Vottunarstofan Tún ehf.
Sustainable Fisheries Scheme

Marine Stewardship Council Fisheries Assessment

ISF Iceland Lemon Sole Fishery

Public Comment Draft Report

Report on the 1st full assessment of the fishery

Conformity Assessment Body: **Vottunarstofan Tún ehf.**
Client: **Iceland Sustainable Fisheries ehf.**

October 2018

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Glossary

ASCOBANS	Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas
B_{lim}	Limit biomass reference point below which recruitment of stock is expected to be impaired
B_{loss}	A particular B_{lim} used by ICES based on the lowest past observed spawning stock biomass.
B_{MSY}	Biomass corresponding to the maximum sustainable yield (biological reference point); the peak value on a domed yield-per-recruit curve
$B_{trigger}$	The point when management intervention should be taken to avoid the stock falling below the limit reference point.
BIOICE	Benthic Invertebrates of Icelandic Waters programme
CAB	Conformity Assessment Body
CITES	The Convention on International Trade in Endangered Species of Wild Fauna and Flora
COC	Chain of Custody
CPUE	Catch per unit of effort
CR	MSC Certification Requirements
CV	Coefficient of Variation
DF	Directorate of Fisheries (Fiskistofa)
EEZ	Exclusive Economic Zone
ETP	Endangered, Threatened and Protected species
F	Fishing Mortality
FAO	Food and Agriculture Organization of the United Nations
FCR	MSC Fisheries Certification Requirements
GADGET	Globally applicable Area Disaggregated General Ecosystem Toolbox
GCR	Guidance to the MSC Certification Requirements
GT	Gross Tonnage
HCR	Harvest Control Rule
HR	Harvest ratio (Harvest rate)
IceAGE	Habitat mapping program by Iceland
ICES	International Council for the Exploration of the Seas
IPI stock	Inseparable or practically inseparable stocks
ISBF	Introduced Species Based Fisheries
ISF	Iceland Sustainable Fisheries ehf. (the Client)
ITQ	Individual Transferable Quota
IUCN	International Union for the Conservation of Nature

LRP	Limit Reference Point
LTL	LTL species: Low Trophic Level species
MFRI	Marine and Freshwater Research Institute (Hafrannsóknastofnun)
MII	Ministry of Industries and Innovation (Atvinnuvega- og nýsköpunarráðuneytið)
MRI	Marine Research Institute (Hafrannsóknastofnun)
MSC	Marine Stewardship Council
MSY	Maximum Sustainable Yield
NAFO	North Atlantic Fisheries Organisation
NAMMCO	North Atlantic Marine Mammal Commission
NASS	North Atlantic Sightings Surveys programme
NEAFC	North East Atlantic Fisheries Commission
NGO	Non-governmental organisation
nm	Nautical miles
NPFC	North Pacific Fisheries Commission
NWWG	ICES´s North-Western Working Group
OSPAR	OSPAR Convention for the Protection of the Marine Environment of the North-East Atlantic
PCR	Public Certification Report
PI	Performance Indicator
PRI	Point of recruitment impairment (stock reference point)
PSA	Product Susceptibility Analysis
RBF	Risk Based Framework
SG	Scoring Guidepost
SI	Scoring Issue
SICA	Scale Intensity Consequence Analysis
t	tonnes
TAC	Total Allowable Catch
TRP	Target Reference Point
VME	Vulnerable Marine Ecosystem
VMS	Vessel monitoring system

1. Executive Summary

1.1 Scope of the Assessment

This report presents the results of the assessment of lemon sole (*Microstomus kitt*) caught by bottom trawl, *Nephrops* trawl and Danish seine within the Icelandic Exclusive Economic Zone (EEZ), North-east Atlantic, and ICES division 5.a.2 against the Marine Stewardship Council's (MSC) Fisheries Standard.

The report provides an account of the process followed by the assessment team during the stages of information gathering and the scoring of the fishery against the MSC Fisheries Standard. The report provides a qualitative description of the fishery. The report is not intended to follow standard editing norm of scientific journals, but intends to address the needs of both fisheries specialists and other interested parties e.g. consumers and/or other stakeholders. The report contains all the sections of the *Full Assessment Reporting Template* v2.0 appropriate to this assessment.

