and ECOSPACE	Ecopath with Ecosim	Potentially useful
ATLANTIS	ATLANTIS	Operational
Minimum realistic models (Multispecies models)		
Bifrost	Boreal integrated fish resource optimization and simulation tool.	Operational
STOCOBAR	Stock of cod in the Barents Sea	Operational
GADGET	Globally applicable Area Disaggregated General Ecosystem Toolbox	Operational
DSF	Dynamic Stochastic Food web	In development
BORMICON	Boreal Migration and consumption model	Precursor to GADGET
MULTISPEC	Multi-species model for the Barents Sea: Simplified version is AGGMULT which is also connected to a ECONMULT - a model describing the economies of the fishing fleet.	Retired
MSVPA and MSFOR (and derivates)	Multi-species Virtual Population Analysis; Multi-species Forecasting Model.	Potentially useful
IBM	Individual-Based Models	Operational
Dynamic system models		
NORWECOM.E2E	Formulation is moving towards whole ecosystem model	In development
SYMBIOSES	SYMBIOSES	First version functional, under further development.
Extension of single species assessment models		
ESAM	Extended Single-Species Models e.g. Livingston and Methot 1998; Hollowed et al., 2000; Tjelmeland and Lindstrøm 2005.	Limited application
SEASTAR	Stock Estimation with Adjustable Survey observation model and TAg-Return data	Limited application
EcoCod	Ecosystem and Cod	In development

These models and assessments provide enough information to indicate that the Barents Sea ecosystem is relatively healthy (affected however by global warming and other human pressures). Declines in the populations of certain species

such as marine mammals or birds are attributed to other factors such as rising sea temperature or redistribution of prey species.
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, 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.

Since 2012 there are two trawlers in the reference fleet. Crew members in these vessels record all interactions, including those with released individuals. Data from 2012 – 2015 include a total of 30 recorded interactions (which would mean 3 interactions per vessel per year) with the following bycatch species: Velvet belly lanternshark (Etmopterus spinax, IUCN Least Concern), Blackmouth catshark (Galeus melastomus, IUCN Least Concern), Sailray (Rajella lintea, IUCN Least Concern), Rabbit fish (Chimaera monstrosa, IUCN Near Threatened), Longnosed skate (Dipturus oxyrhincus, IUCN Near Threatened), Starry ray (Amblyraja radiata, IUCN Vulnerable) and one individual of Great black-backed gull (Larus marinus, IUCN Least Concern). Data collected by the reference fleet in years 2015-2018 show similar interactions by trawling vessels. As reflected in the data recorded by the reference fleet, these interactions are sporadic. Besides, the procedure of releasing them back to the sea and the general high survival rate should serve not to hinder the stock status of these species.
The fishery also takes place in the Norwegian Sea. 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–Vesteralen (on the Norwegian coast). The Norwegian Sea has an area of c.1 million km2 and an average depth of c. 2000 m 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 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.

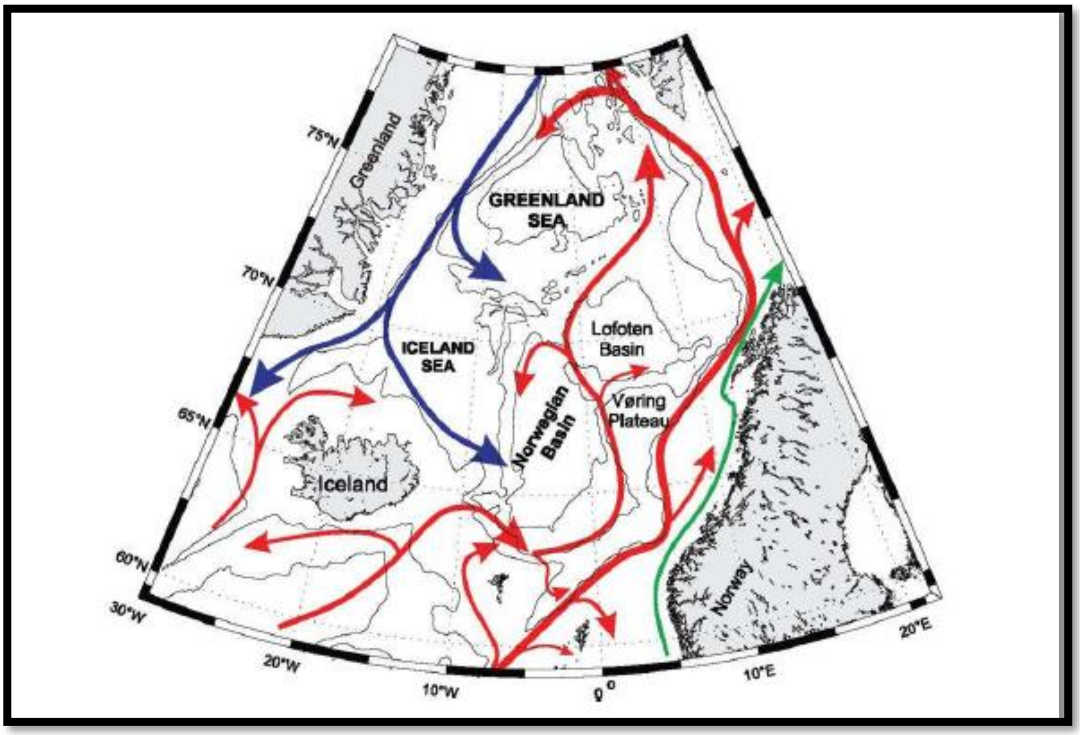


Figure 25: The main circulation pattern in the Norwegian Sea. Red lines indicate warm currents, blue lines indicate cold currents and green lines show low salinity coastal water.

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 (http://www.imr.no/filarkiv/havets_ressurser_og_miljo_2009/2.1_introduksjon-

okosystem_Norskehavet.pdf/nb-no). 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 (http://www.imr.no/filarkiv/havets_ressurser_og_miljo_2009/2.3_primaer_sekundaerproduksjon.pdf/nb-no).

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.

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, filterfeeding 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.

Table 29 Scoring elements

Scoring element	Component	Designation	Data deficient?
Greenland halibut	Principle 1	N/A	No
American plaice	Secondary	Minor	Yes
Anglerfish	Secondary	Minor	Yes
Atlantic halibut	Secondary	Minor	Yes
Atlantic pomfret	Secondary	Minor	Yes
Bag crab	Secondary	Minor	Yes
Beaked redfish (Snaubeler)	Primary	Minor	No
Blackmouth catshark	Secondary	Minor	Yes
Blue ling	Primary	Minor	No
Blue skate	Secondary	Minor	Yes
Common dab	Secondary	Minor	Yes
European plaice	Secondary	Minor	Yes
Golden redfish (uer vanlig)	Primary	Minor	No
Greater forkbeard	Secondary	Minor	Yes
Hadddock	Primary	Minor	No
Hake	Primary	Minor	No
King crab	Secondary	Minor	Yes
Lemon sole	Secondary	Minor	Yes
Lesser silver smelt	Secondary	Minor	Yes
Ling	Primary	Minor	No
Lumpfish	Secondary	Minor	Yes
NEA cod	Primary	Minor	No
Other skates and rays	Secondary	Minor	Yes

Scoring element	Component	Designation	Data deficient?
Pollack	Secondary	Minor	Yes
Porbeagle	ETP	N/A	No
Rabbit fish	Secondary	Minor	Yes
Roughhead grenadier	Secondary	Minor	Yes
Roundnose grenadier	Secondary	Minor	Yes
Saithe	Primary	Minor	No
Spotted wolfish	Secondary	Minor	Yes
Spurdog	ETP	N/A	No
Starry ray	Primary	Minor	No
Thornback ray	Secondary	Minor	Yes
Turbot	Secondary	Minor	Yes
Tusk	Primary	Minor	No
Velvet belly	Secondary	Minor	Yes
Witch flounder	Secondary	Minor	Yes
Fine substratum (with flat associated geomorphology and large erect biota).	Habitat	Commonly encountered hábitats	No
Cold water coral reefs	Habitat	Vulnerable marine ecosystems	No
Coral gardens	Habitat	Vulnerable marine ecosystems	No
Deep sea sponge aggregations	Habitat	Vulnerable marine ecosystems	No
Seapens fields	Habitat	Vulnerable marine ecosystems	No
Coarse sediments	Habitat	Minor hábitat	No
Rocky areas	Habitat	Minor habitat	No

7.3.2 Principle 2 Performance Indicator scores and rationales

PI 2.1.1 – Primary species outcome: All UoAs

PI 2.1.1		The UoA aims to maintain primary species above the point where recruitment would be impaired (PRI) and does not hinder recovery of primary species if they are below the PRI		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guide post	Main primary species are **likely** to be above the PRI. OR If the species is below the PRI, the UoA has measures in place that are **expected** to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are **highly likely** to be above the PRI. OR If the species is below the PRI, there is either **evidence of recovery** or a demonstrably effective strategy in place **between all MSC UoAs which categorise this species as main**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main primary species are above the PRI **and are** fluctuating around a level consistent with MSY.
	Met?	**Yes**	**Yes**	**Yes**

Rationale

There are no main primary species. A default score of SG100 is given.

b	Minor primary species stock status			
	Guide post			Minor primary species are highly likely to be above the PRI. OR If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species.
	Met?			**No**

Rationale

There are many minor primary species listed in the different catch composition tables per UoA.
Golden redfish is one of them for all UoAs.
Golden redfish: According to ICES 2020 advice on golden redfish in subareas I and II (latest advice available), the spawning-stock biomass (SSB) shows a declining trend since the late 1990s and is currently at the lowest in the time-series. Recruitment in 2006 (the 2003 yearclass) is now entering the SSB and fishery but the SSB has not yet ceased declining. The large recruitment estimates for 2011 and 2012 have high uncertainty. Fishing mortality (F) decreased until around 2005 but is now rising again. The stock is subject to specific management measures (such as area closures) to assist stock rebuilding and is landed as retained bycatch in small quantities by the different fleets. Targeted fishing is controlled by a ban on all directed trawl fisheries and specific licensing for seasonal gillnet and longline fisheries for beaked redfish. While these measures are having a positive effect on beaked redfish stock status with signs of stock rebuilding (ACOMsmen, 2014), the golden redfish stock continues to be at an all-time low with no signs of recovery (ICES 2018 advice). ICES advises that when the precautionary approach is applied, there should be zero catch in each

of the years 2021 and 2022. ICES is not aware of any agreed precautionary management plan for golden redfish in this area. ICES assess that the spawning stock size is below Bpa and Blim. The current exploitation rate is above the FMSY proxy.
There is no significant direct fishery, and measures have been taken to attempt reduce the bycatch mortality by area closures. However, fishing mortality has been rising in recent years, and a further bycatch reduction is needed to minimize all sources of fishing mortality. It is imperative to minimize catches on the remaining mature fish and to protect incoming recruits.
Golden redfish stock is not likely to be above the PRI. However, there are measures in place implemented by the whole Norwegian fleet which seek the rebuilding of the stock. These measures, who have been in place for several years now, are expected to ensure that the different UoAs do not hinder recovery and rebuilding of the stock. While these measures can be considered as a strategy, so far the strategy is not considered to be demonstrably effective as the measures have been implemented for several years now but there is no evidence of recovery yet. **SG100 is not met by golden redfish.**
Given this, the assessment team does not assess the status of other minor primary species as the score is caped down to SG80 due to the poor status of golden redfish.

References
https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2020/2020/reg.27.1-2.pdf

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.1.2 – Primary species management strategy: All UoAs

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to be above the PRI.	There is a **partial strategy** in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the PRI.	There is a **strategy** in place for the UoA for managing main and minor primary species.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

There are no main primary species to consider for any UoA. The list of minor primary species found in each UoA is shown in Tables 18-21.

The Norwegian Marine Resources Act is an established strategy which should address all main impacts of the fishery on the ecosystem. Besides, the Joint Russian–Norwegian Fisheries Convention and the Norwegian management plans for the Barents Sea and Norwegian Sea set the guidelines to manage the different commercial stocks present in these areas.

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. IMR CRISP programme contributes with research into potential improvements in target identification and gear selectivity.

Generic management regulations that apply to the Greenland halibut fishery are:

- Discard ban
- minimum catch size
- minimum mesh size
- maximum bycatch of undersized fish
- closure of areas having high densities of undersized fish and in addition some seasonal and other area restrictions.
- The use of sorting grid is mandatory for all trawl fisheries.
- ban on targeted fishing for vulnerable species such as golden redfish.
- Regulation on the releasement of Atlantic halibut <80 cm which must be returned to sea alive to contribute to the rebuilding of the stock.
- Cod, haddock and saithe are subject to quota
- There are specific management measures directed to the rebuilding of golden redfish and coastal cod as both stocks are in poor conditions.

The different measures implemented under the auspices of the Norwegian Marine Resources Act, act as a strategy for managing primary species. SG60, SG80 and SG100 are met.

b	Management strategy evaluation			
	Guide post	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 measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.

	Met?	**Yes**	**Yes**	**Yes**
Rationale				

Enforcement by the Coast Guard, together with records on landings, research on the status of the different stocks and the scientific advice given for the different stocks serve to give some objective basis for confidence that the measures will work for most species. ICES stock assessments allow to estimate the size and status of all the impacted primary species.
Given these measures and the limited impact of the different UoAs on the different minor primary species (as there are no main primary species to consider), the assessment team considers that the requirements at SG60, SG80 and SG100 are met.

c	Management strategy implementation			
	Guide post		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is **clear evidence** that the partial strategy/strategy is being **implemented successfully and is achieving its overall objective as set out in scoring issue (a).**
	Met?		**Yes**	**No**
Rationale				

There is clear evidence that the strategy is successfully implemented, as confirmed by previous conversations with the Norwegian Ministry of Fisheries (note that this needs to be reviewed and confirmed at initial audit). There are control measures covering fleet effort, gear types and sizes, landings, quotas and permanent and temporary area closures. Note that there are no main primary species to consider. All UoAs meet the requirements at SG80.

While the good stock status of different minor primary species (such as NEA cod, haddock, saithe or beaked redfish) could serve as clear evidence that the objective of not hindering affected stocks is been met, certain stocks, such as golden redfish show no sign of recovery despite the management efforts applied to the stock. Since golden redfish is present in the catch of all UoAs, SG100 is not met by any UoA.

d	Shark finning			
	Guide post	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?	**NA**	**NA**	**NA**
Rationale				

There are no shark primary species in the catch. In any case, shark finning is not an issue in Norwegian waters. This SI is not applicable.

e	Review of alternative measures			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main primary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all primary species, and they are implemented, as appropriate.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

The Norwegian Directorate of Fisheries performs an annual risk review in which different aspects are taken into consideration, including the examination of the number and type of infringements by Norwegian vessels, the species (and quantities) affected and the alternative measures to minimize such damages in the future. The risk review includes a review of catch data and its relation to allocated TACs.

The risk review is taken as part of the Directorate of Fisheries annual activity, with annual meetings in June and November, and review of results would result in new management measures to minimize unwanted catch and infringements by the fleet (if any).
The continuity of the annual review by the Directorate of Fisheries will be reviewed at the initial audit for the assessment process.

SG60, SG80 and SG100 are met by all UoA's.

References

Chaudhury et al, 2021.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.1.3 – Primary species information: All UoAs

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impact on main primary species			
	Guide post	Qualitative information is **adequate to estimate** the impact of the UoA on the main primary species with respect to status. **OR** **If RBF is used to score PI 2.1.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is **adequate to assess** the impact of the UoA on the main primary species with respect to status. **OR** **If RBF is used to score PI 2.1.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is **adequate to assess with a high degree of certainty** the impact of the UoA on main primary species with respect to status.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

There are no main primary species to consider. A score of SG100 is given by default to all UoAs.

b	Information adequacy for assessment of impact on minor primary species			
	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			**Yes**
Rationale				

The landing obligation, which was implemented for all species in 2009, serves to provide quantitative information on the impacts of the fishery in all affected species. Removals by other countries in the area are also known by the relevant management institutions. Enforcement to the different management measures is carried out by the Norwegian Coast Guard. There is research undertaken by IMR which includes annual coastal surveys and ecosystem surveys, both in the Norwegian Sea and in the Barents Sea.
The impact of the different UoAs with respect to stock status of the different minor primary species can be easily evaluated by consulting ICES catch advice. SG100 is met by all UoA’s and scoring elements.

c	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage **main** primary species.	Information is adequate to support a **partial strategy** to manage **main** primary species.	Information is adequate to support a **strategy** to manage **all** primary species, and evaluate with a **high degree of certainty** whether the strategy is achieving its objective.
	Met?	**Yes**	**Yes**	**Yes**

Rationale

Landing statistics since the implementation of the Norwegian landing obligation can provide trends of the landings of the different primary species in the catch composition and the areas where these species are more abundant. On general terms, the evaluation of the effectiveness of the different management measures can be done by comparing landing statistics before and after the implementation of the different management measures and by consultation of ICES advice on the different species.

The status of the different stocks present in the catch composition is studied by research institutions such as ICES, IMR and also by PINRO (for those stocks in the Barents Sea waters). Special attention is paid to golden redfish and coastal cod due to its poor stock status. **SG60, SG80 and SG100 are met by all UoAs and scoring elements.**

References

Chaudhury et al, 2021.
ICES advice for primary species.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.2.1 – Secondary species outcome: All UoAs.

PI 2.2.1		The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit		
Scoring Issue		SG 60	SG 80	SG 100
a	Main secondary species stock status			
	Guide post	Main secondary species are **likely** to be above biologically based limits. OR If below biologically based limits, there are **measures** in place expected to ensure that the UoA does not hinder recovery and rebuilding.	Main secondary species are **highly likely** to be above biologically based limits. OR If below biologically based limits, there is either **evidence of recovery** or a **demonstrably effective partial strategy** in place such that the UoA does not hinder recovery and rebuilding. AND Where catches of a main secondary species outside of biological limits are **considerable**, there is either **evidence of recovery** or a, **demonstrably effective strategy in place between those MSC UoAs that have considerable catches of the species**, to ensure that they collectively do not hinder recovery and rebuilding.	There is a **high degree of certainty** that main secondary species are above biologically based limits.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

According to information recorded on electronic logbooks (which also record interaction on fatal interactions with out of scope species) for the different UoAs for years 2016-2020 as facilitated by the Directorate of Fisheries, there are no main secondary species to take into consideration for the different UoA's. SG100 is met by default.

b	Minor secondary species stock status			
	Guide post			Minor secondary species are highly likely to be above biologically based limits. OR If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species
	Met?			**No**
Rationale				

According to Tables 18 to 21, there are many minor secondary species to consider in the different UoAs. There are no reference points available for these stocks, neither derived from analytical stock assessment nor using empirical approaches. Thus, all minor secondary scoring elements are Data Deficient species according to MSC FCP v2.1 7.7.3.2 and a RBF shall be triggered for assessing this SI. However, FCP v2.1 PF4.1.4 allows the team to avoid conducting RBF on Minor species when evaluating PI2.1.1 or 2.2.1. Due to the high number of different taxa to be assessed as Minor Secondary species the assessment team decided not to trigger the RBF for assessing them. Therefore, they were not assessed.
Therefore, in accordance with PF4.1.4 the final PI score shall be adjusted downward according to clause PF5.3.2 (which states that "*final PI score shall be no greater than 80*"). **SG100 is not met** by any minor secondary species nor by any UoA.

References

Landing records.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.2.2 – Secondary species management strategy

PI 2.2.2		There is a strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place, if necessary, which are expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **partial strategy** in place, if necessary, for the UoA that is expected to maintain or not hinder rebuilding of main secondary species at/to levels which are highly likely to be above biologically based limits or to ensure that the UoA does not hinder their recovery.	There is a **strategy** in place for the UoA for managing main and minor secondary species.
	Met?	**Yes**	**Yes**	**No**
Rationale				

There are no main secondary species to consider.

The strategy is set out in the Norwegian Marine Resources Act, in the protocol for the JRNFC and in the Barents Sea and Norwegian Sea management plans, which explicitly require 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 e-logbooks must record interactions with seabirds and marine mammals. Electronic logbooks should serve to record fatal interactions with seabirds and marine mammals should these happen.
There is no requirement to record non-fatal interactions with out-of-scope species, which would serve to better quantify the effects that different UoAs have on the different possible out of scope main secondary species. A recommendation on implementing this recording is set.

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. As for seabirds, there are permanent and seasonal closures of inshore waters in the vicinity of key seabird nesting sites. As regards sharks and rays, the study on their status is part of both IMR and ICES research activities, who provides advice on the stock status of some of these species.
Fishermen always avoid interactions of non-targeted species in order to save time and money. Besides, certain management measures are implemented in order to prevent interactions with out of scope species:

- Longlines and Hooks and lines have implemented streamers (tori lines) which should serve to prevent interactions with seabirds. The implementation of swivel hooks could also serve to minimise such interactions (Fanger, 2015).
- The possible implementation of mandatory use of pingers in the Vestfjord was at hearing in 2020. An update on this process will be requested at initial audit. This implementation should serve to reduce interactions of marine mammals with this fishing gear in this area. In any case, there are no specific concerns raised in relation to the possible interaction of gillnets and mammals such as harbour porpoises (concerns related to the gillnet fishery are associated to the inshore cod and lumpfish fisheries, which operate in waters closer to the shoreline).
- Entanglements with Danish seine and demersal trawlers could result either in casualty or in releasement, depending on the level of entanglement. All demersal trawlers are equipped with sorting grids for exclusion of bycatch and minimise the mortality of non-targeted species. Specifically, a review of the impact of Norwegian offshore demersal trawl fisheries on marine mammals was undertaken by ICES Study Group for Bycatch of Protected Species (SGBYC 2009) and concluded that larger offshore demersal trawl vessels “are regarded as having a relatively low risk for bycatches of marine mammals”.