1.2 Assessment Team Members and Secretary

The assessment was conducted by a team of the following experts:

- Dr. Giuseppe Scarcella: Team leader and expert responsible for Principle 1 issues;
- Dr. Fiona Nimmo: Expert assessor responsible for Principle 2 issues;
- Dr. Geir Hønneland: Expert assessor responsible for Principle 3 issues;

Mr. Gunnar Á. Gunnarsson served as an Assessment Secretary on behalf of Vottunarstofan Tún.

1.3 Outline of the Assessment

Full assessment of the ISF Iceland lemon sole fishery was initiated in February 2018 and covers three different fishing methods: bottom trawl, *Nephrops* trawl and Danish seine. Data used in the assessment was gathered by reviewing publicly available reports and scientific journals, and from interviews with representatives of the Client and several stakeholders. The assessment team met to score the fishery against MSC principles. Three conditions and three recommendations were raised and put to the Client who then submitted a plan of action to address those over the period of potential certification.

Preliminary Draft Report was submitted for Client review and subsequent to comments received a Peer Review Draft Report was issued in July 2018 and a Public Comment Draft Report in October 2018. The on-site component of the assessment was witnessed and the Preliminary Draft Report reviewed by the accreditation body ASI. The assessment team made some amendments to the report in response to ASI´s comments.

1.4 Main Strengths and Weaknesses of the Assessed Fishery

Strengths:

- There is a strong management system for the target species consisting of an annual assessment and TAC setting. The system is reviewed, well-justified based on good quality data and is demonstrably achieving its objectives.
- There is good enforcement and compliance with regulations. Monitoring and surveillance is relatively complete for the Icelandic fleets. There is a good system to evaluate and report on weaknesses.
- The fishing industry is well integrated into the management system and there is strong support for catch limitations and industry reporting contributes to effective enforcement.
- There is a high level of transparency throughout most of the management system. This is particularly apparent in the vessel monitoring and quota uptake systems that are available online in real-time.

Weaknesses:

Although single species management is very good, the Icelandic system is less strong on wider ecosystem management:

- Some species may be at risk of unsustainable fishing mortality, now or in the future.
- The Harvest Control Rules for lemon sole exploitation do not show remedial actions in the case of the stock being in a decreasing phase, due environmental factors and/or fishing pressures.
- The catches in the last 3 years are higher than the TAC, due to interspecifc and interannual vartiation of TAC.
- There is no local designation of ETP species.
- Although some vulnerable habitats such as several known deep-water *Lophelia* coral reefs are protected, there is a need to further address fishing impacts on habitats (in particular from bottom trawling on coral gardens, areas with deep-water sponge aggregations, and unprotected *Lophelia* reefs), by evaluating the need for implementing protective measures. Mapping of benthic habitats has recently been given new impetus, but will take a considerable time to complete.

1.5 Overall Conclusion

The ISF Iceland lemon sole fishery reaches the minimum aggregate score of 80 for each of the three Principles. The average weighted scores for each of the three Principles were as follows:

Principle		***Score***
Principle 1 – Target Species		82.5
Principle 2 – Ecosystem	UoA1: Bottom Trawl (TB)	85.0
	UoA2: Nephrops Trawl (TN)	85.3
	UoA3: Danish Seine (SD)	87.3
Principle 3 – Management System		89.4

1.6 Draft Determination, Conditions and Recommendations

The assessment team recommends that the bottom trawl, Nephrops trawl and Danish seine units of the ISF Iceland lemon sole fishery are granted certification against the MSC Fisheries Standard as a well-managed and sustainable fishery.

This draft determination is made, provided the following three conditions set are sufficiently addressed in a plan of action submitted by the Client (see also section 6 and Appendix 1.3). One of the conditions applies to the whole stock; two conditions apply to the bottom trawl unit; and one condition applies to the *Nephrops* trawl unit. Furthermore, three recommendations are made that apply to the whole fishery.

Condition 1 (PI 1.2.2)

A well-defined harvest control rule should be put in place that is consistent with the harvest strategy and defines how the exploitation rate will be reduced as the stock approaches the limit reference point. Evidence should be provided that the HCR is precautionary within 4 years.

Condition 2 (PI 2.4.1 – Bottom trawl)

By the fourth surveillance audit necessary conservation and management measures for all vulnerable marine habitats shall be in place and implemented, such that the trawl fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function.

This condition is harmonised with a condition applying to the ISF Iceland anglerfish fishery, ISF Iceland haddock fishery, ISF Iceland golden redfish, blue ling and tusk fishery, and the ISF Iceland saithe, ling, Atlantic wolfish and plaice fishery.

Condition 3 (PI 2.4.2 – Bottom trawl and Nephrops trawl)

By the fourth surveillance audit necessary conservation and management measures for deep-sea sponge aggregation and coral gardens shall be in place and implemented, such that there is a partial strategy in place and implemented for these habitat types specifically, ensuring that the bottom and Nephrops trawl fisheries do not cause serious or irreversible harm to habitat structure and function in Icelandic waters. This strategy will include, where necessary, appropriate formalised move-on measures to avoid interactions with ALL forms of VMEs.

With regard to the bottom trawl UoA, this condition is harmonised with that for ISF Iceland anglerfish fishery, ISF Iceland haddock fishery, ISF Iceland golden redfish, blue ling and tusk fishery, and the ISF Iceland saithe, ling, Atlantic wolfish and plaice fishery.

With regard to the Nephrops UoA, this condition is harmonised with that for ISF Iceland anglerfish fishery, the ISF Iceland cod fishery, and the ISF Greenland halibut fishery

Recommendation 1 (PI 2.2.3 Secondary species information)

The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals.

This recommendation applies to all gears. This recommendation is harmonised with that for ISF Iceland anglerfish fishery.

Recommendation 2 (PI 2.3.3 ETP species information)

The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabirds and marine mammals.

This recommendation applies to all gears. This recommendation is harmonised with recommendation 1 (applicable to secondary out-of-scope species).

Recommendation 3 (Traceability)

The team recommends that the client issues a reminder to all of the client members, as well as auctions, to observe the following:

- to ensure full segregation of catch of each species by gear in the event of more than one gear being applied during the same fishing trip;
- to ensure full segregation of catch of each species by management region, i.e. fish caught inside the Icelandic EEZ is kept separate, in the event where a vessel catches the same species on the same trip inside and outside the Icelandic EEZ – and –
- to observe and implement appropriate measures of packing and labelling certified products prior to moving them to sub-contracting cooler or freezer storages upon landing, to ensure client members´ responsibility for product integrity prior to sale or further handling.

This serves to harmonise the fishery with all other Tún certified Icelandic demersal fisheries, where the same recommendation is made.

2 Authorship and Peer Reviewers

2.1 Team Members

Dr Giuseppe Scarcella, Ph.D. , team leader. Primarily responsible for Principle 1 and RBF

Giuseppe Scarcella has Laurea 110/110 in Biology (2001) and PhD in Marine Biology and Ecology at the Università Politecnica delle Marche (2009) with Vincenzo Caputo. Contracted research scientist at the National Research Council since 2008. Project scientist in several research programs on artificial reefs and the impact of off-shore platforms. During the years of employment at CNR-ISMAR he has gained experience in benthic ecology, fish assemblages of artificial structures, fisheries ecology and impacts of fishing activities, stock assessment, otholith analysis, population dynamics. He has attended courses on uni- and multivariate statistics and participated in field activities, both scuba diving and aboard fishing and research vessels.

His work as a researcher for the National Research Council (CNR), Institute of Marine Sciences (ISMAR) of Ancona, as well as his academic experience at the Polytechnic University of Marche, have given him considerable international field knowledge. He is currently participating in expert meetings and working groups which are organized under the auspices of the EC's Directorate General for Maritime Affairs (DGMARE), STECF, ICES, GFCM, and the FAO regional projects MedSudMed, Adriamed and Eastmed. In addition, he is collaborating with numerous scientific institutions in the horizontal framework project MAREA (scientific advice for the implementation of the Common Fisheries Policy in the Mediterranean Sea), in the framework of EMODNETMedSea checkpoint (TENDER No. MARE/2012/11, Growth and innovation in ocean economy- Gaps and priorities in sea basin observation and data - LOT NO: 2 – THE MEDITERRANEAN) and other DGMARE tenders recently started. As a scientist at CNR-ISMAR, he is responsible for the sampling design and statistical analyses of numerous research activities. In particular, he has worked as a project scientist on several research programs on fishery activities in the Mediterranean and Black Sea, artificial structures and their impact on the marine environment. In the framework of such activities he has gained experience in stock assessment, management plans, benthic ecology, fish assemblages of artificial structures, analysis of stomach contents, fisheries ecology and the impacts of fishing activities. Moreover, during his employment at ISMAR-CNR he worked as part of a team of scientists operating within different fields of marine biology, including population dynamics, taxonomy and fisheries as well as with physical oceanographers and fisheries technologists. The application of EAF principles to fisheries management have been at the core of these collaborations.