The different measures implemented are considered as a partial strategy by the UoA for managing interactions with possible main secondary species. **SG60 and SG80 are met by all UoAs**.

Despite the fact that interactions with out-of-scope species are not expected, and that there are no main secondary fish species to consider in this assessment, the team is not aware of any “strategy” designed to manage interactions with main and minor secondary species. **SG100 is not met by any UoA**.

b	Management strategy evaluation			
	Guide post	The measures are considered **likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).	There is **some objective basis for confidence** that the measures/partial strategy will work, based on some information directly about the UoA and/or species involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.
	Met?	**Yes**	**Yes**	**No**
Rationale				

As described in SIa, the strategy is set out in the Norwegian Marine Resources Act, in the protocol for the JRNFC and in the Barents Sea and Norwegian Sea management plans, which explicitly require an ecosystem approach to marine environmental management. Actual level of implementation of the different management measures in place is discussed under SIc.

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. Where specific problems are identified, they are modelled and subject to quantitative analysis although more generally emphasis is given to broader ecosystem modelling. IMR conducts on-site research which serves to provide estimations on the effectiveness of mitigation measures.

The general low level of interactions with secondary species (resulting in no main secondary species to consider) gives some objective basis for confidence that the partial strategy implemented will work. **The requirements at SG60 and SG80 are met by all UoAs.**

The high number of minor secondary species together with uncertainties related to the stock status of some of them prevent the UoAs from meeting the requirements at SG100. **The requirements at SG100 are not met by any UoA.**

c	Management strategy implementation			
	Guide post		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is **clear evidence** that the partial strategy/strategy is being **implemented successfully and is achieving its objective as set out in scoring issue (a).**
	Met?		**Yes**	**No**
Rationale				

ICES, IMR and NINA conduct research and monitoring of the populations of marine mammal and seabirds. Their results are afterwards reviewed by OSPAR and NAMMCO.

Norwegian specific management measures such as landing obligation of all species, area closures, bycatch limitations, move on rules, return to sea of alive elasmobranchs, use of sorting grids to avoid catch of unwanted species, use of specific scaring devices such as streamers (by longlines) and potentially pingers in the Vestfjord (by gillnets, still subject to implementation. This information shall be reviewed at initial audit), comprehensive research by IMR and a robust enforcement system serve as a clear evidence that the strategy is being implemented successfully. There is a strong enforcement system covering fleet effort, gear types and mesh sizes, landings and permanent and temporary area closures. **All UoAs meet requirements at SG80.**

While the monitoring of interactions by the fishery and the monitoring of elasmobranchians, marine mammal and seabird populations by ICES, IMR and NINA would serve to detect any increase in the risk posed by these populations due to the Norway Greenland halibut fishery, the lack of information on the biologically based limits for all secondary species such as fish and elasmobranchs prevent the UoA from meeting the requirements at SG100, since it is not possible to asseverate that the partial strategy is achieving its overall objective in relation to minor secondary species, **SG100 is not met by any UoA.**

d	Shark finning			
	Guide post	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?	**Yes**	**Yes**	**Yes**

Rationale

While some sharks are identified in the catch as minor secondary species, shark finning is forbidden in Norway and is not reported to occur. **All UoAs meet the requirements at SG60, 80 and 100.**

e	Review of alternative measures to minimise mortality of unwanted catch			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of main secondary species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of **unwanted** catch of all secondary species, and they are implemented, as appropriate.
	Met?	**Yes**	**Yes**	**Yes**

Rationale

The Norwegian Directorate of Fisheries performs an annual risk review in which different aspects are taken into consideration, including the examination of the number and type of infringements by Norwegian vessels, the species (and quantities) affected and the alternative measures to minimize such damages in the future. The risk review includes a review of fatal interactions with out-of-scope species, but non-fatal interactions can't be taken into consideration due to the lack of records.

The risk review is taken as part of the Directorate of Fisheries annual activity, with meetings in June and November, and review of results would result in new measures to minimize unwanted catch (including out of scope main secondary species if any) and infringements by the fleet (if any). The continuity of the risk review will be verified at the initial audit. **SG60, SG80 and SG100 are met by all UoA's.**

References

Landing records.
Chaudhury et al, 2021.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.2.3 – Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species		
Scoring Issue		SG 60	SG 80	SG 100
a		Information adequacy for assessment of impacts on main secondary species		
	Guide post	Qualitative information is **adequate to estimate** the impact of the UoA on the main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and **adequate to assess** the impact of the UoA on main secondary species with respect to status. OR **If RBF is used to score PI 2.2.1 for the UoA:** Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and **adequate to assess with a high degree of certainty** the impact of the UoA on main secondary species with respect to status.
	Met?	**Yes**	**Yes**	**No**
Rationale				

Quantitative information from catches and landings is available, including VMS and standardised logbooks, combined with regular at sea inspections. This provides an accurate time-series of catches. Catch composition data as facilitated by the Directorate of Fisheries shows that there are no main secondary species to consider. There is information available on the status of stocks and populations of certain secondary species gathered by research institutions and programs (such as IMR, ICES, NAMMCO, NINA, JRNFC) which provide some qualitative information on the possible out of scope secondary species present in the area and their population status. This qualitative and quantitative information is generally available and is adequate to assess the impact of the different UoAs on main secondary species (if any) with respect to status. **The requirements at SG60 and SG80 are met by all UoAs.**
However, available quantitative information on the occurrence of non-fatal interactions with out-of-scope species is not considered adequate to assess with a high degree of certainty the full impact that the different UoAs may have on possible out-of scope main secondary species. **The requirements at SG100 are not met for any UoA.**

b		Information adequacy for assessment of impacts on minor secondary species		
	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			**No**
Rationale				

As all out of scope species which are not considered ETP species are by default considered as main secondary species, minor secondary species can only refer to fish species which are not specifically managed and which comprise less that a 5% of the total catch by the different UoAs. Tables 18 to 21 show the different minor secondary fish species present in the catch for each UoA.
While quantitative information is available on the amounts of these species taken by the different UoAs, stock status of is not always known for all of them. **Therefore, the requirements at SG100 are not met by the different UoAs.**

c	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage **main** secondary species.	Information is adequate to support a **partial strategy** to manage **main** secondary species.	Information is adequate to support a **strategy** to manage **all** secondary species, and **evaluate** with a **high degree of certainty** whether the strategy is **achieving its objective**.
	Met?	**Yes**	**Yes**	**No**

Rationale

Information on catches and interactions with main secondary species is gathered by the Directorate of Fisheries and also by research institutions such as IMR. This information, collected on a continued basis, is considered adequate both to support measures or a partial strategy to manage main secondary species. **SG60 and SG80 are met by all UoA's.** Information gathered by research institutions should also serve to assess the impact that the different UoA's may have with respect to the status of the different main secondary species. Given the high number of minor secondary species in the catch the team considers that available information is not adequate to support a strategy to manage all secondary species and to evaluate with a high degree of certainty whether the strategy is achieving its objective, as stock status and reference limits are not known for some of them. **SG100 is not met by any UoA.**

References

Landing records.
Chaudhury et al, 2021.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.3.1 – ETP species outcome: All UoAs

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Effects of the UoA on population/stock within national or international limits, where applicable			
	Guide post	Where national and/or international requirements set limits for ETP species, the **effects of the UoA** on the population/ stock are known and **likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, the **combined effects of the MSC UoAs** on the population /stock are known and **highly likely** to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a **high degree of certainty** that the **combined effects of the MSC UoAs** are within these limits.
	Met?	**Yes**	**Yes**	**No**
Rationale				

According to landing records the only ETP species interacting the Norway Greenland halibut are spurdog and portbeagle, present in very small quantities in the catch records of UoA 3 (gillnets). There are no interactions with ETP species for UoAs 1,2 and 4.

In 2007, Norway introduced a general ban on target fisheries for spurdog in the Norwegian economic zone and in international waters of ICES subareas 1–14, with the exception of a limited fishery for small coastal vessels. This was followed in 2011 by a ban of all directed fisheries, although there is still a bycatch allowance (with strict percentage limits, regularly reviewed). Live specimens can be released, whereas dead specimens must be landed. This also applies to recreational fisheries (ICES WGEF 2018). Norwegian Regulation J-250-2013, protecting basking sharks, spurdogs, porbeagles and silky sharks prohibits direct fishing for these species and enforces releasement when species are still alive. Apart from the 0 TAC, this regulation does not set specific limits for these encounters.

ICES advises that when the precautionary approach is applied, there should be no targeted fisheries on these stocks in 2021 and 2022. Landing of bycatch should be part of a management plan, including close monitoring of the stocks and fisheries. As for spurdog, based on medium-term projections, annual catches at the recent assumed level (2468 tonnes) would allow the stock to increase at a rate close to that estimated with zero catches; therefore, ICES considers that bycatch should not exceed that level (ICES Advice Spurdog areas 1-10, 2020, and Ices advice Portbeagle areas 1-10, 2020).

Low mortality has been reported for spurdog caught by trawl when tow duration was <1 h, with overall mortality of about 6% (ICES WGEF 2018). Survival studies on elasmobranchs indicate that the rate of survival is high, provided on-board handling is speedy, and the cod-end weight did not damage the specimens (STECF 2014). It is standard practice on board the vessels of the fishery under assessment to release any living by-caught elasmobranchs as speedily as possible. All fisheries in the Norwegian EEZ have to comply with the zero TAC rule, and this is enforced through the usual means of inspections.

Considering the detailed reporting, and the low number of interactions reported by UoA 3, as well as the general procedure of quick release handling on board when encountered, it can be said that the effect of the fishery on the species is known and highly likely to be within limits set by ICES. SG60 and SG80 are met by all UoAs. The team is not in a position to asseverate this with a high degree of certainty. The requirements at SG100 are not met by any UoA.

b	Direct effects			
	Guide post	Known direct effects of the UoA are likely to not **hinder recovery** of ETP species.	Direct effects of the UoA are **highly likely** to not **hinder recovery** of ETP species.	There is a **high degree of confidence** that there are no **significant detrimental direct effects** of the UoA on ETP species.
	Met?	**Yes**	**Yes**	**No**

Rationale

According to landing records the only ETP species interacting the Norway Greenland halibut are spurdog and portbeagle, present in very small quantities in the catch records of UoA 3 (gillnets). There are no interactions with ETP species for UoAs 1,2 and 4.

Landing obligation, implemented in 1987, would require vessels to land any dead animal, regardless it being ETP species or not. 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. Skippers are also required to avoid all known coral reefs and report all catches of coral >30 kg and sponges >400 kg and move on ≥2 miles.

The stocks of spurdog and portbeagle are subject to ICES Advice, which for 2020 recommends a 0 catch for 2021 and 2022. Landing of bycatch should be part of a management plan, including close monitoring of the stock and fisheries.

There are specific measures prohibiting targeted fishing for spurdog and porbeagle but if caught they should be landed (in practice, if still alive they are more likely to be released). The catch of these species should be recorded individually as they are easily identified by crew members. Fatal interactions can be obtained from landing records, and show that total quantities involved are very small and only affect UoA 3.

As regards unidentified skates and rays, catch by the different UoAs also show these interactions are sporadic. Given this low level of interactions and the high post releasement rate of these species (as described by Mandelman and Farrington (2007), direct effects are likely not to hinder the recovery of ETP species. Besides, interactions with seabirds and marine mammals are not expected due to the different mitigation measures implemented by the different UoAs (as with out of scope species). **The requirements at SG60 are met by all UoAs.**

Given the implemented recording of interactions with spurdogs, portbeagles and other ETP species, and the low interactions by UoA3 and nil interactions by UoAs 1,2 and 4, the team considers that it is highly likely that the different UoAs do not hinder the recovery of ETP species. **The requirements at SG80 are met by all UoAs.**

Uncertainties related to the identification of interacted skates and rays prevent all UoAs from meeting the requirements at SG100, as with this uncertainty it is not possible to asseverate with a high degree of confidence that there are o significant detrimental direct effects of the different UoAs on ETP species. **The requirements at SG100 are not met by any UoA**.

As regards seabirds and marine mammals, fatal interactions with these species are also recorded by the fleet in the electronic logbook. Records show 0 fatalities.

The abundance and distribution of seabirds and marine mammals are monitored as part of the annual IMR–PINRO ecosystem survey (Mauritzen & Klepikovsky, 2013). Both institutions collect information on the presence of ETP species in the Barents Sea through the combined research projects on board research vessels. Besides, PINRO has 5 scientific observers covering Russian vessels in the Barents Sea (with approximately 5% coverage) collecting information on ETP and benthic species in the catch, and IMR collects information through the reference fleet.

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 (both considered as ETP 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, 993, Mehlum et al., 1996). The seabird communities in south and west depend on juvenile gadoids, juvenile herring, sandeels (Ammodytes sp.) and capelin (e.g. Anker-Nilssen, 1992, Barrett & Krasnov, 1996, Barrett et al., 1997, Fauchald & Erikstad, 2002).

There is always concern with respect to interactions of static-gear fisheries and seabirds (Fangel et al., 2011). The 2009 joint IMR–NINA survey 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). 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) 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). 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, even more when targeting demersal fish species such as Greenland halibut.

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). 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 24).

Marine mammal abundance is estimated through counting surveys by NAMMCO. The NAMMCO NASS 2015 surveys (Figure 10) covered the Northern part of the North Atlantic. These surveys include areal sightings and vessel observations.

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. Trophic competition for pelagic prey species (e.g. herring, 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: Stefansson et al., 1997; CEFAS, UK: Blanchard et al., 2002) and as part of the Barents Sea Management Plan (BSMP, 2006; Stiansen et al., 2009; Arneberg, 2013). Harp seal (*Pagophilus groenlandicus*) is the marine mammal that exists in the highest numbers in the region, with an estimated population in 2012 of c. 160 000 (NAMMCO, 2014). 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.

As regards ETP species such as harbour porpoises (*Phocoena phocoena)*, the 2014 NAMMCO report expresses concern about the number of individuals affected by the inshore cod (and monkfish) gillnet fishery in Norwegian coastal waters. So far no concerns have been raised in relation to possible interactions by the Norway Greenland halibut fishery, however this needs to be reviewed at initial audit. Vessels equipped with electronic logbooks are also required to keep records (including 'zero' observation) of interactions with marine mammals and seabirds although it is unclear if that data is already being analysed.

c	Indirect effects			
	Guide post		Indirect effects have been considered for the UoA and are thought to be **highly likely** to not create unacceptable impacts.	There is a **high degree of confidence** that there are no **significant detrimental indirect effects** of the UoA on ETP species.
	Met?		**Yes**	**No**
Rationale				

Indirect effects on ETP populations would be those caused as results of interactions with the fishing gear or vessel (such as injuries, acoustic disturbances, ghost fishing in case of gear loss or environmental degradation such as pollution) or those related to the reduction of prey availability for prey species, competition for forage, destruction of egg cases or geolocation difficulties.
As regards lost fishing gears, fleets make every effort to avoid gear loss and to retrieve it.
Indirect effects such as prey removal are normally considered in the management plans by increasing the natural mortality in the assessment to account for the needs of higher trophic levels. Personal comments by the Institute of Marine Research in Bergen in previous years reported that marine mammals are normally taken into account on catch advice, but they could not asseverate the same for bird species. In any case, the Greenland halibut stock in subareas 1 and 2 is on a healthy situation.
Given this, indirect effects have been considered for all UoAs under assessment and are thought to be highly likely to not create unacceptable impacts to ETP species. **SG80 is met by all UoAs**.

Given the uncertainties related to certain indirect effects (such as acoustic disturbances) and the difficulty to provide a high degree of confidence that there aren't significant detrimental effects of the fishery on ETP species **prevent all UoAs from obtaining SG100.**

References

Chaudury et al, 2021.
Landing records.
ICES 2020 advice for spurdog in areas 1 and 2.
ICES 2020 advice for portbeagle in areas 1 and 2.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.3.2 – ETP species management strategy: All UoAs.

PI 2.3.2		The UoA has in place precautionary management strategies designed to: - meet national and international requirements; - ensure the UoA does not hinder recovery of ETP species. Also, the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place (national and international requirements)			
	Guide post	There are **measures** in place that minimise the UoA-related 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 UoA'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 UoA'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?	**NA**	**NA**	**NA**
Rationale				

While there is a strategy in place to manage the UoA's impact on ETP species, there are no specific requirements for their protection set out in applicable national ETP legislation nor in international agreements. See SIb.

b	Management strategy in place (alternative)			
	Guide post	There are **measures** in place that are expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **strategy** in place that is expected to ensure the UoA does not hinder the recovery of ETP species.	There is a **comprehensive strategy** in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species.
	Met?	**Yes**	**Yes**	**No**
Rationale				

The strategy is set out in the Norwegian Marine Resources Act, in the protocol for the JRNFC and in the Barents Sea and Norwegian Sea management plans, which explicitly require 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 e-logbooks must record interactions with seabirds and marine mammals. Electronic logbooks should serve to record fatal interactions with any ETP species should these happen. Records from catch statistics for years 2016-2020 show that these interactions are very limited. There have been some interactions with elasmobranchs such as spurdogs, portbeagles and unidentified skates, but not with seabirds nor marine mammals. There is no requirement to record non-fatal interactions, which would serve to better quantify the effects that different UoAs have on the different ETP populations.

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 status of the different sharks and ray species is part of both IMR and ICES research activities, who provides advice on the stock status of some of these species. As for seabirds, there are permanent and seasonal closures of inshore waters in the vicinity of key seabird nesting sites.

Fishermen always avoid interactions of ETP species with the fishing gear, as these may result in damages to the net that would require expensive reparations:

- The use of sorting grids is mandatory for bottom trawlers.

- Longlines and Hooks and lines have implemented streamers (tori lines) which should serve to prevent interactions with seabirds. The implementation of swivel hooks could also serve to minimise such interactions (Fanger, 2015).
- Gillnets in UoA3 set their nets in waters outside 12 nm and target Greenland halibut. The depth and distance from the coast should serve to reduce interactions with marine mammals. No concerns have been raised by NAMMCO in relation to the Greenland halibut gillnet fishery. In 2020 a hearing was in place in order to decide on the implementation of mandatory use of pingers in the Vestfjord. An update on this process will be requested at initial audit. As regards seabirds, according to Fanger (2015), interactions of seabirds with gillnets decreases significantly at depths equal or higher than 50 m.
- Entanglements with Danish seine and demersal trawlers could result either in casualty or in releasement, depending on the level of entanglement. All demersal trawlers are equipped with sorting grids for exclusion of bycatch and minimise the mortality of non-targeted species. Specifically, a review of the impact of Norwegian offshore demersal trawl fisheries on marine mammals was undertaken by ICES Study Group for Bycatch of Protected Species (SGBYC 2009) and concluded that larger offshore demersal trawl vessels “are regarded as having a relatively low risk for bycatches of marine mammals”.

The team considers that the different regulations and measures in place are considered as a strategy which is expected to ensure that the different UoAs do not hinder the recovery of ETP species. **SG60 and SG80 are met by all UoAs.**

However, the team considers that this strategy is not comprehensive it still lacks from mandatory use of tori lines and pingers (which are now voluntary implemented by some vessels) and from the mandatory record for all interactions and measures to avoid non-fatal interactions. **SG100 is not met by any UoA.**

c	Management strategy evaluation			
	Guide post	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 measures/strategy will work, based on **information** directly about the fishery and/or the species involved.	The strategy/comprehensive 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?	**Yes**	**Yes**	**No**

Rationale

Norwegian Regulation J-250-2013 applies to all gear types and obliges to the releasement of spurdogs, porbeagles, silky sharks and basking sharks if entangled. Research undertaken by Madelman and Farrington (2007) shows that shark species have a high survival rate if released soon.
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. The rationale at PI 2.3.1.SIb describes that specific interactions with seabirds and marine mammals are not considered to be a cause of concern for research agencies, although this shall be specifically reviewed for the Greenland halibut fishery at the initial audit. .
Where (and if) specific problems are identified, they are modelled and subject to quantitative analysis although more generally emphasis is given to broader ecosystem modelling. IMR conducts on-site research which serves to provide estimations on the effectiveness of mitigation measures. Information from catch statistics show that interactions with ETP species are low. This is supported by research agencies such as NAMMCO and NINA (see PI 2.3.1.b).
The minimal interactions of the different gear types with ETP species serve as an objective basis for confidence that the different measures implemented work effectively in preventing any hindering to ETP species. **The requirements at SG60 and SG80 are met for all UoAs.**

The lack of a comprehensive strategy directed to minimise these impacts and of a quantitative analysis of interactions **prevent the different UoAs from meeting the requirements at SG100.**

d	Management strategy implementation

	Guide post		There is some **evidence** that the measures/strategy is being implemented successfully.	There is **clear evidence** that the strategy/comprehensive strategy is being implemented successfully and **is achieving its objective as set out in scoring issue (a) or (b).**
	Met?		**Yes**	**No**
Rationale				

ICES, IMR and NINA conduct research and monitoring of the populations of marine mammal and seabirds. Their results are afterward reviewed by OSPAR and NAMMCO.
Norwegian specific management measures such as landing obligation of all species, area closures, bycatch limitations, move on rules, return to sea of alive elasmobranchs, use of sorting grids to avoid catch of juvenile fish, use of specific scaring devices such as streamers (by longlines) and pingers (by gillnets), research by IMR and a robust enforcement system serve as a clear evidence that the strategy is being implemented successfully. **All UoAs reach SG80**.

While the monitoring of interactions with the fishery and the monitoring of elasmobranchs, marine mammal and seabird populations by ICES, IMR and NINA, would serve to detect any increase in the risk posed by these populations due to the Norway Greenland halibut fishery, the uncertainties in relation to the identification of possible ETP species (such as unidentified skates and rays) prevent all UoAs from meeting the requirements at SG100, since it is difficult to quantitatively determine the level of impact by the different UoAs on these species (although it is expected to be very low). **SG100 is not met by any UoA.**

e	Review of alternative measures to minimise mortality of ETP species			
	Guide post	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.
	Met?	**Yes / No**	**Yes / No**	**Yes / No**
Rationale				

The Norwegian Directorate of Fisheries performs an annual risk review in which different aspects are taken into consideration, including the examination of the number and type of infringements by Norwegian vessels, the species (and quantities) affected and the alternative measures to minimize such damages in the future. The risk review includes a review of fatal interactions with ETP species, but non-fatal interactions can't be taken into consideration due to the lack of records.

The risk review is taken as part of the Directorate of Fisheries annual activity, with meetings held in June and November, and review of results would result in new measures to minimize unwanted catch (including ETP species) and infringements by the fleet (if any). The continuity of this risk review shall be checked at initial audit.
SG60, SG80 and SG100 are met by all UoAs.

References

Landing records.
Chaudhury et al, 2021.
Mandelman, J.W., and M.A. Farrington. 2007. The estimated short-term discard mortality of a trawled elasmobranch, the spiny dogfish (*Squalus acanthias*).

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.3.3 – ETP species information: All UoAs

<table>
<tr><td colspan="2">PI 2.3.3</td><td colspan="3">Relevant information is collected to support the management of UoA 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</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="3">a</td><td colspan="4">Information adequacy for assessment of impacts</td></tr>
<tr><td>Guide post</td><td>Qualitative information is adequate to estimate the UoA related mortality on ETP species.

OR

If RBF is used to score PI 2.3.1 for the UoA:
Qualitative information is adequate to estimate productivity and susceptibility attributes for ETP species.</td><td>Some quantitative information is adequate to assess the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species.

OR

If RBF is used to score PI 2.3.1 for the UoA:
Some quantitative information is adequate to assess productivity and susceptibility attributes for ETP species.</td><td>Quantitative information is available to assess with a high degree of certainty the magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status of ETP species.</td></tr>
<tr><td>Met?</td><td>Yes</td><td>Yes</td><td>No</td></tr>
<tr><td colspan="5">Rationale</td></tr>
</table>

A good overview of the ETP species' spatial and temporal distribution is obtained from the joint IMR–PINRO and IMR surveys of the Barents Sea and Norwegian Sea ecosystems, Polar Institute research, NINA bird surveys and ICES working groups, who gather information on sharks, marine mammals and seabird distributions, populations and life-history characteristics.
Research on ETP species in the area is undertaken by different groups, such as ICES Working Group on Elasmobrachian Fishes (WGEF), ICES Working Group on Protected Species (SGBYC), and ICES Working Group on marine mammal ecology (WGMME) which identify issues relating to marine mammal ETP species or. Other groups, such as NAMMCO (the North Atlantic Marine Mammal Commission) and IWC also monitor marine mammal ETP species in the Barents Sea.
There have been marine mammal surveys going on in the NE Arctic for a long time which inform us of abundance estimates. Mark–recapture experiments, breeding surveys and more recently transect surveys either by ship for large cetaceans, or spotter planes for small one, have been used to get this information. The ICES states that any quotas for harvesting marine mammal species commercially must be based on estimates that are less than 5-years old, and therefore has advised that these surveys are necessary. Obviously, the species that are most threatened or most valuable commercially receive more monitoring than the rest of species. Annual vessel monitoring surveys undertaken by IMR target minke whales and other large baleen whales and provide abundance estimates every 6 years. According to NINA, the principal threat to seabird populations is the inshore static gear fishery, with other methods of fishing having little significant interaction. According to IMR, estimates of seabird static gear interaction show that bird mortality is low in relation to total fishing effort and the population sizes.
At initial audit both NINA and IMR views on the Greenland halibut fishery shall be reviewed.

Landing obligation, implemented in 1987, should serve to detect any increase in landings of ETP species. IMR also collects information on interactions of the fishing fleets with ETP species. This qualitative and quantitative information is adequate to assess the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species. **The requirements at SG60 and SG80 are met by all UoAs.**

So far injuries or other non-fatal impacts are not being measured so information falls short to cover the possible non-fatal injuries made to ETP populations. **SG100 is not met by any UoA**. It is recommended that all vessels record all ETP interactions in an electronic database.

b	Information adequacy for management strategy			
	Guide post	Information is adequate to support **measures** to manage the impacts on ETP species.	Information is adequate to measure trends and support a **strategy** to manage impacts on ETP species.	Information is adequate to support a **comprehensive strategy** to manage impacts, minimise mortality and injury of ETP species, and evaluate with a **high degree of certainty** whether a strategy is achieving its objectives.
	Met?	**Yes**	**Yes**	**No**

Rationale

The broad range of surveys undertaken by IMR, PINRO, NINA and the Norwegian Polar Institute provide adequate information to monitor the trends that support the strategies represented by the protocols of the JNRFC, NAMMCO and OSPAR and the Norwegian and Barents Seas management plans. According to the team, the amount of data provided by landing records, fishery's log books, research done by ICES working groups and the current monitoring programs are enough to measure trends and support a full strategy to manage the possible fatal impacts that the fishery may have on ETP species. **SG60 and SG80 are met by all UoAs.**
However, such strategy can't be considered as comprehensive as it falls short to evaluate impacts and injuries that the fishery may have on ETP species. **SG100 is not met by any UoA.**

References

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- ICES 2019 Working Group on Marine Mammals Ecology. http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/EPDSG/2019/WGMME/wgmme_2019.pdf
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Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.4.1 – Habitats outcome

PI 2.4.1	The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates			
Scoring Issue		SG 60	SG 80	SG 100
a	Commonly encountered habitat status			
	Guide post	The UoA is **unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.
	UoA 1	**Yes**	**Yes**	**No**
	UoAs 2,3 &4	**Yes**	**Yes**	**Yes**
Rationale				

Most commonly encountered habitats by the different UoAs in the Barents and Norwegian Seas are clay, muddy and sandy bottoms. All of them are considered to fall under the "Fine" substratum category, which has a "flat" associated geomorphology and "large erect" biota. Hard sediments in the area are rare and are evaluated under SIc, minor habitats.

The degree to which the effect of a fishing 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 fishing 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. MSC guidance suggests that serious (or irreversible) harm refers to change that fundamentally alters the capacity of the component to maintain its function (e.g. reducing ecosystem services; loss of resilience; regime shift; gross changes in composition of dependent species) or to recover from the impact (within timescales of natural ecological processes – normally one or two decades).

Longlines (UoA 2) and gillnets (UoA 3) are not dragged across the seabed in the way that mobile gears such as bottom trawlers and Danish seines are. Contact with the seafloor is not expected and if any, the soft condition of the seabed would facilitate its recovery. **SG60, SG80 and SG100 are met for these UoA's (UoA 2 and UoA 3).** The evidence that these UoA are highly unlikely to reduce structure and function of commonly encountered habitats to a point where there would be serious or irreversible harm is found in the fishing methodology of these fishing gears and on the soft nature of commonly encountered habitats, which have quick recovery rates.

As regards **Danish seines (UoA 4)**, this gear has a very light construction and can only be used on relatively flat grounds that are known not to have any significant irregularities or obstructions. As with longlines and gillnets, the evidence that these UoA are highly unlikely to reduce structure and function of commonly encountered habitats to a point where there would be serious or irreversible harm is found in the fishing methodology (with limited contact with the seafloor) and on the soft nature of commonly encountered habitats, which have quick recovery rates. **SG60, SG80 and SG100 are met for Danish seines, this is, UoA 4.**

As regards the **bottom trawl UoA 1,** fishing activity takes place in the Fisheries protection zone around Svalbard and in Norwegian waters, in well-established trawl corridors meaning that they concentrate fishing activity to historic grounds which represent less than 20% of the total Barents Sea area and in habitats which are already degraded. Many of the trawls used are rockhopper trawls that are designed to ride over seabed irregularities but still 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.

Trawling affects benthic habitats through relocation of shallow burrowing infaunal species to the surface of the seafloor, and by resuspension of surface sediment. Kaiser et al. (2006) concluded that trawling produces a significant, negative, short-term effect on soft habitats, but no detrimental effects were seen in the long term once the fishing stops. The recovery time as described in Figure 22, which shows that commonly encountered areas by the fishery should recover in 5 to 10 years' time once the fishery stops. Besides, trawl modified habitats continue to cover ecosystem needs, regardless of showing a lower biodiversity rate.

The team concludes that bottom trawls are highly unlikely to (further) reduce structure and function of the commonly encountered habitats (soft bottoms of fine substratum with flat associated geomorphology and large erect biota) to a point where there would be serious or irreversible harm. **SG60 and SG80 are met for UoA 1**.

As regards SG100, the assessment team could not find any evidence to support SG100 for the bottom trawl UoAs. **SG100 is not met for UoA1.**

Scoring element	SG60	SG80	SG100
Fine substratum (with flat associated geomorphology and large erect biota).	Trawl- Yes Longline- Yes Gillnet-Yes Danish seine-Yes	Trawl- Yes Longline- Yes Gillnet-Yes Danish seine-Yes	Trawl- No Longline- Yes Gillnet-Yes Danish seine-Yes

b	VME habitat status			
	Guide post	The UoA is **unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	The UoA is **highly unlikely** to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.	There is **evidence** that the UoA is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm.
	UoA 1	**Yes**	**Yes**	**No**
	UoA 2 & 3	**Yes**	**Yes**	**Yes**
	UoA 4	**Yes**	**Yes**	**No**
Rationale				

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.

Different species described by NEAFC and OSPAR as indicator species of VME ecosystems have been identified in the fishing grounds. Both Jørgensen *et al* (2015) and Jakobsen and Ozhigin (2011) have located the spatial distribution of corals, sponges, seapens, and soft corals. These species have been designated by NEAFC as indicators of VMEs in the Barents Sea (although OSPAR does not consider seapens to be a declining habitat in OSPAR Region 1, see https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats).

The assessment team has considered the following scoring elements (VME habitats), following ICES and NEAFC advice and Jorgesen et al (2015) identification of benthic species present in the area:

- Cold water hard coral reefs: *Lophelia pertusa* reef and *Solenosmilia variabilis* reef.
- Coral garden: Hard bottom coral garden and soft bottom coral garden.
- Deep sea sponge aggregations: Hard bottom sponge gardens and glass sponge communities
- Seapen fields.

In considering the potential impact of the fishery, the assessment team took into account the distribution of fishing activity in relation to known distribution of the VME habitats, the bio-regional distribution of habitat types, the irregular reproduction and slow growth rates of the vulnerable species with the consequent slow recovery rates, the nature of the fishing gear used, and the behaviour of fishermen in avoiding habitats which might damage the fishing gear.

There are certain management measures and regulations protecting VME in the fishing grounds. These include:

- Comprehensive research on the distribution of VME gained through the Mareano program.

- Avoidance of coral reefs and sponges by the fishing industry, as towed-gear vessels avoid coral because of the damage it can do to the gear and sponges crush 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. Vessels engaged in the current fishery have the technology (high precision GPS navigation and ground-discrimination echo sounders which can distinguish between mud and sand or hard rock, coral and sponges) that enables them to skirt around and avoid known VME areas.
- Mandatory use of satellite monitoring (VMS – vessel monitoring system) which serves to verify that large vessels do not enter Marine Protected Areas (MPAs), as confirmed by the Norwegian Directorate of Fisheries.
- Trawling is forbidden within the majority of the 12 nautical mile limit from Norwegian baselines (in some instances, this limit is set at 6 nautical miles). Much of the cold-water coral reefs are located within this limit.
- Fishing below 1000 m within the Norwegian EEZ is banned in order to protect deep-water sensitive habitats and species.
- Norwegian regulation J-61-2019 regulating bottom gears to protect vulnerable marine ecosystems (https://fiskeridir.no/Yrkesfiske/Regelverk-og-reguleringer/J-meldinger/Kommende-J-meldinger/J-61-2019)
- Norwegian Regulation J-40-2016 – which applies to all the Norwegian EEZ including waters in the Barents Sea; article 2 establishes that when a trawl vessel catches more than 30 kgs of coral or 400 kg of sponges in a single haul, the vessel shall stop fishing and move position at least 2 nautical miles in order to avoid such catches. The incident must be reported to the Directorate of Fisheries.

  Regulation J-40-2016 requires that when fishing in a “new fishing area” in the Norwegian EEZ or the Svalbard FPZ, vessels must have a special permit from the Directorate of Fisheries. These are only approved by the Directorate if the vessel has submitted for approval:

  - A detailed protocol for trial fishing which includes a fishing plan for fishing gear, fish stocks, by-catches, time and areas.
  - A plan to avoid damage to sensitive marine ecosystems.
  - A plan for journal entry and reporting.
  - And a plan for collecting data on vulnerable habitats.
- Norwegian Regulation J-215-2015 states that when fishing in “New fishing areas” all living corals and sponges are to be reported by the fishing vessels. This goes into effect from 1 kg corals and 1 kg sponge bycatch Norwegian Regulation J-215-2015.
- Norwegian Regulation J-58-2015 states that it is illegal for any fishing vessel to fish on known coral reefs” (included those mapped by the Mareano program and which are not managed as MPAs)
- Similar measures on the protection of corals and sponges is recommended in NEAFC waters, where Recommendation 19/2014 establishes threshold limits for bycatch of corals and sponges.
- NEAFC commission meets annually and decides, when necessary, on the establishment of area closures, as done in other NEAFC waters. To date, NEAFC has not identified any need for area closure in the Loophole area (http://www.fao.org/fishery/topic/16204/en).
- Norwegian Regulation J-187-2008, prohibits trawling near coral reefs, and establishes MPAs to protect coral species. It is noted that these are all located in Norwegian coastal waters.
- Norwegian Regulation J-151-2014 establishing closed areas to protect benthic habitats (mostly coral) in Norwegian and Svalbard EEZs.
- Other VME habitats, present in the area, such as seapen fields, have recently (May 2017) been protected in the Barents Sea by the creation of a closed area directed to protect these VME.

The Directorate of Fisheries is generally satisfied as regards the UoAs compliance of these measures. However this statement needs to be reviewed at initial audit.

As with the commonly encountered habitats, l**onglines and gillnets** are not dragged across the seabed in the way that mobile gears such as bottom trawlers and Danish seines are. Contact with the seafloor is not expected regardless of the existence of vulnerable habitats underneath. **SG60, SG80 and SG100 are met for UoA 2 and UoA 3.** The evidence that these UoAs are highly unlikely to reduce structure and function of VME to a point where there would be serious or irreversible harm is found in the fishing methodology of these fishing gears.

As regards **Danish seines (UoA 4)**, this gear has a very light construction and can only be used on relatively flat grounds that are known not to have any significant irregularities or obstructions, as these would damage the nets. As for **bottom trawlers**, many of the trawls used are rockhopper trawls that are designed to ride over seabed irregularities but still have the capacity to affect habitat structure and function through surface abrasion and boulder turning. Therefore, while fishermen again would avoid hard substrate in order to prevent damage to the nets, the best way to prevent impacts on vulnerable benthic habitats is to avoid them.

As mentioned above, VME scoring elements to consider are cold water coral reefs, coral gardens, deep sea sponge aggregations and seapen fields.

Coral water coral reefs, coral gardens and sponges: The distribution of these VME habitats has been investigated by different research institutions (IMR, PINRO, and individual researchers) and mapped by the Mareano program. Results of the Mareano program are updated in the vessel's bridge technology. Given the different management measures that apply to the protection of corals (through the identification of these areas and the use of VMS to position the vessels, the prohibition of bottom trawling in waters closer than the 12 nm limit from the coast, the establishment of MPA and the mandatory move on rule) and sponges (again through the identification of these areas and the use of VMS to position the vessels, and through the mandatory move on rule) the team considers that it is unlikely that any UoA under this assessment would reduce the structure and function of these VME habitats to a point where there would be serious or irreversible harm, as interactions are generally avoided.

It should be considered that some areas of the Barents Sea are regularly fished, while other areas will never be targeted and fished. This limits the impact of the different gears to particular lanes, while creating benthic unfished patches or islands of greater diversity amongst even the more heavily fished areas. Such islands support recovery of benthic community in fished areas through neighbouring emigration and by acting as source locations for new recruits to other areas. This is important because such benthic ecology/habitats are key to the life history processes (breeding, nursery and feeding areas) for a wide range of species, including commercially important fish and shellfish. Also varying levels of recoverability is expected post-fishing. Large sessile fauna may require years or decades to recover. Indirect evidence (Pitcher 2000, and Sainsbury et al. 1997) suggests that large sponges probably take more than 15 years to recover. Kaiser et.al. (2006), suggest 5-10years recovery time.

Hard bottom areas associated with VMEs and other habitat forming species are likely to take much longer from trawling impact. Coral aggregations or structures are thousands of years old, and some sponges live for hundreds of years. According to Lubin (2013) and Denisenko and Zgurovsky (2013) full recovery of VMEs - age structures and species composition - is likely to take decades. However, there are examples of relatively rapid recovery of certain sponge communities. These may not be identical to the original habitat in terms of age, size structure and species composition, however their functionality, diversity and healthy habitats deliver a wide and comparable range of ecosystem services. Also, though there is evidence of reduced physical heterogeneity and of changes in the abundance of some taxa, there is no evidence of loss or change in the number of taxa. For the ecoregion, it suggested that recovery in most parts of the Barents Sea would take place within 5 years, but recovery would be up to 10 years or more in the areas where VMEs tend to occur (such as epibenthos, and sponge aggregations on the edge of the continental slope). In other benthic environments similar to the Barents Sea, recovery is observed in similar time periods (3 to 9 years) from monitoring, pre and post mobile bottom fishing gear and closed areas (Collie et al., 2001).

As regards seapens (which are not considered to be a declining habitat in OSPAR region 1), following the highlight of this topic in previous MSC assessments in Norwegian waters, a MPA has been designated in the fisheries protection zone around Svalbard. In any case, and according to Denisenko et al (2015), most seapens in the Barents Sea are distributed further north that where the fishery takes place.

SG60 and SG80 are met for the coral reefs, soft coral gardens, sponges and seapens scoring elements for the Danish seine, longlines and gillnets UoAs. As longlines and gillnets are not expected to touch the seafloor these UoA achieve SG100 for all scoring elements. As Danish seines have some interactions with the seafloor **SG100 is not met for UoA 4.**

As regards bottom trawlers (UoA 1) and the different scoring elements, the established management measures together with the historical footprint of the fishery (which follow the same paths over the time) make it unlikely for the UoA to reduce structure and function of the VME habitats to a point where there would be irreversible harm. **SG60 is met for UoA 1.**

Bottom trawlers have an impact on VMEs when encountered. MSC FS v2.01 SA3.13.4.1 describes that in the case of VMEs the team shall interpret "serious or irreversible harm" as reductions in habitat structure and function below 80% of the unimpacted level. However, the MSC also issued an interpretation7 on the definition of an 'unimpacted level' (This notes that the historical cut off point for the unimpacted level of a VME "depends on the status of the VME at the time of identification by a management authority/governance body." Further, if the VME was already impacted by any fishery/UoA at the time that it was identified as a VME and the impact occurred before 2006, "the unimpacted level at the time of identification should be used (*i.e., there is an acceptance that the UoA should not be penalised for historical damage, but further damage would not be accepted*)". Given the historical footprint of the fishery and the defined paths were it takes place the team considers that the bottom trawl Norway Greenland halibut fishery (UoA 1) is highly unlikely to reduce structure and function of the VME habitats to a point where there would be serious or irreversible harm. **The requirements at SG80 are met by UoA 1** for all VMEs (coral reefs, soft coral gardens, sponges and seapens scoring elements). The lack of evidence prevents UoA1 from meeting the requirements at SG100. SG100 is not met by UoA 1.