Since the beginning of 2010 he has moved to Cyprus, where he is collaborating as consultant with the private sector (AP Marine Environmental Consultancy Ltd), working on DCF data collection, marine bio-invasions and the implementation of the Marine Strategy Framework Directive. This allowed him to extend his work experience on the eastern part of the Mediterranean and also to improve his skill in working in international/multicultural projects and environments.

Vottunarstofan Tún confirms that Giuseppe meets the fishery team member qualification and competency criteria specified in Annex PC2, Table PC2, in particular:

- has a university degree (Ph.D.) in fisheries science;
- has over five years´ experience in the fisheries sector related to the tasks under his responsibility; - has passed MSC team leader and team member training (MSC FCR v2.0);
- has undertaken 2 MSC fishery assessments or surveillance site visits as team member in the last 5 years.

Furthermore, Giuseppe has the qualifications and competencies required for serving as an assessor on Principle 1 issues as outlined in Annex PC3, Table PC3. Vottunarstofan Tún confirms that Giuseppe has no conflicts of interest in relation to the ISF Iceland lemon sole fishery.

Fiona Nimmo, team member. Primarily responsible for Principle 2

Fiona Nimmo is a Director with Poseidon Aquatic Resource Management Ltd and has over 12 years' experience in commercial fisheries, marine environmental and renewable energy consultancy. Fiona is a Principle 2 expert and assessor for the Marine Stewardship Council (MSC) certification scheme and has worked on full and preassessments in the UK, Denmark, Germany, Sweden, the Netherlands, and Spain and in the Asian region. She has worked on seven MSC full assessments as the Principle 2 expert and has also adopted Team Leader responsibilities for one of these assessments.

Fiona has completed a number MSC pre-assessments at various scales including at a district level for English Inshore Fisheries and Conservation Authorities, as part of Project Inshore; at national level for the Danish fleet across 33 species and 10 gear types; regional level for 2 species across the Bay of Bengal region (eight countries); as well as for single fisheries. Fiona was also involved in the Spanish Project Medfish, reviewing all Spanish fisheries in the Mediterranean and undertaking pre-assessments for a selection of fisheries. In addition, Fiona has completed numerous surveillance audits, both on-site and remotely, and has acted as a peer reviewer. Fiona has a keen knowledge on EU and UK policy in relation to fisheries and their management to protect environmental features and ecology. She has led independent studies investigating the benefits of MSC, including a recent value chain analysis of the Scottish haddock supply chain to determine quantitative and qualitative benefits of a fishery being MSC certified.

She undertook work for the Organisation for Economic Cooperation and Development (OECD) examining the global distribution and transmission of costs and benefits in different types of capture fisheries certification schemes, including the MSC. In other areas of expertise, Fiona leads Poseidon's work in the renewable energy market having project managed Environmental Impact Assessments (EIAs) for wind and tidal developments and undertaken numerous commercial fisheries impact assessments for offshore wind and tidal EIAs, feasibility and scoping studies. Projects involve extensive consultation with the industry, data gathering, analyzing and quantification to determine the impacts of proposed developments on the commercial fisheries sector.

Vottunarstofan Tún confirms that Fiona meets the fishery team member qualification and competency criteria specified in Annex PC2, Table PC2, in particular:

- has a university degree in marine biology;
- has over five years´ experience in the fisheries sector related to the tasks under her responsibility;
- has passed MSC team member training;
- has undertaken several MSC fishery assessment involving site visit as team member in the last 5 years.

Furthermore, Fiona has the qualifications and competencies required for serving as an assessor on Principle 2 as outlined in Annex PC3, Table PC3. Vottunarstofan Tún confirms that Fiona has no conflicts of interest in relation to the ISF Iceland lemon sole fishery.