Scoring element	SG60	SG80	SG100

Cold water coral reefs	Trawl- Yes Longline- Yes Gillnet-Yes Danish seine-Yes	Trawl-Yes Longline- Yes Gillnet-Yes Danish seine-Yes	Trawl- No Longline- Yes Gillnet-Yes Danish seine-No
Coral gardens	Trawl- Yes Longline- Yes Gillnet-Yes Danish seine-Yes	Trawl-Yes Longline- Yes Gillnet-Yes Danish seine-Yes	Trawl-No Longline- Yes Gillnet-Yes Danish seine-No
Deep sea sponge aggregations	Trawl- Yes Longline- Yes Gillnet-Yes Danish seine-Yes	Trawl-Yes Longline- Yes Gillnet-Yes Danish seine-Yes	Trawl-No Longline- Yes Gillnet-Yes Danish seine-No
Seapens fields	Trawl- Yes Longline- Yes Gillnet-Yes Danish seine-Yes	Trawl-Yes Longline- Yes Gillnet-Yes Danish seine-Yes	Trawl-No Longline- Yes Gillnet-Yes Danish seine-No

c	Minor habitat status			
	Guide post			There is **evidence** that the UoA is highly unlikely to reduce structure and function of the minor habitats to a point where there would be serious or irreversible harm.
	UoA 1 &4			**No**
	UoA 2 &3			**Yes**
Rationale				

As with in the commonly encountered habitats**, longlines and gillnets** are not dragged across the seabed in the way that mobile gears such as bottom trawlers and Danish seines are, so contact with the seafloor is not expected. The low chance of contact serves as evidence that these UoA are highly unlikely to reduce structure and function of minor habitats to a point where there would be serious or irreversible harm. **SG100 is met for UoA 2 and UoA 3.**

As regards **Danish seines**, this gear has a very light construction and can only be used on relatively flat grounds that are known not to have any significant irregularities or obstruction. And while it is expected that this gear is not deployed in hard substrate, the team could not find evidence of this. **SG100 is not met for UoA 4 (Danish seine).**

As for **bottom trawlers**, these are designed to ride over seabed irregularities but still have the capacity to affect habitat structure and function through surface abrasion and boulder turning. The team could not find evidence to support SG100 for the bottom trawlers UoAs. **SG100 is not met for UoA 1 (bottom trawlers).**

Scoring element	SG60	SG80	SG100
Coarse sediments	N/A	N/A	UoA 1(Trawl)- No UoA 2 (Longline)- Yes UoA 3 (Gillnet)-Yes UoA 4 (Danish seine)-No
Rocky areas	N/A	N/A	UoA 1 (Trawl)- No UoA 2 (Longline)- Yes UoA 3 (Gillnet)-Yes UoA 4 (Danish seine)-No

References

- Kaiser et al, 2006.
- Collie, J.S., Hall, S.J., Kaiser, M.J., and Poiner, I.R. (2001). A quantitative analysis of shing impacts on shelf-sea benthos. Journal of Animal Ecology, 69, 785-798.
- https://www.ospar.org/work-areas/bdc/species-habitats/list-of-threatened-declining-species-habitats
- Jørgensen *et al* (2015)
- Jakobsen and Ozhigin (2011)
- Denisenko et al (2015)
- Norwegian Regulation J-215-2015
- Norwegian Regulation J-58-2015
- Norwegian Regulation J-40-2016
- https://www.fiskeridir.no/Yrkesfiske/Regelverk-og-reguleringer/J-meldinger/Gjeldende-J-meldinger/J-61-2019
- NEAFC Recommendation 19/2014
- Norwegian Regulation J-187-2008
- Norwegian Regulation J-151-2014
- Chaudhury et al, 2021.
- https://mscportal.force.com/interpret/s/article/identification-of-VMEs-SA3-13-3-1527262008557
- https://mscportal.force.com/interpret/s/article/historical-cut-off-point-of-VME-unimpacted-level-SA3-13-4-1-1527262008264

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range UoA1	**≥80**
Draft scoring range UoA2	**≥80**
Draft scoring range UoA3	**≥80**
Draft scoring range UoA4	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.4.2 – Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	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 all MSC UoAs/non-MSC fisheries on habitats.
	All UoAs	**Yes**	**Yes**	**Yes**
Rationale				

As described in PI 2.4.1.SI b, there is a broad range of management measures which apply to Norwegian vessels when fishing in the Barents or in the Norwegian Seas, including Barents and Norwegian Seas management plans. Management measures include:

- Comprehensive research on the distribution of VME gained through the Mareano program, which maps depth, topography, sediment composition, contaminants, biotopes and habitats in Norwegian and Svalbard waters, serves as a valuable tool to manage habitat types in Norwegian and Svalbard waters, and has helped to establish no fishing zones in Norwegian waters, which have been designed mainly to protect cold corals which are mostly located near the shore line, with the exception of two protected areas in more open waters.
- Mandatory use of satellite monitoring (VMS – vessel monitoring system) which serves to verify that large vessels do not enter Marine Protected Areas (MPAs), as confirmed by the Norwegian Directorate of Fisheries.
- Fishing below 1000 m within the Norwegian EEZ is banned in order to protect deep-water sensitive habitats and species.
- Norwegian Regulation J-58-2017 creating a protected area in the Trænadjupet Slide, offshore Norway.
- Norwegian Regulation J-151-2014 establishing closed areas to protect benthic habitats (mostly coral) in Norwegian and Svalbard EEZs.
- Other VME habitats, present in the area, such as seapen fields, are protected in the Barents Sea by the creation of a closed area near Bear Island directed to protect these VME.
- Avoidance of coral reefs and sponges by the fishing industry, as towed-gear vessels avoid coral because of the damage it can do to the gear and sponges crush 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. Vessels engaged in the current fishery have the technology (high precision GPS navigation and ground-discrimination echo sounders which can distinguish between mud and sand or hard rock, coral and sponges) that enables them to skirt around and avoid known VME areas. Besides, trawling vessels generally fish only in predetermined trawling corridors thus concentrating fishing activity in historical fishing grounds already degraded.
- Trawling is forbidden within the majority of the 12 nautical mile limit from Norwegian baselines (in some instances, this limit is set at 6 nautical miles). Much of the cold-water coral reefs are located within this limit.
- Norwegian regulation J-61-2019 regulating bottom gears to protect vulnerable marine ecosystems (https://fiskeridir.no/Yrkesfiske/Regelverk-og-reguleringer/J-meldinger/Kommende-J-meldinger/J-61-2019)
- Norwegian Regulation J-40-2016 – which applies to all the Norwegian EEZ including waters in the Barents Sea; article 2 establishes that when a trawl vessel catches more than 30 kgs of coral or 400 kg of sponges in a single haul, the vessel shall stop fishing and move position at least 2 nautical miles in order to avoid such catches. The incident must be reported to the Directorate of Fisheries.

  Regulation J-40-2016 requires that when fishing in a "new fishing area" in the Norwegian EEZ or the Svalbard FPZ, vessels must have a special permit from the Directorate of Fisheries. These are only approved by the Directorate if the vessel has submitted for approval:

  - A detailed protocol for trial fishing which includes a fishing plan for fishing gear, fish stocks, by-catches, time and areas.

- A plan to avoid damage to sensitive marine ecosystems.
- A plan for journal entry and reporting.
- And a plan for collecting data on vulnerable habitats.

- Similar measures on the protection of corals and sponges is recommended in NEAFC waters, where Recommendation 19/2014 establishes threshold limits for bycatch of corals and sponges.
- NEAFC commission meets annually and decides, when necessary, on the establishment of area closures, as done in other NEAFC waters. To date, NEAFC has not identified any need for area closure in the Loophole area (http://www.fao.org/fishery/topic/16204/en).
- Norwegian Regulation J-187-2008, prohibits trawling near coral reefs, and establishes MPAs to protect coral species. It is noted that these are all located in Norwegian coastal waters.

Enforcement of these measures is carried out by the Norwegian Coast Guard. The Directorate of Fisheries has in the past been generally content with the accomplishment of these measures. However, this statement needs to be updated at initial audit.
The comprehensive set of measures to manage habitat impacts by the different fishing gears (mostly focused on the performance of trawling vessels, which have the higher impact on bottom types) serve to justify that there are measures in place to manage habitat impacts and that these measures conform a partial strategy (**SG80 is met by all UoAs)**.

As SG80 for scoring issue a is met, SG60 is not scored following Derogation for PI 2.4.2 for scoring issue a (see https://mscportal.force.com/interpret/s/article/Move-On-Rules-derogation-November-2020) This applies to all UoAs under assessment. These measures are considered as a comprehensive strategy to manage habitat impacts by Norwegian vessels in Norwegian and Svalbard waters. **All UoAs meet the requirements at SG100**.

b	Management strategy evaluation			
	Guide post	The measures are **considered likely** to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/habitats).	There is some **objective basis for confidence** that the measures/partial strategy will work, based on **information directly about the UoA and/or habitats** involved.	**Testing** supports **high confidence** that the partial strategy/strategy will work, based on **information directly about the UoA and/or habitats** involved.
	UoA 1&4	**Yes**	**Yes**	**No**
	UoA 2&3	**Yes**	**Yes**	**Yes**
Rationale				

The environmental status of the Barents and Norwegian Seas (including common and VME habitats) is monitored by different research programs, including the MAREANO monitoring program, the joint IMR-PINRO ecosystem surveys in the Barents Sea and research by IMR on the status of benthic habitats in Norwegian waters.
Information gathered on these research programs together with information gathered by VMS, serve to support scientific advice for conservation measures when deemed necessary, e.g. the coral-reef MPAs and general prohibition on ground-contact fishing is similar areas. The science supporting management measures serve to provide an objective basis for confidence that this strategy to manage benthic habitats will work. **SG60 and SG80 are met for all UoAs.**

It is not expected that static gears as l**onglines and gillnets** will cause any irreversible harm in the seafloor. The limited effects of these gears on bottom habitats serve as a test to support with a high degree of confidence that the strategy will work. **SG100 is met for UoAs 2 and 3.**

As regards fishing gears such as Danish seine and demersal trawlers, the team considers that the strategy won't be fully tested until all fishing grounds in the UoA are fully mapped and research is undertaken to see the response of vulnerable habitats to management measures. **SG100 is not met for UoAs 1 & 4.**

c	Management strategy implementation			
	Guide post		There is **some quantitative evidence** that the measures/partial strategy is	There is **clear quantitative evidence** that the partial strategy/strategy is being

			being implemented successfully.	implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	UoAs 1&4		**Yes**	**No**
	UoAs 2&3		**Yes**	**Yes**
Rationale				

The MAREANO program began mapping the Norwegian Sea seafloor in 2005 and continues to increase its coverage of the Norwegian and Svalbard EEZs seafloor annually. The Marine Resources Act was established in 2008. Regulation J- 187-2008, which prohibits trawling near coral reefs, was implemented in 2008, while Regulation J-40-2016 (now J-61-2019), which protects corals and sponges through the implementation of a move on rule, was first implemented in 2016. Since 2016 different areas have been closed to the fishing activity in order to protect vulnerable habitats (mostly corals but also seapens).
All vessels above 15 m carry VMS which serve to monitor their position and accomplishment of regulation measures as regards Marine Protected Areas. The Norwegian Coast Guard enforces these regulations, and the Directorate of Fisheries who monitors VMS data and catch logbooks for compliance has been generally content as regards the fishery compliance with management measures. This statement needs confirmation at initial audit.
Fishing vessels avoid any activity at MPAs.
Given the different management measures implemented and the enforcement in place the team considers that there is clear quantitative evidence that the management strategy to ensure that the fishery does not cause serious or irreversible harm to habitat types is successfully implemented. **All UoAs achieve SG60 and SG80**.

As regards the requirements for **SG100, these are met for UoAs 2 and 3 (longlines and gillnets)** since the fishing methodology is working effectively in avoiding impact on any habitats and therefore meeting the requirements set at SIa, SG100.
SG100 is not met for UoAs 1 and 4 (bottom trawlers and Danish seines) since fishing methodology impacts the seafloor and there is no evidence of the recovery of vulnerable habitats following area closures nor on the identification of all potential VMEs in the fishing grounds. **SG100 is not met by UoAs 1 and 4 (bottom trawls and Danish seines)**.

d	Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs			
	Guide post	There is **qualitative evidence** that the UoA complies with its management requirements to protect VMEs.	There is **some quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	There is **clear quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	UoA 1	**Yes**	**No**	**No**
	UoA 2, 3 &4	**Yes**	**Yes**	**Yes**
Rationale				

At the initial audit the assessment team will request quantitative evidence (based on the number of inspections and the number of infractions) from the Norwegian fisheries authority and Coast guard to confirm if all permitted fishing vessels (MSC and non-MSC) are complying with fisheries management regulations with regards to sharing VMS data, catch data and avoiding closed areas, and MPA, where any non-compliance would result in infringements as well as loss of fishing permit.

At present the team is not in a position to determine if there is clear quantitative evidence that all UoAs comply with the different mandatory management requirements affecting the fishery, including those designed to protect VMEs.

As regards protection measures afforded to VMEs by other MSC UoAs/ non MSC fisheries, these include:
- Development and implementation of lighter gear (several Russian fisheries e.g. Arkhangelsk, FIUN etc.)
- Several Russian fisheries are developing and hoping to implement lighter bottom trawl gears.

- Implementation of NEAFC Recommendation as regards the establishment of a move on rule of 5 nm when encountering 7 kg of seapens.
- Recording by the crew of interactions with living corals and living sponges (AGARBA, FIUN)
- The MSC AGARBA cod fishery has an internal Code of Conduct and internal move on rule so that vessels shall move 2 nm when encountering 200 kg sponges or 20 kg corals.
- Agreement by Russian Barents Sea MSC fisheries to voluntarily protect a number of areas in the Barents Sea from demersal fishing (came into force on 1st August 2020). Two of these areas fall within Russian EEZ and one within Norwegian EEZ.

To the team's knowledge, the Norwegian bottom trawl Greenland halibut fishery (UoA 1) is not complying with these voluntary measures. Further information will be required at initial audit.

As these voluntary measures afforded by other MSC UoAs / non-MSC fisheries in the area do not affect to the longline, gillnet and Danish seine fleets, these UoAs are expected to meet the requirements at SG100. Evidence of compliance with management regulations will be requested at initial audit. **SG80 and SG100 are expected to be met for UoAs 2, 3 and 4.**

References

- Norwegian Regulation J-215-2015
- Norwegian Regulation J-58-2015
- Norwegian Regulation J-40-2016
- NEAFC Recommendation 19/2014
- Norwegian Regulation J-187-2008
- Norwegian Regulation J-151-2014
- Norwegian regulation J-61-2019
- https://wwf.ru/en/resources/news/barents/morskie-lesa-barentseva-morya-zashchityat-rossiyskie-rybaki-/
- Chaudhury et al, 2021.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range UoA 1	**To be determined (60-79)**
Draft scoring range UoA 2	**To be determined (≥80)**
Draft scoring range UoA 3	**To be determined (≥80)**
Draft scoring range UoA 4	**To be determined (≥80)**
Information gap indicator	**More information sought in relation with compliance with mandatory management measures and voluntary management measures by other MSC fisheries.**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.4.3 – Habitats information: All UoAs

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat		
Scoring Issue		SG 60	SG 80	SG 100
a		Information quality		
	Guide post	The types and distribution of the main habitats are **broadly understood**. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the types and distribution of the main habitats.	The nature, distribution and **vulnerability** of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. **OR** **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	Met?	**Yes**	**Yes**	**No**
Rationale				

As described in the background section, there is sufficient information on the nature, distribution and vulnerability of the main habitats in the different UoAs. Moreover, the general distribution of vulnerable habitats such as cold-water coral reefs, coral gardens, deep sea sponge aggregations and seapen fieldsare also identified. Information on depths, sediments, distribution of biotopes, and presence of certain indicator species of VME has been gathered over the years by different institutions, such as IMR and PINRO through their Joint annual ecosystem survey, or by the Mareano program (which maps depth, topography, sediment composition, contaminants, VME biotopes, biotopes in general with species diversity and richness, and habitats in Norwegian and Svalbard EEZ). The MAREANO-programme was launched in 2005 by multibeam echo-sounder mapping of a 984 km2 area at Tromsoflaket. This is a progressive programme, in 2013, the sum depth measurements, for all years: were about 131 000 km2, and by 2014, an area of 157 585 km2 has been sampled. While Norwegian coastal waters have been widely mapped, the Mareano program still falls short in providing specific information on the central Barents Sea, but which is slowly increasing its coverage year by year.

Besides, there are different publications on the distribution on benthic species, as those by Jakobsen and Ozhigin (2011), Jørgensen *et al*. (2015), Lubin (2013) or by ICES working groups (WGIBAR 2018) which serve to increase the knowledge of habitats in the area.

Research undertaken serves to provide sufficient knowledge on the nature, vulnerability and distribution of main habitats (this is, commonly encountered habitats and VME) in the different areas under assessment are known at a level of detail relevant to the scale and intensity of the UoA. **SG60 and SG80 are met by all UoAs.**

While the occurrence of vulnerable habitats has been identified, it is difficult to state that ALL habitats are known over their range, especially in the central Barents Sea where further mapping would be welcomed. **SG100 is not met by any UoA.**

b		Information adequacy for assessment of impacts		
	Guide post	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.	Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and	The physical impacts of the gear on all habitats have been quantified fully.

		OR **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	location of use of the fishing gear. OR **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	
	Met?	**Yes**	**Yes**	**No**
Rationale				

VMS tracks provide reliable information on the spatial and temporal location and extent of fishing gear types. These tracks, together with available information on the distributions of main habitat types and the knowledge of the impacts that the different gears may have on habitat types serve to identify the main impacts that the different UoAs have on main habitats and that there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear.

As regards specific impacts that each gear type has, Grekov and Pavlenko (2011) estimated that the area annually affected by the Russian longline fleet in the Barents Sea was about 100 km2 (using an estimation of 88 million fished hooks per year) and concluded that both the relative size of the area and the impacts of both the hooks and anchors on the seabed do not cause special concern. While not specific for the longline UoAs, the team considers that estimations made for the Russian longline fleet could also serve to estimate the impact of the Norwegian longline fleet, although this impact has not been quantified fully.

As for other gear types, the effect of static gears such as gillnets and hooks and lines on sensitive habitats has not been quantified other than by the general observation that such physical impact is avoided by the fishermen as it could generally damage the net. The quantification of physical impacts of bottom fixed gears could be calculated by the study of the number, size and distribution of these gears, and the proportion of affected area versus the Norwegian and Barents Seas areas. While lost gears (either static or moving) could influence the distribution and abundance of benthic communities through encouraging aggregation of scavengers, these risks are minimized by the Coastguard's annual lost-gear recovery program. As regards hooks, the impact that these could have on benthic habitats is negligible. In any case, and as with the longline fleet, these impacts have not been quantified fully.

As regards trawling activity, it is known that this activity generates disturbance on any type of sediments. Effects such as bottom damage, seabed relief, sediment sorting and species survival, abundance and recovery have been studied in different research programs. According to Kaiser et al (2006), Gordon et al (2002) and Meenakumari et al (2008), soft grounds such as muddy and sandy bottoms are expected to recover quickly, and in a timeframe smaller than 5 years once the disturbance is stopped. Lubin (2013) estimated this time to range from 4 to 7 years in the affected habitats. It is acknowledged that the composition of the benthic communities may shift favouring more resilient species, but the overall structure and function of the habitats remains. Effects or hard substrate have also been studied and are considered more harmful. While not as noticeable, Danish seines also have an impact on benthic habitats.

While there is reasonable data on recovery rates of major habitats, understanding of recovery rates of associated species, and especially vulnerable species is still poorly understood, and although effects of the different fishing gears has been studied in different research papers, its effects in the affected fishing grounds have not been quantified fully.

SG60 and SG80 is met by all UoAs. **SG100 is not met by any UoA**.

c	Monitoring			
	Guide post		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in all habitat distributions over time are measured.
	Met?		**Yes**	**No**
Rationale				

Information on habitats continues to be collected through the ongoing MAREANO Program, joint IMR-PINRO ecosystem surveys and the OSPAR Commission (www.ospar.org). This statement needs confirmation at initial audit. The

combination of VMS maps and habitat maps would serve to determine the risk that a fishery may have for the habitat of a certain area. **SG80 is met by all UoAs.**
However, further mapping is needed in order to gather information on yet un-mapped areas (such as the central Barents Sea) in order to be able to measure change in all habitat distributions over time. Besides, habitat maps on the same area that date back time enough would be necessary in order to measure any change or trend. **SG100 is not met for any UoA.**

References

Jakobsen and Ozhigin (2011)

Jørgensen et al. (2015)

ICES working group (WGIBAR 2018)

VMS maps.
MAREANO Program
IMR-PINRO Joint fisheries commission.
OSPAR Commission (www.ospar.org)
Grekov and Pavlenko (2011)
Kaiser et al (2006),
Gordon et al (2002)
Meenakumari et al (2008)
Lubin (2013)
Chaudhury et al, 2021.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.5.1 – Ecosystem outcome

PI 2.5.1		The UoA 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	Ecosystem status			
	Guide post	The UoA 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 UoA 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 UoA 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?	**Yes**	**Yes**	**No**
Rationale				

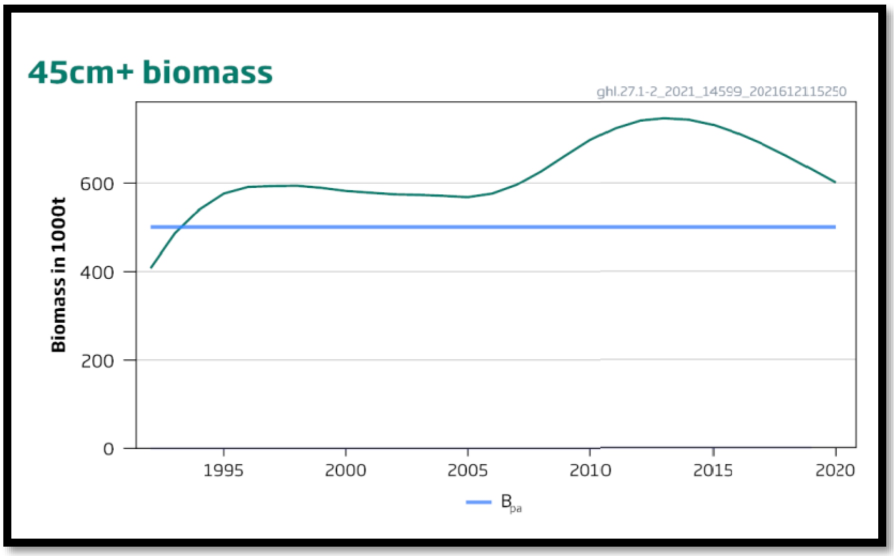
The background section summarises the ecosystem models, specific to the Barents Sea, described in the 2018 ICES AFWG Report. The AFWG has reported on the trophic relationships among the different species in the ecosystem, such as Ecopath type studies by Blanchard *et al* 2002; EcoCod (which seeks to estimate cod MSY taking into account a range of ecosystem factors), Gadget (multispecies interactions between cod, herring, capelin, minke whale, krill) in the Barents Sea; Biofrost (multispecies model for Barents Sea – addressing primarily cod / capelin dynamics); STOCOBAR (Stock of cod in the Barents Sea) and various ecosystem modelling studies by e.g. Planque and Lindstom at IMR. Similar ecosystem models exist for the Norwegian Sea (Hjollo et al, 2012; Utne et al, 2012). Broader ecosystem models include NORWECOM.E2E, which includes plankton and fish. PINRO and IMR have developed together hydrodynamic models that complement these mainly biologically based models.

Three ICES working groups (AFWG, WGDEC and WGIBAR) provide a comprehensive annual review of ecosystem status in the NE Arctic. This information is supplemented by on-going data collected by IMR and PINRO under the Joint Norwegian-Russian Commission and its environmental status reports for the Barents Sea (which issues annual Barents Sea ecosystem status report, trends, highlights expected future situation) and work undertaken as part of implementing the Norwegian Integrated Management Plan for the Barents Sea- Lofoten area. The different models and assessments provide enough information to support that both the Norwegian and the Barents Sea ecosystems are relatively healthy (affected however by global warming and other human pressures).

Key ecosystem elements considered to be most crucial to giving the Barents Seas ecosystem its characteristic nature, structure, dynamics and functions are well documented (WGIBAR 2018).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, such as some seabirds species with declining population trends (northern fulmar, black-legged kittiwake, razorbill, Atlantic puffin and common guillemot) as 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 bycatch in different fisheries (particularly long line and gill net fisheries).
As 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 Greenland halibut 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 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).

The Marine Resources Act makes it an explicit requirement that an ecosystem approach is taken to all aspects of marine resource management. Norway maintains extensive ecosystem monitoring and management programmes that review the role of fisheries and target species' trophic role. The fishery's share of TAC is based on ICES advice, which takes into account the potential needs of other species in the ecosystem, such as other fish species or marine mammals. However, the feed needs of other predators such as seabirds are not yet taken into account.

Of relevance to the Greenland halibut fishery, stock biomass has been above sustainable levels since 1995, as described in ICES advice.



The current Greenland halibut fishery is not being considered as disrupting ecosystem main functions. Declines in the populations of other species such as marine mammals or birds in the Barents Sea are attributed to other factors such as rising sea temperature or redistribution of prey species.
The team considers that the Greenland halibut fishery in the NEA 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. **SG60 and SG80 are met by all UoAs.**

Uncertainties in relation to the impact that global warming has on the different elements of the ecosystem including distribution and abundance of fish and out-of-scope species prevent all UoAs from meeting the requirements at SG100, Since this impact is still not well understood in relation to fisheries. **SG100 is not met by any UoA.**

References

ICES 2018 AFWG Report
Blanchard *et al* 2002;
Planque and Lindstom at IMR
Hjollo et al, 2012
Utne et al, 2012
NORWECOM.E2E
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ICES 2021 advice for Greenland halibut in areas 1 and 2.
Marine Resources Act.
Chaudhury et al, 2021

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.5.2 – Ecosystem management strategy

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guide post	There are **measures** in place, if necessary which take into account the **potential impacts** of the UoA on key elements of the ecosystem.	There is a **partial strategy** in place, if necessary, which takes into account **available information and is expected to restrain impacts** of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a **strategy** that consists of a **plan**, in place which contains measures to **address all main impacts of the UoA** on the ecosystem, and at least some of these measures are in place.
	Met?	**Yes**	**Yes**	**No**
Rationale				

The Norwegian EEZ and the Barents Sea are subject to management measures which seek profit from the fishery as well as the protection of the fishing resources. This is done by the establishment of fishing regulations, mesh limitations and technical measures, closed areas, bycatch limitations, enforcement effort, landing obligation, and continue monitoring of many species present in the ecosystem.
The Norwegian Marine Resources Act has an explicit requirement to take an ecosystem approach to resource management and exploitation. The act provides the statutory basis for the suite of regional seas management plans (for the North Sea and Skagerrak, the Norwegian Sea, and the Barents Sea), each of them aimed at monitoring and safeguarding the status of the marine environment and the resources it supports. Major revisions of these management plans are planned every 4 years. Further information on these reviews shall be gathered at Initial audit.
An integral part of the fishing strategy in the Barents Sea is the JNRFC 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 JNRFC, to monitor and assess the status of resources, ecosystems and environment. The strategy bases its measures on data gathered through different research institutions (including IMR and PINRO), ICES advice on fish stocks (which is based on SMS modelling, which includes prey-predator relationships), ICES Advisory Committee on Ecosystems (ACE), habitat mapping programs (MAREANO Programme) and OSPAR Commission research (www.ospar.org).
Specifically, for the Barents Sea there are different management measures used in the Greenland halibut fishery which ensure that these fisheries do not pose a risk of serious or irreversible harm to ecosystem structure and function. These measures include: TACs for the target species but also for several of the P2 primary species (although these are taken in such a small level that the Greenland halibut fishery can not be said to affect these stocks); minimum landing size, sorting grids in the bottom trawl fishery to minimize the catch of juvenile fish; minimum mesh size (130mm); maximum bycatch of undersized fish, move-on rules to protect juvenile fish (cod, saithe, Greenland halibut and redfish); area closures to protect spawning grounds; MPAs to protect vulnerable benthic habitats and species and move on-rule to protect corals and sponges.
The different measures in place take into account the potential impact of the fishery. **SG60 is met by all UoAs**.

Given the coordination with Russian management authorities gained through the JNRFC and the Norwegian management plans for the Barents and Norwegian Sea these measures can be considered as a partial strategy already implemented. **SG80 is met by all UoAs**.

Norway has defined management plans for the Barents Sea and the Norwegian sea ecoregions. These management plans contain management measures design to ensure that the fishing activity does not pose a risk of serious or irreversible harm to the ecosystem structure and function, however this plan fails short to manage all possible impacts (since not all measures are binding) and is therefore only considered as partial. **SG100 is not met by any UoA.**

b	Management strategy evaluation			
	Guide	The **measures** are considered likely to work,	There is **some objective basis for confidence** that	**Testing** supports **high confidence** that the partial

	post	based on plausible argument (e.g., general experience, theory or comparison with similar UoAs/ ecosystems).	the measures/ partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved.	strategy/ strategy will work, based on information directly about the UoA and/or ecosystem involved.
	Met?	**Yes**	**Yes**	**No**
Rationale				

The Greenland halibut stock is at biomass levels above B pa (Precautionary approach). The integrated ecosystem approach-based management plan and strategies for the Barents Sea and Lofoten areas, as well as for the Norwegian Sea, which take into account direct information about the ecosystems involved through ICES advice, scientific advice from IMR, PINRO and the scientific community and which uses historical and current information collected under the framework of the Joint-Norwegian-Russian Fisheries Commission, are reviewed every 4 years which allows for modifications to the management plans where further effectiveness is required.
Given the broad knowledge on the Barents Sea and Norwegian Sea ecosystems, the continued monitoring by different research institutions, the generally healthy status of both ecosystems and of the heathy situation of the Greenland halibut stock, there is some objective basis for confidence that the measures and partial strategy implemented will work (and are working already). **SG60 and SG80 are met for all UoAs.**

Although the main pressures of the Barents Sea and the Norwegian Sea are evaluated and reported by ICES (EOBSE 2016 and EONSE 2018) there is no testing as regards the management plan effectiveness. **SG100 is not met by any UoA.**

c	Management strategy implementation			
	Guide post		There is **some evidence** that the measures/partial strategy is being **implemented successfully**.	There is **clear evidence** that the partial strategy/strategy is being **implemented successfully and is achieving its objective as set out in scoring issue (a).**
	Met?		**Yes/No**	**No**
Rationale				

Evidence needs to be gathered at initial audit, specifically on area closures (with VMS tracking to confirm compliance), compliance with management measures (evidence to be gathered through inspection by the Coast Guard informing of no systematic non-compliance), evidence of scientific research cruises and resulting status reports, and evidence of ecosystem elements being given key consideration at fisheries management level – both in the form of ICES advice and in the deliberations of the JNRFC.
If evidence is gathered, then the partial strategy will be considered successfully implemented, and **SG80 would be met by all UoAs**.

This evidence is not available for all the fishing grounds, as some fishing areas remain unmapped by the Mareano program. **SG100 is not met by any UoA.**

References

ICES Ecosystem Overview for the Barents Sea Ecoregion, 2016. https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2016/2016/Barents_Sea_Ecoregion-Ecosystem_overview.pdf
ICES Ecosystem Overview for the Norwegian Sea Ecoregion, 2018. https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/NorwegianSea_EcosystemOverview.pdf
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Chaudhury et al, 2021.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**To be determined (≥80?)**
Information gap indicator	**More information sought on evidences.**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 2.5.3 – Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guide post	Information is adequate to **identify** the key elements of the ecosystem.	Information is adequate to **broadly understand** the key elements of the ecosystem.	
	Met?	**Yes**	**Yes**	
Rationale				

As described in PI 2.5.1, key elements of the ecosystem, such as primary and secondary productivity, and predator-prey relationships, have been studied through different ecosystem models both in the Norwegian and the Barents Seas. The trophic relationships of different species on the North East Atlantic have been studied through ecosystem models for the Norwegian Sea (Hjollo et al, 2012; Utne et al, 2012) and the Barents Sea.
The Norwegian Institute for Nature Research (NINA) monitors birds populations while the IMR Institute studies the Norwegian Sea ecosystem through the Norwecom.E2E project. Barents Sea ecosystem is studied under the auspices of the JNRFC. Information from these studies is adequate to broadly understand the key elements of these ecosystems.
SG60 and SG80 are met by all UoAs.

b	Investigation of UoA impacts			
	Guide post	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but **have not been investigated** in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and **some have been investigated in detail**.	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and **have been investigated in detail**.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

International research effort over the past 25 years has led to an increased knowledge and understanding of interactions between fisheries and ecosystems. This understanding is backed-up by different ecosystem models designed for the fishing grounds.
There is a good level of information on the ecosystem, and also a broad knowledge of the impacts that the fishery has on the different ecosystem elements, including information on the level of interactions with bycatch, ETP species, and main habitat types. Such information is collected via VMS, landing and inspection records. Furthermore, different institutions such as IMR, PINRO and WWF follow up the status of the different elements of the Norwegian and Barents Seas ecosystems.
The main impacts and interactions of the fishery on key ecosystem elements can be inferred from existing information, and several have been investigated in detail**. SG60, 80 and 100 are met by all UoAs**.

c	Understanding of component functions			
	Guide post		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are **known**.	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are **understood**.
	Met?		**Yes**	**Yes**
Rationale				

Information obtained by different means ((relevant scientific research by IMR/PINRO together with ecosystem modelling over the years, and fishery specific data such as VMS data, catch composition data, and non-commercial species sightings data, as well as coast guard inspection data) is sufficient to gather a good understanding of the main functions of key ecosystem components, such as target species – Greenland halibut – primary, secondary, ETP species, habitats (productive nursery areas) and ecosystem. **SG80 is met by all UoAs.**

The distribution of fishing effort and landings are recorded accurately and shared with national authorities for real-time quota/fishing removal management. There is a well-established landing obligation. Impact on seabed habitat is managed by scientific surveys of closed areas, and before –after surveys of open areas. The impacts of the different UoAs on the different species and habitats are identified and the main functions of these components in the ecosystem have been investigated and are understood. **SG100 is met by all UoAs**.

d	Information relevance			
	Guide post		Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components **and elements** to allow the main consequences for the ecosystem to be inferred.
	Met?		**Yes**	**Yes**
Rationale				

The long-established and long-term research programmes have built a database that ensures that the main functions of the components in the ecosystem are known. Different ecosystem models (mentioned under PI 2.5.1) provide a broad knowledge of the impacts that the fishery has on the targeted species and dependent predators. These simulation models have been developed 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. **SG80 and SG100 are met by all UoAs.**

e	Monitoring			
	Guide post		Adequate data continue to be collected to detect any increase in risk level.	Information is adequate to support the development of strategies to manage ecosystem impacts.
	Met?		**Yes**	**Yes**
Rationale				

There is a comprehensive monitoring of the area by IMR (in the Norwegian and Barents Seas) and also by PINRO (in the Barents Sea), conducted through different annual research trips intended to evaluate the status of different fishing stocks, ETP species and habitats. Other institutions monitor other populations such as seabirds and mammals. There also are different ecosystem models in the area which serve to foresee expected future changes in the status of the ecosystem. Risks associated with changing populations or relations between fisheries and various elements of the ecosystem should be detected. **SG80 is met by all UoAs.**

Although there are some gaps in understanding, there is more than enough information available to support precautionary strategies to manage marine ecosystem impacts. 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 for the Norwegian and the Barents Sea are de facto examples of such management strategies. **SG100 is met by all UoAs.**

References

Chaudhury et al, 2021.
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Mareano program. www.mareano.no
http://www.jointfish.com/index.php/eng.html

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

7.4 Principle 3

7.4.1 Principle 3 background

a. Jurisdiction

The fishery takes place solely in waters under Norwegian jurisdiction, and all catch is landed in Norway. The UoA stock is managed exclusively by Norway. Only the Norwegian fisheries management system needs to be assessed.

b. Legislative basis and management set-up

In Norway, fisheries management is governed by the 2008 Marine Resources Act. The Act applies to all catch and use of marine resources and their genetic material (§ 3) and covers issues such as bioprospecting (Chapter 2), catch levels and quotas (Chapter 3), catch and use of marine resources (Chapter 4), arrangements on the fishing fields, liability for damage and local regulations (Chapter 5) and monitoring, enforcement, sanctions and criminal liability (Chapters 6–12).

The Marine Resources Act is a framework law, which in the main authorizes the Government to issue specific regulations within designated fields. The most important rules are found in the Regulation on the Execution of Marine Fisheries, which is updated annually. The Regulation contains rules for mesh size, selection and limitations on the use of specific catch gear (Chapters II–V), seasonal restrictions (Chapter VI), bycatch (Chapters VII–VIII), minimal fish size (Chapter IX), discard ban (Chapter X), restrictions on the use of trawl in specific areas (Chapters XI–XII), protection of coral reefs (Chapter XIII), documentation on hold volumes (Chapter XIV), marking of vessels and gear (Chapters XV–XVI), loss of gear (Chapter XVII) and fish welfare (Chapter XVIII). Other important legal instruments are the 1999 Act on the Right to Participate in Fisheries, the 2015 Act on First-Hand Sales of Wild Catch of Marine Resources, the 2018 Regulation on Participation in Fisheries, the 2018 Regulation on Licencing and the 2018 Regulation on Landing and Sales Notes. All Regulations are subject to running modifications and additions through so-called J-orders, which are distributed to the fishing fleet electronically. This includes dedicated and regularly updated annual regulations for the fishery of each specific species, including Greenland halibut.

The executive body at governmental level is the Ministry of Trade, Industry and Fisheries, while the practical regulation of fisheries is delegated to the Directorate of Fisheries. Enforcement at sea is taken care of by the Coast Guard, which is part of the Royal Norwegian Navy, but performs tasks on behalf of several ministries, including the Ministry of Trade, Industry and Fisheries. Scientific research is performed by the Institute of Marine Research. Fisheries management authorities coordinate their regulatory work with that of other bodies of governance, for instance the Ministry of Climate and Environment and the Norwegian Environmental Agency, which are responsible for the implementation of the integrated management plans for different marine areas.

c. Objectives

The 2008 Marine Resources Act explicitly requires that Norwegian fisheries management be guided by the precautionary approach, in line with international treaties and guidelines, 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 plan for the Barents and Norwegian Seas.

The Norwegian system for fisheries management includes various mechanisms that generally respect and observe the rights of the coastal population along the country’s northern, western and southern coast. For the most important species, significantly and proportionately larger quota shares are allotted to coastal fisheries than to the ocean going fleet (see, for instance, the Regulation on Participation in Fisheries for an overview), with particular attention to the traditional fisheries of the coastal Sami population in the northernmost part of the country. The Sami Parliament, which is a consultative body for the indigenous Sami population on Norwegian territory, is consulted on all management measures, including the distribution of the national quota, related to species of particular historic importance to the Sami. The Government has formally committed to this through the 2005 Royal Decree on Consultations with the Sami Parliament.

d. Stakeholders and consultation processes

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 the Norwegian Fishermen’s Sales Organization, fishermen’s organizations such as the Norwegian Fishermen’s

Association and environmental NGOs such as WWF, Greenpeace and the Norwegian Society for the Conservation of Nature. The Sami Parliament represents the interests of the coastal Sami population.

Norway has a long tradition of including non-governmental organisations in fisheries management, with continuous consultation and close cooperation between governmental agencies and user-group organisations, in particular the Norwegian Fishermen's Association, but also the more specialized organisations such as the fishermen's sales organisations. As these organisations have regional branches, whose representatives are actively involved in policymaking, ensuring that local knowledge is also taken into consideration in the management process. So-called Regulatory Meetings are organized twice a year are open to all; user-group organisations and NGOs attend on a regular basis. In addition, there is day-to-day contact by telephone and email between authorities, user groups and other interested parties. Distribution of the national quota between different gear and fishing fleets has in practice been delegated to the Norwegian Association of Fishermen, which includes all fishermen from the smallest coastal vessels to ocean-going trawlers. Technical regulation measures are to a large extent decided upon in direct consultations 'over the table' between authorities and user groups at the Regulatory Meetings. The Sami Parliament is formally consulted in the management of fisheries that are of historical importance to the Sami population.

e. Enforcement and sanctions

The Marine Resources Act contains provisions in Chapter 6 on fishermen's duties to contribute to an effective control (see, e.g., § 36 and § 39 on catch log and sales notes requirements, respectively); in Chapter 7 on authorities' responsibilities for control and enforcement (including, in § 48, the sales organizations' control obligations); in Chapter 8 measures to combat illegal, unreported and unregulated (IUU) fisheries (including § 50 on the ban to land IUU catch); and in Chapter 9 on illegally caught fish.

The Marine Resources Act places the overall responsibility for monitoring, control and surveillance in Norwegian fisheries with the Directorate of Fisheries (§ 44). The 1997 Coast Guard Act provides the Coast Guard with the authority to conduct inspections in waters under Norwegian jurisdiction, within the fields covered by the Marine Resources Act and secondary legislation given with statutory authority in that Act (§ 9). According to the 2015 Act on First-Hand Sales of Wild Catch of Marine Resources, the six sales organizations, which have monopoly on first-hand sale of fish in Norway, 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 (§§ 17-21). Hence, monitoring, control and surveillance in Norwegian fisheries is taken care of through shared responsibility and close collaboration between the Directorate of Fisheries, the Coast Guard and the sales organizations, here: the Norwegian Fishermen's Sales Organization (Norges Råfisklag), located in Tromsø. The Directorate of Fisheries keeps track of how much fish is taken of the quotas of individual vessels, different vessel groups and other states at any given time, based on reports from the fishing fleet. Norwegian vessels are required to have electronic logbooks, or more specifically Electronic Reporting Systems (ERS). This implies that real-time data are forwarded to the Directorate of Fisheries, with the possibility to make corrections of data submitted each day within 12 hours into the next day. Norway has agreements in place with a number of other countries about exchange of ERS data, including the EU.