Dr. Geir Hønneland, team member. Primarily responsible for Principle 3

Dr. Geir Hønneland is Director at the Fridtjof Nansen Institute in Oslo, Norway, and adjunct professor at the University of Tromsø, Norway. He holds a PhD in political science from the University of Oslo and has studied international fisheries management (with main emphasis on compliance issues), international environmental politics and international Arctic politics.

Among his recent books are Arctic Politics, the Law of the Sea and Russian Identity (Palgrave, 2014), Making Fishery Agreements Work (Edward Elgar, 2012), International Environmental Agreements (Routledge, 2011), Arctic Politics and International Cooperation (Routledge, 2007) and Law and Politics

in Ocean Governance: the UN Fish Stocks Agreement and Regional Fisheries Management Regimes (Martinus Nijhoff, 2006).

He worked in the Norwegian Coast Guard from 1988 to 1994, where he was certified as a fisheries inspector. Geir also has a wide range of evaluation and consultancy experience, e.g. for the FAO and OECD, relating to responsible fisheries management. He has been involved in MSC assessments since 2009 (covering cod, blue whiting, haddock, herring, mackerel and shrimp fisheries in the Northeast Atlantic and krill in the Southern Ocean) and was certified as MSC Team Leader in 2014.

Vottunarstofan Tún confirms that Geir meets the fishery team member qualification and competency criteria specified in Annex PC2, Table PC2, in particular:

- has a university degree in political science;
- has over five years´ experience in the fisheries sector related to the tasks under his responsibility;
- has passed MSC team member training;
- has undertaken several MSC fishery assessment involving site visit as team member in the last 5 years.

Furthermore, Geir has the qualifications and competencies required for serving as an assessor on Principle 3 as outlined in Annex PC3, Table PC3. Vottunarstofan Tún confirms that Geir has no conflicts of interest in relation to the ISF Iceland lemon sole fishery.

Other Special Qualifications Required for the Assessment

Current knowledge of the country, language and local fishery context

All the team members and its secretary are fluent in spoken and written English. Although not a native langage English is highly commonly spoken in Iceland, including by representatives of the fishery client and stakeholders. Application of English by the assessment team is not expected to present a problem of understanding. However, since such barriers cannot be excluded, Tún provides an observer secretary to the team with native (Icelandic) linguistic capacity. The local fishery context is well known to all the team members, Dr Scarcella and Dr Hønneland have recently conducted MSC assessments of Icelandic fisheries, and all of the team members have conducted MSC assessments of North East Atlantic fisheries.

Understanding of the Chain of Custody Standard

The Team Leader has completed MSC´s traceability training module.

Application of the Risk Based Framework

The Team Leader has completed MSC´s RBF training course for v2.0 of the FCR. RBF was announced but eventually not applied to the evaluation of this fishery.

2.2 Use of Risk Based Framework

The Risk Based Framework (RBF) was planned to be used in this assessment for the scoring of Performance Indicator 2.2.1 (Secondary species outcome) for the lemon sole fishery unit of assessment (UoA). However, having established the availability of catch statistics, the team decided to not use the RBF approach. Stakeholder notice of the eventual application of RBF was issued.

2.3 Peer Reviewers

The Peer Review College submitted a shortlist of potential peers to review the assessment report for this fishery. Of those listed the following two were selected to conduct the peer reviews.

Rob Blyth-Skyrme

Dr Blyth-Skyrme has worked in aquaculture and then in marine fisheries science, management and policy since 1996. Following his PhD which focussed on fisheries management and the environmental effects of fishing, he worked at the Eastern Sea Fisheries Joint Committee, the largest inshore fisheries management organization in England, where he became the Deputy Chief Fishery Officer. He then became a senior advisor to the UK Government on marine fisheries and environmental issues, leading a team dealing with fisheries policy, science and nationally significant fisheries and environmental casework. Rob now runs Ichthys Marine Ecological Consulting Ltd., a marine fisheries and environmental consultancy. As well as working for Government and industry on fisheries science and management issues, he has undertaken all facets of MSC work as a Lead Assessor, expert team member and peer reviewer across a wide range of fisheries.