The self-reported catch data can be checked at sales operations through the sales organizations and through physical checks by the Directorate of Fisheries and the Coast Guard. 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. They check, among other things, weighing equipment, quantity and size distribution of the catch, the quality of the fish and documentation. 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. All landings have to be reported six hours in advance in order to give the inspectors the possibility to check the landed catch. The landed volumes are compared to the volumes reported to the Directorate through the logbooks. Both landing and at-sea control is conducted using a risk-based framework aimed at utilizing resources to optimize compliance at any given moment. The Norwegian Food Safety Authority checks all landings by foreign vessels in Norwegian ports, while the Directorate of Fisheries conducts physical inspections of at least 15 % of these landings.

The Norwegian Coast Guard operates 15 vessels, of which five patrol the coastal area and the rest the wider EEZ – four of the latter have a helicopter on board. These Coast Guard vessels are the largest in the entire Royal Norwegian Navy. They perform spot checks at sea (in the EEZ and the Protection Zone around Svalbard), including from helicopters during fishing activities and inspections at check points that foreign vessels have to pass when entering or leaving the EEZ and in connection with transhipments in Norwegian waters, which have to be reported in advance. Coast Guard inspectors board fishing vessels and control the catch from last haul (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 calculate the volume of the fish in round weight and compare this with the catches reported to the Directorate through the logbooks. Both landing and at-sea control is conducted using a risk-based framework aimed at utilizing resources to optimize compliance at any given moment. Helicopters are used for impromptu inspections, e.g. to reveal discards. The Norwegian Coast Guard carried out 1139 inspections in waters under Norwegian jurisdiction in 2019. 52 inspections (4.6 %) resulted in a fine or prosecution. In 2020, 1155 inspections were carried out, of which 49 (4.2 %) resulted in fine or prosecution.

Statutory authority for the use of sanctions in the event of infringements of fisheries regulations is given in Chapters 11 and 12 of the Marine Resources Act. Intentional or negligent violations are punished with fines or prison up to one year (§§ 60–63), while infringements committed with gross intent or negligence may be punished with prison up to six years. In the judgment of the seriousness of the infringement, the economic gain of the violation, among other things, is to be taken into consideration (§ 64). Alternatively, catch, gear, vessels or other properties can be confiscated (§ 65). The Act on First-Hand Sales of Wild Catch of Marine Resources also provides a legal foundation for sanctions, including penal liability (§ 22; same as for the Marine Resources Act) and confiscation (§ 23), and the Coast Guard Act for penal liability (§ 36; up to six months prison or two years for infringements committed under aggravating circumstances).

The Norwegian enforcement agencies use a graduated sanctioning system, with sanctions ranging from oral warnings, written warnings and administrative fines to formal prosecution. If the fishers 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.

f. Review of the management system

There are various mechanisms in place to evaluate the Norwegian system for fisheries management, but at varied levels of ambition and coverage. At the Regulatory Meetings that take place twice a year (see PI 3.1.2 above), management authorities receive feedback on management practices from the industry and other interested stakeholders, including NGOs. The scientific research component of the fisheries management system is reviewed in ICES reports and advice. The enforcement component is subject to continuous evaluation at meetings between the various bodies involved in enforcement activities, where priorities are hammered out based on risk-based monitoring of past experience. The international side to the Norwegian fisheries management system is reviewed by the Parliament upon submission by the Government (through the Ministry of Trade, Industry and Fisheries) of annual reports on the agreements concluded with other states for the coming year, and the previous year’s fishing in accordance with such agreements. The Office of the Auditor General conducts annual reviews of the financial performance of the fishery management system.

7.4.2 Principle 3 Performance Indicator scores and rationales

PI 3.1.1 – Legal and/or customary framework

PI 3.1.1		The management system exists within an appropriate legal and/or customary framework which ensures that it: - Is capable of delivering sustainability in the UoA(s); - 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	Compatibility of laws or standards with effective management			
	Guide post	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?	**Yes**	**Yes**	**Yes**
Rationale				

In Norway, fisheries management is governed by the 2008 Marine Resources Act. The Act applies to all catch and use of marine resources and their genetic material (§ 3) and covers issues such as bioprospecting (Chapter 2), catch levels and quotas (Chapter 3), catch and use of marine resources (Chapter 4), arrangements on the fishing fields, liability for damage and local regulations (Chapter 5) and monitoring, enforcement, sanctions and criminal liability (Chapters 6–12) (see PI 3.2.3 below).

The Marine Resources Act is a framework law, which in the main authorizes the Government to issue specific regulations within designated fields. The most important rules are found in the Regulation on the Execution of Marine Fisheries, which is updated annually. The Regulation contains rules for mesh size, selection and limitations on the use of specific catch gear (Chapters II–V), seasonal restrictions (Chapter VI), bycatch (Chapters VII–VIII), minimal fish size (Chapter IX), discard ban (Chapter X), restrictions on the use of trawl in specific areas (Chapters XI–XII), protection of coral reefs (Chapter XIII), documentation on hold volumes (Chapter XIV), marking of vessels and gear (Chapters XV–XVI), loss of gear (Chapter XVII) and fish welfare (Chapter XVIII). Other important legal instruments are the 1999 Act on the Right to Participate in Fisheries, the 2015 Act on First-Hand Sales of Wild Catch of Marine Resources, the 2018 Regulation on Participation in Fisheries, the 2018 Regulation on Licencing and the 2018 Regulation on Landing and Sales Notes. All Regulations are subject to running modifications and additions through so-called J-orders, which are distributed to the fishing fleet electronically. This includes dedicated and regularly updated annual regulations for the fishery of each specific species, including Greenland halibut.

The executive body at governmental level is the Ministry of Trade, Industry and Fisheries, while the practical regulation of fisheries is delegated to the Directorate of Fisheries. Enforcement at sea is taken care of by the Coast Guard, which is part of the Royal Norwegian Navy, but performs tasks on behalf of several ministries, including the Ministry of Trade, Industry and Fisheries. Scientific research is performed by the Institute of Marine Research. Fisheries management authorities coordinate their regulatory work with that of other bodies of governance, for instance the Ministry of Climate and Environment and the Norwegian Environmental Agency, which are responsible for the implementation of the integrated management plans for different marine areas.

Hence, there is an effective national legal system in place to deliver management outcomes consistent with MSC Principles 1 and 2. **SG 60 and SG80 are met.**

It also contains binding procedures insofar as it is based on formal law. **SG 100 is met.**

b	Resolution of disputes

	Guide post	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 UoA.	The management system incorporates or is 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?	**Yes**	**Yes**	**Yes**

Rationale

At the national level in Norway, there is an effective, transparent dispute resolution system in place, as fishers 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. **SG 60 is met.**

The system is transparent insofar as court cases are open to the public and verdicts published in Norway. The Norwegian court system is generally considered to be effective in dealing with most issues and is appropriate to the context of the UoA. **SG 80 is met.**

There are instances where management authorities have lost cases against fishermen and accepted the verdict, which is a clear demonstration that the system has been tested and proven to be effective. **SG 100 is met.**
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	Respect for rights			
c	Guide post	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?	**Yes**	**Yes**	**Yes**

Rationale

The Norwegian system for fisheries management includes various mechanisms that generally respect and observe the rights of the coastal population along the country's northern, western and southern coast. For the most important species, significantly and proportionately larger quota shares are allotted to coastal fisheries than to the ocean going fleet (see, for instance, the Regulation on Participation in Fisheries for an overview), with particular attention to the traditional fisheries of the coastal Sami population in the northernmost part of the country. The Sami Parliament, which is a consultative body for the indigenous Sami population on Norwegian territory, is consulted on all management measures, including the distribution of the national quota, related to species of particular historic importance to the Sami. The Government has formally committed to this through the 2005 Royal Decree on Consultations with the Sami Parliament.

Hence, 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. **SG 60 is met.**

The system has a mechanism to observe such rights, so **SG 80 is also met.**

Since it is founded in law, the mechanism formally commits to these rights, and **SG 100 is met.**

References

Deltakerloven, LOV-1999-03-26-15, 1999 (Act on the Right to Participate in Fisheries).

J-3-2021: Deltakerforskriften ('Regulation on Participation in Fisheries'), Directorate of Fisheries, Norway, 6 January 2021.

J-31-2021: Forskrift om utøvelse av fisket i sjøen ('Regulation on the Execution of Marine Fisheries'), Directorate of Fisheries, Norway, 2 February 2021.

Lov om forvaltning av viltlevande marine ressursar (havressurslova), LOV-2008-06-06-37 ('Marine Resources Act'), Parliament of Norway (Stortinget), 2008.

Lov om førstehandsomsetning av viltlevande marine ressursar (fiskesalslagslova), LOV-2015-06-19-65, 2015 (Act on First-Hand Sales of Wild Catch of Marine Resources).

Meld. St. 10 (2010–2011) Oppdatering av forvaltningsplanen for det marine miljø i Barentshavet og havområdene utenfor Lofoten ('Update of the [Integrated] Management Plan for the Marine Environment in the Barents Sea and the Marine Area outside Lofoten'), Ministry of Climate and Environment, Norway, 2011.

Meld. St. 35 (2016–2017) Oppdatering av forvaltningsplanen for Norskehavet, 2017 (Update of the [Integrated] Management Plan for the Norwegian Sea).

Prosedyrer for konsultasjoner med Sametinget, Kgl. res. 04/186 ('Royal Decree on Procedures for Consultations with the Sami Parliament'), Government of Norway, 2005.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 3.1.2 – Consultation, roles and responsibilities

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	Roles and responsibilities			
	Guide post	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?	**Yes**	**Yes**	**No**
Rationale				

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 the Norwegian Fishermen's Sales Organization, fishermen's organizations such as the Norwegian Fishermen's Association and environmental NGOs such as WWF, Greenpeace and the Norwegian Society for the Conservation of Nature. The Sami Parliament is consulted in the management of fisheries that are of historical importance to the Sami people.

Organizations and individuals involved in the management process have been identified, and according to the submitted client checklist, their functions, roles and responsibilities are generally understood. **SG 60 is met.**

The functions, roles and responsibilities are explicitly defined in legislation and long-standing practice and well understood for key areas of responsibility and interaction. **SG 80 is met.**

It remains to be seen at interviews during the site visit whether these are well understood for *all* areas. At this point, **SG100 is not met.**

b	Consultation processes			
	Guide post	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?	**Yes**	**Yes**	**No**
Rationale				

Norway has a long tradition of including non-governmental organisations in fisheries management, with continuous consultation and close cooperation between governmental agencies and user-group organisations, in particular the Norwegian Fishermen's Association, but also the more specialized organisations such as the fishermen's sales organisations. As these organisations have regional branches, whose representatives are actively involved in policymaking, ensuring that local knowledge is also taken into consideration in the management process. So-called

Regulatory Meetings are organized twice a year are open to all; user-group organisations and NGOs attend on a regular basis. In addition, there is day-to-day contact by telephone and email between authorities, user groups and other interested parties. Distribution of the national quota between different gear and fishing fleets has in practice been delegated to the Norwegian Association of Fishermen, which includes all fishermen from the smallest coastal vessels to ocean-going trawlers. Technical regulation measures are to a large extent decided upon in direct consultations 'over the table' between authorities and user groups at the Regulatory Meetings. As mentioned under SI 3.1.1c above, the Sami Parliament is formally consulted in the management of fisheries that are of historical importance to the Sami population.

Hence, the management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system. **SG 60 is met.**

The processes regularly seek and accept relevant information, and the management system demonstrates consideration of the information obtained. **SG 80 is met.**

It is at this stage not clear whether the authorities provide adequate explanations of how stakeholders' input is used or not used. **SG 100 is not met.**

	Participation			
c	Guide post		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?		**Yes**	**Yes**

As follows from SI 3.1.2b above, the consultation processes provide opportunity for all interested and affected parties to be involved at both national and international level. Meetings are publicly announced, and authorities encourage all interested parties, including NGOs and the media, to attend. The various hearing opportunities available online also contribute to encouraging and facilitating public involvement.

Hence, the consultation process provides opportunity for all interested and affected parties to be involved. **SG 80 is met.**

The authorities not only provide opportunity, but actively encourage all parties both within and outside the fisheries sector to get involved, and facilitate their effective engagement. **SG 100 is met.**

References

Deltakerloven, LOV-1999-03-26-15, 1999 (Act on the Right to Participate in Fisheries).

J-3-2021: Deltakerforskriften ('Regulation on Participation in Fisheries'), Directorate of Fisheries, Norway, 6 January 2021.

Lov om forvaltning av viltlevande marine ressursar (havressurslova), LOV-2008-06-06-37 ('Marine Resources Act'), Parliament of Norway (Stortinget), 2008.

Prosedyrer for konsultasjoner med Sametinget, Kgr. res. 04/186 ('Royal Decree on Procedures for Consultations with the Sami Parliament'), Government of Norway, 2005.

Referat fra reguleringsmøtet 6. og 7. november 2019 ('Minutes from the Regulatory Meeting 6 and 7 November 2019'), Directorate of Fisheries, Norway, 2019.

Reguleringsmøte 2020 (online) ('Regulatory Meeting 2020 (online)), available at https://www.fiskeridir.no/Yrkesfiske/Dokumenter/Reguleringsmoetet2/Hoeringer-av-reguleringer-for-2021-reguleringsmoetet.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 3.1.3 – Long term objectives

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Fisheries Standard, and incorporates the precautionary approach		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guide post	Long-term objectives to guide decision-making, consistent with the MSC Fisheries Standard and the precautionary approach, are **implicit** within management policy.	**Clear** long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach are **explicit** within management policy.	**Clear** long-term objectives that guide decision-making, consistent with MSC Fisheries Standard and the precautionary approach, are **explicit** within **and required by** management policy.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

The 2008 Marine Resources Act explicitly requires that Norwegian fisheries management be guided by the precautionary approach, in line with international treaties and guidelines, 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 plan for the Barents and Norwegian Seas.

Hence, clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within management policy. **SG 60 and SG 80 are met.**

These objectives are required by binding legislation which has to be followed at lower management levels. **SG 100 is met.**

References

Lov om forvaltning av viltlevande marine ressursar (havressurslova), LOV-2008-06-06-37 ('Marine Resources Act'), Parliament of Norway (Stortinget), 2008.

Meld. St. 10 (2010–2011) Oppdatering av forvaltningsplanen for det marine miljø i Barentshavet og havområdene utenfor Lofoten ('Update of the [Integrated] Management Plan for the Marine Environment in the Barents Sea and the Marine Area outside Lofoten'), Ministry of Climate and Environment, Norway, 2011.

Meld. St. 35 (2016–2017) Oppdatering av forvaltningsplanen for Norskehavet, 2017 (Update of the [Integrated] Management Plan for the Norwegian Sea).

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 3.2.1 – Fishery-specific objectives

PI 3.2.1		The fishery-specific management system 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	Objectives			
	Guide post	**Objectives**, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are **implicit** within the fishery-specific 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-specific 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-specific management system.
	Met?	**Yes**	**Yes**	**Partial**
Rationale				

Objectives which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2 are in place in the integrated management plans for the Barents and Norwegian Seas, the Marine Resources Act and supporting legislation at national level in Norway. **SG 60 is met.**

This includes objectives to maintain fish stocks at sustainable levels (here: both target stocks and other retained species) and protect other parts of the ecosystem, such as habitats. These objectives are short- and long-term and measurable, in the sense that performance against them can be measured through the enforcement bodies' recording and inspection routines (see PI 3.2.3). **SG 80 is met.**

P1 objectives are well defines, but P2 objectives are less so, warranting **a partial score at SG 100**.

References

J-31-2021: Forskrift om utøvelse av fisket i sjøen ('Regulation on the Execution of Marine Fisheries'), Directorate of Fisheries, Norway, 2 February 2021.

Lov om forvaltning av viltlevande marine ressursar (havressurslova), LOV-2008-06-06-37 ('Marine Resources Act'), Parliament of Norway (Stortinget), 2008.

Meld. St. 10 (2010–2011) Oppdatering av forvaltningsplanen for det marine miljø i Barentshavet og havområdene utenfor Lofoten ('Update of the [Integrated] Management Plan for the Marine Environment in the Barents Sea and the Marine Area outside Lofoten'), Ministry of Climate and Environment, Norway, 2011.

Meld. St. 35 (2016–2017) Oppdatering av forvaltningsplanen for Norskehavet, 2017 (Update of the [Integrated] Management Plan for the Norwegian Sea).

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 3.2.2 – Decision-making processes

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		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	Guide post	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?	**Yes**	**Yes**	
Rationale				

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 different 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. (The enforcement system is further described under PI 3.2.3 below.)

Hence, there are decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives. This applies to the UoA fishery as it does to Norwegian fisheries in general; see PIs 3.1.1 and 3.1.2 above. **SG 60 is met.**

These processes are established – evolved over several decades and now codified in the 2004 Federal Fisheries Act and secondary legislation – so **SG 80 is also met.**

b	Responsiveness of decision-making processes			
	Guide post	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?	**Yes**	**Yes**	**No**
Rationale				

The well-established decision-making procedures in the Norwegian system for fisheries management respond to serious issues identified in research, monitoring, evaluation or by groups with an interest in the fishery through the arenas for regular consultations between governmental agencies and the public. This happens first and foremost at the Regulatory Meetings, further through ad hoc consultation with the industry and other stakeholders (see PI 3.1.2 above). In addition, there is close contact between authorities and scientific research institutions, primarily between the Directorate of Fisheries and the Institute of Marine Research. **SG 60 is met**.

Not only serious issues are responded to, as demonstrated by the voluminous minutes from the Regulatory Meetings. **SG 80 is met.**

It is a principal challenge to claim that *all* issues are responded to, but at ACDR stage the assessment team prefers a precautionary scoring. **SG 100 is not met.**

c	Use of precautionary approach			
	Guide post		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		**Yes**	
Rationale				

Decision-making processes are based on scientific recommendations from ICES and the Institute for Marine Research. The Norwegian Marine Resources Act, which applies to the capture of all marine species, requires fisheries management to be based on the precautionary approach (see PI 3.1.3 above). **SG 80 is met.**

d	Accountability and transparency of management system and decision-making process			
	Guide post	Some information on the fishery's performance and management action is generally available on request to stakeholders.	**Information on the fishery's 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 the fishery's 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?	**Yes**	**Yes**	**Yes**
Rationale				

The Ministry of Trade, Industry and Fisheries submits annual reports to the Parliament on behalf of the entire system for fisheries management (see PI 3.2.4 below). Other involved agencies, such as the Institute of Marine Research, the Directorate of Fisheries and the Coast Guard, produce annual reports that are available to the public on request. **SG 60 is met.**

In these reports, as well as in the minutes from the Regulatory Meetings, actions taken or not taken by the relevant authority are accounted for, including those proposed based on information from research, monitoring, evaluation and review activity. **SG 80 is met.**

All the information above is available for downloading on the website of the relevant institution. In the opinion of the assessment team, this counts as formal reporting appropriate to the context of the fishery, as much as letters to stakeholders would have done. The information also comprehensive; cf., e.g., the detailed minutes from the Regulatory Meetings. **SG 100 is met.**

e	Approach to disputes			
	Guide post	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	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.

		violating the same law or regulation necessary for the sustainability for the fishery.		
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

The Norwegian system for fisheries management is not subject to continuing court challenges or indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery. **SG 60 is met.**

When occasionally taken to court by fishing companies, the management authority complies with the judicial decision in a timely manner. If management authorities lose court cases, they will accept the verdict. **SG 80 is met.**

The management authority works proactively to avoid legal disputes. This is done partly through the tight cooperation with user groups at the regulatory level (see PI 3.1.2 above), 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 (see PI 3.2.3 below). For example, Coast Guard inspectors work in a dedicated manner to communicate with fishers 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. The enforcement agencies have the authority to issue administrative penalties for minor infringements (serious enough to be met by a reaction above a written warning), thus referring only the more serious cases to prosecution by the police and possible transfer to the court system. Since the management system acts proactively to avoid legal disputes and rapidly implements judicial decisions, **SG 100 is met.**

References

J-3-2021: Deltakerforskriften (‘Regulation on Participation in Fisheries’), Directorate of Fisheries, Norway, 6 January 2021.

J-31-2021: Forskrift om utøvelse av fisket i sjøen (‘Regulation on the Execution of Marine Fisheries’), Directorate of Fisheries, Norway, 2 February 2021.

Lov om forvaltning av viltlevande marine ressursar (havressurslova), LOV-2008-06-06-37, 2008 (‘Marine Resources Act’), Parliament of Norway (Stortinget).

Meld. St. 10 (2010–2011) Oppdatering av forvaltningsplanen for det marine miljø i Barentshavet og havområdene utenfor Lofoten (‘Update of the [Integrated] Management Plan for the Marine Environment in the Barents Sea and the Marine Area outside Lofoten’), Ministry of Climate and Environment, Norway, 2011.

Referat fra reguleringsmøtet 6. og 7. november 2019 (‘Minutes from the Regulatory Meeting 6 and 7 November 2019’), Directorate of Fisheries, Norway, 2019.

Reguleringsmøte 2020 (online) (‘Regulatory Meeting 2020 (online)), available at https://www.fiskeridir.no/Yrkesfiske/Dokumenter/Reguleringsmoetet2/Hoeringer-av-reguleringer-for-2021-reguleringsmoetet.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 3.2.3 – Compliance and enforcement

PI 3.2.3		Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with		
Scoring Issue		SG 60	SG 80	SG 100
a	MCS implementation			
	Guide post	Monitoring, control and surveillance **mechanisms** exist, and are implemented in the fishery and there is a reasonable expectation that they are effective.	A monitoring, control and surveillance **system** has been implemented in the fishery 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 and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

The 2008 Marine Resources Act contains provisions in Chapter 6 on fishermen's duties to contribute to an effective control (see, e.g., § 36 and § 39 on catch log and sales notes requirements, respectively); in Chapter 7 on authorities' responsibilities for control and enforcement (including, in § 48, the sales organizations' control obligations); in Chapter 8 measures to combat illegal, unreported and unregulated (IUU) fisheries (including § 50 on the ban to land IUU catch); and in Chapter 9 on illegally caught fish.

The Marine Resources Act places the overall responsibility for monitoring, control and surveillance in Norwegian fisheries with the Directorate of Fisheries (§ 44). The 1997 Coast Guard Act provides the Coast Guard with the authority to conduct inspections in waters under Norwegian jurisdiction, within the fields covered by the Marine Resources Act and secondary legislation given with statutory authority in that Act (§ 9). According to the 2015 Act on First-Hand Sales of Wild Catch of Marine Resources, the six sales organizations, which have monopoly on first-hand sale of fish in Norway, 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 (§§ 17-21). Hence, monitoring, control and surveillance in Norwegian fisheries is taken care of through shared responsibility and close collaboration between the Directorate of Fisheries, the Coast Guard and the sales organizations, here: the Norwegian Fishermen's Sales Organization (Norges Råfisklag), located in Tromsø. The Directorate of Fisheries keeps track of how much fish is taken of the quotas of individual vessels, different vessel groups and other states at any given time, based on reports from the fishing fleet. Norwegian vessels are required to have electronic logbooks, or more specifically Electronic Reporting Systems (ERS). This implies that real-time data are forwarded to the Directorate of Fisheries, with the possibility to make corrections of data submitted each day within 12 hours into the next day. Norway has agreements in place with a number of other countries about exchange of ERS data, including the EU.

The self-reported catch data can be checked at sales operations through the sales organizations and through physical checks by the Directorate of Fisheries and the Coast Guard. 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. They check, among other things, weighing equipment, quantity and size distribution of the catch, the quality of the fish and documentation. 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. All landings have to be reported six hours in advance in order to give the inspectors the possibility to check the landed catch. The landed volumes are compared to the volumes reported to the Directorate through the logbooks. Both landing and at-sea control is conducted using a risk-based framework aimed at utilizing resources to optimize compliance at any given moment. The Norwegian Food Safety Authority checks all landings by foreign vessels in Norwegian ports, while the Directorate of Fisheries conducts physical inspections of at least 15 % of these landings.

The Norwegian Coast Guard operates 15 vessels, of which five patrol the coastal area and the rest the wider EEZ – four of the latter have a helicopter on board. These Coast Guard vessels are the largest in the entire Royal Norwegian Navy. They perform spot checks at sea (in the EEZ and the Protection Zone around Svalbard), including from helicopters during fishing activities and inspections at check points that foreign vessels have to pass when entering or leaving the EEZ and in connection with transshipments in Norwegian waters, which have to be reported in advance. Coast Guard inspectors board fishing vessels and control the catch from last haul (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 calculate the volume of the fish in round weight and compare this with the catches reported to the Directorate through the logbooks. Both landing and at-sea control is conducted using a risk-based framework aimed at utilizing resources to optimize compliance at any given moment. Helicopters are used for impromptu inspections, e.g. to reveal discards. The Coast Guard carried out 1139 inspections in 2019 and 1155 in 2020 (see SI 3.2.3c below on infringement rates).

Thus, control and surveillance mechanisms exist and are implemented in the fishery, and there is a reasonable expectation that they are effective. **SG 60 is met.**

These measures qualify as a system and have demonstrated an ability to enforce relevant management measures, strategies and rules; see SI 3.2.3c below on compliance. **SG 80 is met.**

The system is comprehensive, cf. the extensive inspection activities on land and at sea, and has demonstrated a consistent ability to enforce regulations; see SI 3.2.3c below on compliance. **SG 100 is met.**

b	Sanctions			
	Guide post	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?	**Yes**	**Yes**	**Yes**
Rationale				

Statutory authority for the use of sanctions in the event of infringements of fisheries regulations is given in Chapters 11 and 12 of the Marine Resources Act. Intentional or negligent violations are punished with fines or prison up to one year (§§ 60–63), while infringements committed with gross intent or negligence may be punished with prison up to six years. In the judgment of the seriousness of the infringement, the economic gain of the violation, among other things, is to be taken into consideration (§ 64). Alternatively, catch, gear, vessels or other properties can be confiscated (§ 65). The Act on First-Hand Sales of Wild Catch of Marine Resources also provides a legal foundation for sanctions, including penal liability (§ 22; same as for the Marine Resources Act) and confiscation (§ 23), and the Coast Guard Act for penal liability (§ 36; up to six months prison or two years for infringements committed under aggravating circumstances).

The Norwegian enforcement agencies use a graduated sanctioning system, with sanctions ranging from oral warnings, written warnings and administrative fines to formal prosecution. If the fishers 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.

Hence, sanctions to deal with non-compliance exist and there is evidence that they are applied. **SG 60 is met.**

Sanctions are consistently applied and thought to provide effective deterrence; see SI 3.2.3 c) below on compliance. **SG 80 is met.**

In addition to official inspection and infringement data, independent social science studies as well as assessments by the Office of the Auditor General document that sanctions provide effective deterrence. **SG 100 is met.**

c	Compliance			
	Guide post	Fishers 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 fishers 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 fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery.

	Met?	**Yes**	**Yes**	**No**

Rationale

The Norwegian Coast Guard carried out 1139 inspections in waters under Norwegian jurisdiction in 2019. 52 inspections (4.6 %) resulted in a fine or prosecution. In 2020, 1155 inspections were carried out, of which 49 (4.2 %) resulted in fine or prosecution.

Hence, fishers are generally thought to comply with the requirements of the management system, including, when required, providing information of importance to the effective management of the fishery. **SG 60 is met.**

Information from Norwegian enforcement authorities provides some evidence that fishers comply. **SG 80 is met.**

Even though independent social science studies as well as assessments by the Office of the Auditor General document a generally high level of compliance in Norwegian fisheries, more detailed information on inspections and compliance in the UoA is needed to conclude that there is a high degree of confidence that fishers comply. **SG 100 is not met.**

d	Systematic non-compliance			
	Guide post		There is no evidence of systematic non-compliance.	
	Met?		**Yes**	

Rationale

Based on information from Norwegian enforcement authorities (see SI 3.2.3c above), fishers generally comply with regulations. The assessment team has not been provided with any other evidence of systematic non-compliance in the fishery either. **SG 80 is met.**

References

Gezelius, S.S. (2003/2012), Regulation and Compliance in the Atlantic Fisheries: State/Society Relations in the Management of Natural Resources, Dordrecht: Springer.

Hønneland, G. (2000/2012), Coercive and Discursive Compliance Mechanisms in the Management of Natural Resources: A Case Study from the Barents Sea Fisheries, Dordrecht: Springer.

Hønneland, G. (2013), Making Fishery Agreements Work: Post-Agreement Bargaining in the Barents Sea, Cheltenham: Edward Elgar.

Kystvaktens årsrapport 2020 (‘The Coast Guard’s Annual Report 2020’), Norwegian Coast Guard, 2021.

Lov om forvaltning av viltlevande marine ressursar (havressurslova) (‘Act relating to the Management of Wild Living Marine Resources (Marine Resources Act)’), LOV-2008-06-06-37, Stortinget (Norwegian Parliament), 2008.

Lov om førstehandsomsetning av viltlevande marine ressursar (fiskesalslagslova), LOV-2015-06-19-65, 2015 (Act on First-Hand Sales of Wild Catch of Marine Resources).

Lov om kystvakten (kystvaktloven), LOV-2015-06-19-65, 1997 (Coast Guard Act).

Press release from the Norwegian Coast Guard about activities in 2019, referred in several Norwegian media outlets, e.g. the newspaper Vesterålen on 4th January 2020 (https://www.blv.no/nyheter/travelt-2019-for-kystvakta/).

Press release from the Norwegian Coast Guard about activities in 2020, referred in several Norwegian media outlets, e.g. the newspaper Fiskeribladet on 1st February 2021 (https://www.fiskeribladet.no/nyheter/kystvakten-ga-138-advarsler-for-brudd-pa-regelverk-og-anmeldte-49-forhold-i-fjor/2-1-955006).

Report from the Parallel Review of the Barents Sea Fisheries by the Norwegian and Russian Auditor Generals (‘Document No. 3:2 (2007–2008) from the Norwegian Auditor General’), Office of the Auditor General of Norway, 2008.

Riksrevisjonens oppfølging av parallellrevisjonen medDen russiske føderasjons riksrevisjon om forvaltningen av fiskeressursene i Barentshavet og Norskehavet, Dokument 3:8 (2010–2011) (‘The Office of the Auditor General’s Follow-up of the Parallel Audit with the Office of the Auditor General of the Russian Federation relating to the Management of Fish Resources in the Barents Sea and Norwegian Sea, Document 3:8 (2010–2011)’), Office of the Auditor General of Norway, 2011.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

PI 3.2.4 – Monitoring and management performance evaluation

PI 3.2.4		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	Evaluation coverage			
	Guide post	There are mechanisms in place to evaluate **some** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **key** parts of the fishery-specific management system.	There are mechanisms in place to evaluate **all** parts of the fishery-specific management system.
	Met?	**Yes**	**Yes**	**Yes**
Rationale				

There are various mechanisms in place to evaluate the Norwegian system for fisheries management, but at varied levels of ambition and coverage. At the Regulatory Meetings that take place twice a year (see PI 3.1.2 above), management authorities receive feedback on management practices from the industry and other interested stakeholders, including NGOs. The scientific research component of the fisheries management system is reviewed in ICES reports and advice. The enforcement component is subject to continuous evaluation at meetings between the various bodies involved in enforcement activities, where priorities are hammered out based on risk-based monitoring of past experience. The international side to the Norwegian fisheries management system is reviewed by the Parliament upon submission by the Government (through the Ministry of Trade, Industry and Fisheries) of annual reports on the agreements concluded with other states for the coming year, and the previous year's fishing in accordance with such agreements. The Office of the Auditor General conducts annual reviews of the financial performance of the fishery management system.

Hence, the fishery has in place mechanisms to evaluate some parts of the management system, so **SG 60 is met**.

Several of these components can be considered as key parts of the management system, so **SG 80 is met** as well.

It is a principal challenge to claim that absolutely *all* parts of a fisheries management system are subject to review, but it seems reasonable to expect some sort of a holistic evaluation of the system as such. The Office of the Auditor General regularly carries out holistic reviews of different sectors of the Norwegian bureaucracy (so-called 'management audits', as opposed to the more traditional financial audits). Such comprehensive reviews have been carried out for the Barents Sea (2007 and 2011) and the North Sea and Skagerrak (2017). **SG 100 is met.**

b	Internal and/or external review			
	Guide post	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?	**Yes**	**Yes**	**Yes**
Rationale				

This SI, as opposed to SI 3.2.4a above, does not ask about the extent of reviews (covering some/key/all parts of the management system), but rather about their frequency and whether they are internal or external to the management system. (If that were not the case, scoring SI 3.2.4b would have made no sense in cases where this SI does not reach SG 100, i.e. if not *all* parts of the management system are subject to review.) Hence, various forms of evaluation can be considered under the present SI even if they do not comprise the entire management system. However, some level of interrelationship between these PIs must be assumed. For instance, external reviews of only peripheral components of fisheries management (such as financial audits of management bodies) cannot automatically lead to a positive score on the external review indicator (whether 'occasional' for SG 80 or 'regular' for SG 100).

The fishery-specific management system is subject to various forms of internal self-evaluation within the Norwegian bodies of governance (see SI 3.2.4a above). **SG 60 is met.**

These take place on a regular basis, and the system is also subject to external review. For instance, Norway's fishery agreements with other states are reviewed by Parliament following the submission of status reports by the Ministry of Trade Industry and Fisheries. GSA4.10.1, an external review can be a review carried out by another governmental body than the fisheries management agency, so reviews by the legislative of the performance of the executive branch of government are considered external. **SG 80 is met.**

Since these external reviews are performed on an annual basis and hence regular, **SG 100 is met.**

References

Forvaltning og kontroll av fiskeressursene i Barentshavet: en parallelrevisjon mellom norsk og russisk Riksrevision, Office of the Auditor General, Oslo, 2007 (Management and Control of the Fish Resources in the Barents Sea: A Parallel Audit between the Norwegian and Russian Auditors General).

Meld. St. 13 (2019–2020) Noregs fiskeriavtalar for 2020 og fisket etter avtalane i 2018 og 2019 ('White Paper on Norway's [International] Fisheries Agreements for 2020 and Fishing in Accordance with the Agreements in 2018 and 2019'), Ministry of Industry, Trade and Fisheries, Norway, 2020.

Report from the Parallel Review of the Barents Sea Fisheries by the Norwegian and Russian Auditor Generals (Document No. 3:2 (2007–2008) from the Norwegian Auditor General), Office of the Auditor General of Norway, 2008.

Riksrevisjonens oppfølging av parallellrevisjonen medDen russiske føderasjons riksrevisjon om forvaltningen av fiskeressursene i Barentshavet og Norskehavet, Dokument 3:8 (2010–2011) ('The Office of the Auditor General's Follow-up of the Parallel Audit with the Office of the Auditor General of the Russian Federation relating to the Management of Fish Resources in the Barents Sea and Norwegian Sea, Document 3:8 (2010–2011)'), Office of the Auditor General of Norway, 2011.

Riksrevisjonens undersøkelse av fiskeriforvaltningen i Nordsjøen og Skagerrak, Dokument 3:9 (2016–2017) (The Office of the Auditor General's Investigation of the Fisheries Management in the North Sea and Skagerrak), Office of the Auditor General of Norway, 2017.

Draft scoring range and information gap indicator added at Announcement Comment Draft Report stage

Draft scoring range	**≥80**
Information gap indicator	**Information sufficient to score PI**

Overall Performance Indicator scores added from Client and Peer Review Draft Report stage

Overall Performance Indicator score	
Condition number (if relevant)	

8 Appendices

8.1 Assessment information

8.1.1 Small-scale fisheries

To help identify small-scale fisheries in the MSC program, the CAB should complete the table below for each Unit of Assessment (UoA). For situations where it is difficult to determine exact percentages, the CAB may use approximations, e.g. to the nearest 10%.

Information on the percentage of small-scale fisheries in the Norway Greenland halibut fishery will be determined at site visit.

Table 30 Small scale fisheries

Unit of Assessment (UoA)	Percentage of vessels with length <15m	Percentage of fishing activity completed within 12 nautical miles of shore
UoA 1 (trawlers)		
UoA 2 (longlines)		
UoA 3 (gillnets)		
UoA 4 (Danish seine)		

8.2 Evaluation processes and techniques

8.2.1 Site visits

The CAB shall include in the report:

- An itinerary of site visit activities with dates.
- A description of site visit activities, including any locations that were inspected.
- Names of individuals contacted.

Reference(s): FCP v2.2 Section 7.16

The ACDR was prepared as a desk -study based on public available information and input from the Client (Norges Fiskarlag). Site visits were scheduled to be held on January 2021.

The CPRDR/PCDR is prepared based on a site visit (city, country) on (date). Stakeholders were informed 30/60 days before the site visit and given the opportunity to provide information in advance. Information from the client and stakeholders was reviewed by the assessment team before the on-site meetings. In some cases, information was not available at the on-site meeting but was supplied within the cut-off date requirements in FCP v.2.2. ***Error! Reference source not found.****below provides details on who was met, and the topics discussed.*

8.2.2 Stakeholder participation

The CAB shall include in the report:

- Details of people interviewed: local residents, representatives of stakeholder organisations including contacts with any regional MSC representatives.
- A description of stakeholder engagement strategy and opportunities available.

Reference(s): FCP v2.2 Section 7.16

There was no stakeholder participation for the ACDR.

Thirty/sixty days prior to the site visit, all stakeholders were informed of the visit and the opportunity to provide advance information to the auditors or to meet with the team during the site visit. DNV received no request for participation at the site visit, and no written submissions regarding the (fishery name) fishery.

The participants present at the different stakeholder meetings in (city, country) on the (date) are given in the table above.

8.2.3 Evaluation techniques

At Announcement Comment Draft report stage, if the use of the RBF is triggered for this assessment, the CAB shall include in the report:

- The plan for RBF activities that the team will undertake at the site visit.
- The justification for using the RBF, which can be copied from previous RBF announcements, and stakeholder comments on its use.
- The RBF stakeholder consultation strategy to ensure effective participation from a range of stakeholders including any participatory tools used.
- The full list of activities and components to be discussed or evaluated in the assessment.

At Client Draft Report stage, if the RBF was used for this assessment, the CAB shall include in the report:
- A summary of the information obtained from the stakeholder meetings including the range of opinions.
- The full list of activities and components that have been discussed or evaluated in the assessment, regardless of the final risk-based outcome.

The stakeholder input should be reported in the stakeholder input appendix and incorporated in the rationales directly in the scoring tables.

Reference(s): FCP v2.2 Section 7.16, FCP v2.2 Annex PF Section PF2.1

The ACDR was based on a desk-top study with information from the client on request, and the client document checklist.

Information on the assessment/reassessment/scope extension process was made publicly available through www.msc.org at given stages of the assessment. DNV published the assessment/ reassessment/scope extension announcement along with the Announcement Comment Draft report on (date). These were published on the MSC website and followed by stakeholder notifications by direct emails.

In addition, all relevant stakeholders identified at the beginning of the (original) assessment were reached through direct e-mails and given a possibility to monitor the assessment process and provide feedback to the assessment team. Relevant main stakeholders were interviewed on (date) as outlined in sections 8.2.1 and 8.2.2 above.

Information gathered is presented in this report and in the enclosed scoring tables. As no stakeholder comments were submitted during the stakeholder consultancy period prior to the site visit in (city, country), information gathered during the site visits formed the main basis of the stakeholder consultancy for this assessment.
The interviews were based on audit agenda sent to all involved stakeholders.
(At these meetings, it was confirmed that the fishery has developed as in previous years and that there were no changes in the management, control and enforcement of the fishery.)

The default assessment tree from the MSC Fisheries standard v 2.01 Annex SA was used for the scoring of this assessment.

Information was reviewed by the assessment team at the scoring meetings held on (date), in (city, country). The team finalised scoring through TEAMS meetings on the (date) as well as by email communication.

After all relevant information was compiled and analysed, the assessment team scored the Unit of Assessment against the Performance Indicator Scoring Guideposts (PISGs) in the final tree. The team discussed evidence together, weighed up the balance of evidence and used their judgement to agree on a final score following MSC FCP v2.2 process and based on consensus. Each scoring issue was scored and then averaged to principle scores. Individual Performance indicators were scored. Scores for individual PIs were assigned in increments of five points. Any divisions of less than five points were justified in the relevant scoring table. Scores for each of the three Principles were reported to the nearest one decimal.

Some scoring issues do not have a scoring guidepost at each of the 60, 80 and 100 levels. The scoring issues and scoring guideposts are cumulative; this means that a PI is scored first at the SG60 levels. If not all of the SG scoring issues meet the 60 requirements, the fishery fails, and no further scoring occurs.
If all of the SG60 scoring issues are met, the fishery meets the 60 level, and the scoring moves to SG80 scoring issues. If no scoring issues meet the requirements at the SG80 level, the fishery receives a score of 60. As the fishery meets increasing numbers of SG80 scoring issues, the score increases above 60 in proportion to the number of scoring issues met; PI scoring occurs at 5-point intervals. If the fishery meets half the scoring issues at the 80 level, the PI would score 70; if it meets a quarter, then it would score 65; and it would score 75 by meeting three-quarters of the scoring issues. If the fishery meets all of the SG80 scoring issues, the scoring moves to the SG100 level. Scoring at the SG100 level follows the same pattern as for SG80.

MSC do not require the SG100s to be assessed (or rationales provided) when all of the scoring issues within the SG80 level are not met, as per FCP v2.2 §7.17.7.4, except in cases where obtaining a combined scoring element PI score require it (7.10.7). However, if the assessment team judge that it would be useful to assess the SG100s they may do so – ref. interpretation log https://mscportal.force.com/interpret/s/article/Scoring-SG100-if-not-all-SG80-met-7-10-5-3-1527262010218
The assessment has followed the interpretation log and scored all SG100s.

The final scores are based on group consensus within the assessment team. During the scoring process the assessment team discussed the information available for evaluating PIs with the intention to develop a broad opinion of performance of the fishery against each PI thus assuring that the assessment team was aware of the issues for each PI. Subsequently, the assessment team member responsible for each principle discussed the relevant scoring tables and provided provisional scores. The assessment team members reviewed the rationales and scores, and recommended modifications as necessary, including possible changes in scores. PI scores were entered into MSC's Fishery Assessment Scoring Worksheet (Table xx) to arrive at Principle-level scores.

The assessment team recommends the reassessment certification as the weighted average score is 80 or more for all the three Principles and all individual scoring issues are met at the SG60 level.

Conditions are set where the fishery fails to achieve a score of 80 to any Performance Indicators. Conditions with milestones are set to result in improved performance to at least the 80 level within a period set by the assessment team. The client is required to provide a client action plan to be accepted by the assessment team and may use MSC Client Action Plan template v1.0. The client action plan shall detail:
- how conditions and milestones will be addressed
- who will address the conditions
- the specified time- period within which the conditions and milestones will be addressed
- how the action(s) is expected to improve the performance of the UoA
- how the CAB will assess outcomes and milestones in each subsequent surveillance or assessment
- how progress to meeting conditions will be shown to CABs.

Principle scores result from averaging the scores within each component, and then from averaging the component scores within each Principle. If a Principle averages less than 80, the fishery fails.

Based on the evaluation of the fishery presented in this report the assessment team recommends the certification of the (fishery name), with xx conditions and xx recommendations, for the client xxx.

8.3 Peer Review reports

To be drafted at Public Comment Draft Report stage

The CAB shall include in the report unattributed reports of the Peer Reviewers in full using the relevant templates.
The CAB shall include in the report explicit responses of the team that include:

- Identification of specifically what (if any) changes to scoring, rationales, or conditions have been made; and,
- A substantiated justification for not making changes where Peer Reviewers suggest changes, but the team disagrees.

Reference(s): FCP v2.2 Section 7.14

8.3.1 Peer Reviewer A:

8.3.2 Peer Reviewer B:

8.4 Stakeholder input

To be drafted at Client and Peer Review Draft Report stage

The CAB shall use the ‘MSC Template for Stakeholder Input into Fishery Assessments’ to include all written stakeholder input during the stakeholder input opportunities (Announcement Comment Draft Report, site visit and Public Comment Draft Report). Using the ‘MSC Template for Stakeholder Input into Fishery Assessments’, the team shall respond to all written stakeholder input identifying what changes to scoring, rationales and conditions have been made in response, where the changes have been made, and assigning a ‘CAB response code’.

The ‘MSC Template for Stakeholder Input into Fishery Assessments’ shall also be used to provide a summary of verbal submissions received during the site visit likely to cause a material difference to the outcome of the assessment. Using the ‘MSC Template for Stakeholder Input into Fishery Assessments’ the team shall respond to the summary of verbal submissions identifying what changes to scoring, rationales and conditions have been made in response, where the changes have been made, and assigning a ‘CAB response code’.

Reference(s): FCP v2.2 Sections 7.15, 7.20.5 and 7.22.3

8.5 Conditions – delete if not applicable

8.5.1 Conditions – delete if not applicable

To be drafted at Client and Peer Review Draft Report stage

The CAB shall document in the report all conditions in separate tables.

Reference(s): FCP v2.2 Section 7.18, 7.30.5 and 7.30.6

Table X – Condition 1	
Performance Indicator	
Score	*State score for Performance Indicator.*
Justification	*Cross reference to page number containing scoring template table or copy justification text here.*
Condition	*State condition.*
Condition deadline	*State deadline for the condition.* - *activity (initial assessment/reassessment/scope extension/Surveillance 1/2/3/4* - *date (month and year without day is acceptable) (Start date is publication of PCR)*
Exceptional circumstances ☐	*Check the box if exceptional circumstances apply and condition deadline is longer than the period of certification (FCP v2.2 7.18.1.6). Provide a justification.*
Milestones	*State milestones and resulting scores where applicable.*
Verification with other entities	*Include details of any verification required to meet requirements in FCP v2.2 7.19.8.*
Complete the following rows for reassessments.	
Carried over condition ☐	*Check the box if the condition is being carried over from a previous certificate and include a justification for carrying over the condition (FCP v2.2 7.30.5.1.a).* *Include a justification that progress against the condition and milestones is adequate (FCP v2.2 7.30.5.2). The CAB shall base its justification on information from the reassessment site visit.*
Related condition ☐	*Check the box if the condition relates to a previous condition that was closed during a previous certification period but where a new condition on the same Performance Indicator or Scoring Issue is set.* *Include a justification – why is a related condition being raised? (FCP v2.2 7.30.6 & G7.30.6).*
Condition rewritten ☐	*Check the box if the condition has been rewritten. Include a justification (FCP v2.2 7.30.5.3).*

8.6 Client Action Plan

To be drafted at Public Comment Draft Report stage

The CAB shall include in the report the Client Action Plan from the fishery client to address conditions.

Reference(s): FCP v2.2 Section 7.19

8.7 Surveillance

To be drafted at Client and Peer Review Draft Report stage

The CAB shall include in the report the program for surveillance, timing of surveillance audits and a supporting justification.

Reference(s): FCP v2.2 Section 7.28

Table X – Fishery surveillance program

Surveillance level	Year 1	Year 2	Year 3	Year 4
e.g. Level 5	e.g. On-site surveillance audit	e.g. On-site surveillance audit	e.g. On-site surveillance audit	e.g. On-site surveillance audit & re-certification site visit

Table X – Timing of surveillance audit

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
e.g. 1	e.g. May 2018	e.g. July 2018	e.g. Scientific advice to be released in June 2018, proposal to postpone audit to include findings of scientific advice

Table X – Surveillance level justification

Year	Surveillance activity	Number of auditors	Rationale
e.g.3	e.g. On-site audit	e.g. 1 auditor on-site with remote support from 1 auditor	e.g. From client action plan it can be deduced that information needed to verify progress towards conditions 1.2.1, 2.2.3 and 3.2.3 can be provided remotely in year 3. Considering that milestones indicate that most conditions will be closed out in year 3, the CAB proposes to have an on-site audit with 1 auditor on-site with remote support – this is to ensure that all information is collected and because the information can be provided remotely.

8.8 Risk-Based Framework outputs – delete if not applicable

To be drafted at Client and Peer Review Draft Report stage

8.8.1 Consequence Analysis (CA)

The CAB shall complete the Consequence Analysis (CA) table below for each data-deficient species under PI 1.1.1, including rationales for scoring each of the CA attributes.

Reference(s): FCP v2.2 Annex PF Section PF3

Table X – CA scoring template			
Principle 1: Stock status outcome	Scoring element	Consequence subcomponents	Consequence score
		Population size	
		Reproductive capacity	
		Age/size/sex structure	
		Geographic range	
Rationale for most vulnerable subcomponent			
Rationale for consequence score			

8.8.2 Productivity Susceptibility Analysis (PSA)

The CAB shall include in the report an MSC Productivity Susceptibility Analysis (PSA) worksheet for each Performance Indicator where the PSA is used and one PSA rationale table for each data-deficient species identified, subject to FCP v2.2 Section PF4. If species are grouped together, the CAB shall list all species and group them indicating which are most at-risk.

Reference(s): FCP v2.2 Annex PF Section PF4

Table X – PSA productivity and susceptibility attributes and scores		
Performance Indicator		
Productivity		
Scoring element (species)		
Attribute	Rationale	Score
Average age at maturity		**1 / 2 / 3**
Average maximum age		**1 / 2 / 3**
Fecundity		**1 / 2 / 3**
Average maximum size Not scored for invertebrates		**1 / 2 / 3**
Average size at maturity Not scored for invertebrates		**1 / 2 / 3**
Reproductive strategy		**1 / 2 / 3**
Trophic level		**1 / 2 / 3**
Density dependence Invertebrates only		**1 / 2 / 3**
Susceptibility		
Fishery Only where the scoring element is scored cumulatively	*Insert list of fisheries impacting the given scoring element (FCP v2.2 Annex PF 7.4.10)*	
Attribute	Rationale	Score
Areal Overlap	*Insert attribute rationale. Note specific requirements in FCP v2.2 Annex PF4.4.6.b, where the impacts of fisheries other than the UoA are taken into account*	**1 / 2 / 3**
Encounterability	*Insert attribute rationale. Note specific requirements in FCP v2.2 Annex PF4.4.6.b, where the impacts of fisheries other than the UoA are taken into account*	**1 / 2 / 3**
Selectivity of gear type		**1 / 2 / 3**

Post capture mortality		**1 / 2 / 3**
Catch (weight) Only where the scoring element is scored cumulatively	*Insert weights or proportions of fisheries impacting the given scoring element (FCP v2.2 Annex PF4.4.4)*	**1 / 2 / 3**

Table X – Species grouped by similar taxonomies (if FCP v2.2 Annex PF4.1.5 is used)

Species scientific name	Species common name (if known)	Taxonomic grouping	Most at-risk in group?
e.g. Genus species subspecies		Indicate the group that this species belongs to, e.g. *Scombridae, Soleidae, Serranidae, Merluccius spp.*	Yes / No

8.8.3 Consequence Spatial Analysis (CSA)

The CAB shall complete the Consequence Spatial Analysis (CSA) table below for PI 2.4.1, if used, including rationales for scoring each of the CSA attributes.

Reference(s): FCP v2.2 Annex PF Section PF7

Table X – CSA rationale table for PI 2.4.1 Habitats		
Consequence	Rationale	Score
Regeneration of biota		**1 / 2 / 3**
Natural disturbance		**1 / 2 / 3**
Removability of biota		**1 / 2 / 3**
Removability of substratum		**1 / 2 / 3**
Substratum hardness		**1 / 2 / 3**
Substratum ruggedness		**1 / 2 / 3**
Seabed slope		**1 / 2 / 3**
Spatial	Rationale	Score
Gear footprint		**1 / 2 / 3**
Spatial overlap		**1 / 2 / 3**
Encounterability		**1 / 2 / 3**

8.8.4 Scale Intensity Consequence Analysis (SICA)

The CAB shall complete the Scale Intensity Consequence Analysis (SICA) table below for PI 2.5.1, if used, including rationales for scoring each of the SICA attributes.

Reference(s): FCP v2.2 Annex PF Section PF8

Table X – SICA scoring template for PI 2.5.1 Ecosystem

	Spatial scale of fishing activity	Temporal scale of fishing activity	Intensity of fishing activity	Relevant subcomponents	Consequence Score
Performance Indicator PI 2.5.1 Ecosystem outcome				Species composition	
				Functional group composition	
				Distribution of the community	
				Trophic size/structure	
Rationale for spatial scale of fishing activity					
Rationale for temporal scale of fishing activity					
Rationale for intensity of fishing activity					
Rationale for consequence score					

8.9 Harmonised fishery assessments

There is only one other Greenlandic fishery MSC certified taking place in the Barents Sea fishing grounds. This is the Russia Barents Sea Greenland halibut fishery.

Table 31 Overlapping fisheries

Fishery name	Certification status and date	Area	Assessment tree	Performance Indicators to harmonise
Russia Barents Sea Greenland Halibut Fishery	Certified	27 (Atlantic, Northeast)	Default	P1

Harmonisation process is defined by the Fisheries Certification Process v2.1 and the MSC's Interpretation log. The overlapping fisheries have been identified as fisheries operating within FAO area 27 ICES Subareas 1 and 2. Only MSC fisheries using the same version of the assessment tree (MSC Fisheries Standard v. 2.01 – Annex SA) should be harmonised, as required by FCP v2.1 Annex PB § 1.2.1).

Specifically, MSC interpretation (see https://mscportal.force.com/interpret/s/article/What-are-the-MSC-requirements-on-harmonisation-multiple-questions-1527586957701) describes which (and how) PIs should be harmonised for a fishery under assessment. According to the interpretation, the intent is that harmonisation is needed in fisheries that are effectively assessing the same thing.

- FCR v2.0 guidance section GPB3 confirms that harmonisation should always be conducted for Principle 1 where the same fish stock/s is/are scored in the overlapping fisheries (which is not the case for the present UoA).
- Harmonisation may also sometimes be needed in the case of Principle 2. Species which are taken by two or more UoAs should, however, still be partially harmonised, to ensure consistent interpretation on whether the species are above or below the point of recruitment impairment (PRI) or any biologically based limits (BBLs), or any relevant national or international limits, in PIs 2.1.1, 2.2.1 and 2.3.1 respectively (first part of scoring issue a in each of these PIs). Scoring should also be harmonised for the cumulative outcome requirements of the same scoring issues, found at the SG80 level in each case, so long as the species is main in both cases (see FCR v2.0 GPB3). These considerations are required wherever the two UoAs have some P2 species in common even where the P1 species/stocks are different. Harmonisation is not required for two different UoAs for those clauses that refer only to the impact of the specific UoA (e.g. scoring issue 2.1.1b, all of PIs 2.1.2, 2.1.3 etc).
- Harmonisation should also be considered in the case of any overlapping parts of Principle 3, such as "governance and policy" component of Principle 3, for fisheries under the same overall management framework.

A summary of the harmonisation requirements for overlapping fisheries is given below. No harmonisation is required for P2 PIs and SIs that are not listed in the table below:

Table 32 Harmonization requirements

PIs / SIs	Harmonise?	Comments
All P1 PIs	Yes	P1 always considers the impacts of all fisheries on a stock, so any fisheries which have the same P1 species (stocks) should be harmonised.
PI 2.1.1a	Partially	For stocks that are 'main' in both UoAs, harmonise status relative to PRI (at SG60, 80 and 100), and if below PRI, harmonise cumulative impacts at SG80 (not at SG60).
PI 2.2.1a	Partially	For stocks that are 'main' in both UoAs, harmonise status relative to BBL (at SG60, 80 and 100), and if below BBL, harmonise cumulative impacts at SG80 (not at SG60).
PI 2.3.1a	Partially	Harmonise recognition of any limits applicable to both UoAs (at SG60, 80 and 100), and cumulative effects of the UoAs at SG80 and SG100 (not at SG60).
PI 2.4.1b	Partially	Harmonise recognition of VMEs where both UoAs operate in the same 'managed area/s' (as in SA3.13.5).
PI 2.4.2a,c	Partially	Harmonise scoring at SG100, since all fishery impacts are considered (not at SG60 or 80).
All P2 PIs	Yes, if ->	Two UoAs are identical in scope, even if the UoCs are different (e.g. separate clients).
PIs 3.1.1-3	Yes, if ->	Both UoAs are part of the same larger fishery or fleet, or have stocks in either P1 or P2 which are at least partially managed by the same jurisdiction/s (nation states, RFMOs or others) or under the same agreements. Harmonisation may sometimes be possible for those management arrangements that apply to both UoAs (noting the limitations accepted in GPB3).
PIs 3.2.1-4	Yes, if ->	Both UoAs have stocks within either P1 or P2 which are at least partially managed by the same jurisdiction/s (nation states, RFMOs or others) or under the same agreements. Harmonisation is needed for those management arrangements that apply to both UoAs, e.g. at the RFMO level but not the national level in the case of two separate national fleets both fishing the same regional stock.

Harmonisation of the Greenland halibut redfish fishery was done as desk review of relevant fishery reports and agreed scoring process within the Norwegian and Barents Seas.

Principle 1: The Russian Barents Sea Greenland halibut fishery has been considered in the harmonization process for the Norway Greenland halibut fishery.

Table 33 Scoring differences for Principle 1 PIs.

Performance Indicators (PIs)	Norway Greenland halibut fishery (ACDR)	Russia Barents Sea Greenland Halibut Fishery
PI 1.1.1	>80	**80**
PI 1.2.1	60 – 79	**75**
PI 1.2.2	60 – 79	**65**
PI 1.2.3	>80	**90**
PI 1.2.4	>80	**90**

There are however several MSC fisheries targeting other species in the Norwegian and Barents Seas, such as beaked redfish, cod, haddock or saithe. Some of the PIs under Principle 2 and Principle 3 can be harmonized with results in overlapping fisheries, especially for those taking place only in Norwegian waters.

Principle 2: Direct harmonization would only be possible with Norwegian fisheries operating the same fishing grounds. The Norwegian beaked redfish, NEA cod, haddock and saithe fisheries operate in the same fishing grounds (Norwegian Sea under Norwegian jurisdiction) but also Barents Sea grounds under Russian jurisdiction, Therefore, direct harmonization can´t be conducted regardless of much of the information related to management and information background is very similar and information of overlapping fisheries has been taken into account when scoring management and information PIs.

All fisheries operating in the Norwegian EEZ (within FAO 27 subareas 1 & 2) were reviewed to identify any overlap in ETP species interaction and identification of VMEs. These are harmonization requirements for Principle 2 PIs:

- PI 2.3.1 (a) DNV is required to harmonise recognition of any limits set for ETP species as with those evaluated under the assessments of Norway NEA cod offshore fishery and Norway NEA haddock offshore fishery.
- PI 2.4.1 (a,b) DNV is required to harmonise the recognition of VMEs when operating in the same managed area as with those evaluated under the assessments of Norway NEA cod offshore fishery and Norway NEA haddock offshore fishery.

Principle 3: The fishery is harmonised with overlapping Norwegian fisheries targeting beaked redfish, NEA cod offshore fishery, Norway NEA haddock offshore fishery and Norway NEA saithe fishery. There is very little difference between the relevant fisheries. Evaluations are consistent in relation to scoring.

- PIs 3.1.1, 3.1.2 and 3.1.3 are harmonised.

Table 34 Overlapping fisheries

Fishery name	*Certification status and date*	*Status*	*Assessment tree*	*FAO Area*	*ICES area*	*Gear*	*Performance Indicators to harmonise*
Norway beaked redfish fishery	*In assessment*	*In assessment*	*FS v2.01 Annex SA*	*27*	*I & II*	*Trawl*	*PI 2.3.1.a & PI 2.4.1.b PI 3.1.1, 3.1.2 & 3.1.3*
Norway NEA haddock offshore (>12nm) fishery	*Certified 26.04.2010 DNV GL*	*Surveillance 1*	*FS v2.01 Annex SA*	*27*	*I & II*	*Trawl, longline, gillnet, Danish seine, hook & line*	*PI 2.3.1.a & PI 2.4.1.b PI 3.1.1; 3.1.2 & 3.1.3*
Norway NEA cod offshore (>12nm) fishery	*Certified 26.04.2010 DNV GL*	*Surveillance 1*	*FS v2.01 Annex SA*	*27*	*I & II*	*Trawl, longline, gillnet, Danish seine, hook & line*	*PI 2.3.1.a & PI 2.4.1.b PI 3.1.1; 3.1.2 & 3.1.3*
Norway North East Arctic saithe fishery	*Certified 16.06.2008 DNV GL*	*N/A*	*CR v 1.3*	*27*	*I & II*	*Bottom trawls, Gillnets and Entangling Nets - Gillnets, Hooks and Lines, Seine Nets - Boat or vessel seines - Danish seines, Surrounding Nets - With purse lines (purse seines),*	*NA*
AGARBA Spain Barents Sea cod	*Certified 28.11.2013 Bureau Veritas Certification*	*Surveillance 1*	*FCR v 2.0 Annex SA*	*27*	*I & II*	*Bottom trawl*	*PI 2.3.1.a & PI 2.4.1.b PI 3.1.1; 3.1.2 & 3.1.3*

Table 35 Scoring differences – Principle 2 PI 2.4.1.b: Identification of VMEs identified in the FAO 27 subdivision 1 & 2 area.

Performance Indicators (PIs)	Cold water Corals - Lophelia reefs & Solenosmilia variabilis reef	Coral Gardens - hard and soft	Sponges	Seapens	Burrowing Megafauna
Norway Greenland halibut	Yes	Yes	Yes	Yes	No
Norway beaked redfish	Yes	Yes	Yes	Yes	No
Norway North East Arctic haddock	Yes	Yes	Yes	Yes	No
Norway North East Arctic Cod	Yes	Yes	Yes	Yes	No
AGARBA Spain Barents Sea cod	Yes	Yes	Yes	Yes	No

Table 36 Scoring differences Principle 3

Performance Indicators (PIs)	Norway Greenland halibut fishery	Norway beaked redfish fishery	Norway NEA haddock offshore (>12nm)	Norway NEA cod offshore (>12nm)	Norway North East Arctic cold water prawn
PI 3.1.1	>80	>80	95	95	95
PI 3.1.2	>80	>80	100	100	85
PI 3.1.3	>80	>80	100	100	100

Table X – Overlapping fisheries	
Supporting information	
- Describe any background or supporting information relevant to the harmonisation activities, processes and outcomes.	
Was either FCP v2.2 Annex PB1.3.3.4 or PB1.3.4.5 applied when harmonising?	**Yes / No**
Date of harmonisation meeting	**DD / MM / YY**
If applicable, describe the meeting outcome	
- e.g. Agreement found among teams or lowest score adopted.	

Table X – Rationale for scoring differences
If applicable, explain and justify any difference in scoring and rationale for the relevant Performance Indicators (FCP v2.2 Annex PB1.3.6).
If exceptional circumstances apply, outline the situation and whether there is agreement between or among teams on this determination.

8.10 Objection Procedure – delete if not applicable

To be added at Public Certification Report stage

The CAB shall include in the report all written decisions arising from the Objection Procedure.

Reference(s): MSC Disputes Process v1.0, FCP v2.2 Annex PD Objection Procedure

8.11 Client Agreeement

8.12 References

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8.13 Vessel list (if applicable)

8.14 Landing sites (if applicable)

9 Template information and copyright

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