Tom Jagielo

Mr Jagielo has a wide breadth of experience in marine fish science, habitat studies, and oceanography. He formed his own firm in 2008 to provide consulting services in quantitative fisheries science. Previously he served for 24 years with the Washington Department of Fish and Wildlife, and 6 years with the Fisheries Research Institute at the University of Washington in Seattle. He has specialized in groundfish stock assessment and survey design, adapting state of the art tools and methods to assess marine fish populations for sustainable fisheries management. He has produced groundfish stock assessments used by the Pacific Fishery Management Council, including analysis of lingcod, black rockfish, and yelloweye rockfish populations. Tom has experience working with government agencies, commercial and recreational fisheries groups, Native American tribes, community organizations, and both national and international advisory groups. He has received appointments to the Scientific and Statistical Committee of the Pacific Fishery Management Council, the Technical Subcommittee of the US-Canada Groundfish Committee, the Pacific Coast Ocean Observation System, and other workshop panels and review bodies. He has published in peer-reviewed journals and symposium proceedings, and has presented papers at national and international meetings. Tom received a B.S. degree in Biology from the Pennsylvania State University, and a M.S. degree in Fisheries from the University of Washington, where he also conducted post M.S. graduate studies in fisheries population dynamics and parameter estimation. In addition to serving as an MSC Surveillance Team Member/Auditor (variously as P1,P2, or P3 expert) for stocks in the US and Europe (e.g. sablefish, Pacific halibut, Icelandic lumpfish, golden redfish, and saithe), he has experience in providing MSC Peer Reviews on the West Coast-US (Pacific hake, Limited Entry groundfish), Alaska (BSAI/GOA Pacific cod, BSAI/GOA flatfish, BSAI/GOA pollock), and Australia (blue grenadier).

3 Description of the Fishery

3.1 Unit(s) of Assessment (UoA) and Proposed Scope of Certification

3.1.1 Units of Assessment and Proposed Units of Certification (UoC)

The assessment applies to all lemon sole (*Microstomus kitt*) caught by bottom trawl, *Nephrops* trawl and Danish Seine from the Icelandic stock (ICES Division 5.a) by vessels licenced to operate within the Icelandic EEZ. These fisheries operate within the same jurisdiction under the same management system and are subject to the same coherent controls and monitoring. Within the gear categories, the fisheries are homogeneous in operation and culture and supply to a common chain of custody, with all catches and landings in Iceland and abroad being monitored and recorded by the Directorate of Fisheries. Finally, the UoAs together form an almost complete set of commercial fisheries operating in the region so that cumulative impacts (e.g. combined impacts of MSC UoAs) need not be considered separately.

Table 3-1: Unit(s) of Assessment and proposed Unit(s) of Certification

Units of Assessment (3)	
Fish stock	Lemon sole (*Microstomus kitt*) in ICES subarea 5.a
Location of Fishery	FAO Statistical Area 27 / ICES 5.a; Icelandic Exclusive Economic Zone
Management	Ministry of Industries and Innovation
Fishing Methods	**UoA 1: Bottom Trawl (TB)**
	UoA 2: Nephrops Trawl (TN)
	UoA 3: Danish Seine (SD)
Fishery Practices	All registered Icelandic vessels that carry valid permits, issued by the Icelandic Directorate of Fisheries, for fishing within the Icelandic Exclusive Economic Zone.
Rationale for choosing the UoA	The Units of Assessment include all vessels, operating bottom trawl, *Nephrops* trawl and Danish seine in Icelandic waters.
Proposed Units of Certification (3)	
Fish stock	Lemon sole (*Microstomus kitt*) in ICES subarea 5.a
Location of Fishery	FAO Statistical Area 27 / ICES 5.a; Icelandic Exclusive Economic Zone
Management	Ministry of Industries and Innovation
Fishing Methods	**UoA 1: Bottom Trawl (TB)**
	UoA 2: Nephrops Trawl (TN)
	UoA 3: Danish Seine (SD)
Fishery Practices	All registered Icelandic vessels that carry valid permits, issued by the Icelandic Directorate of Fisheries, for fishing within the Icelandic Exclusive Economic Zone.
Eligible Fishers	Any new entry to the group of Icelandic registered vessels targeting the lemon sole stock and/or that are incidentally catching lemon sole in other MSC certified fisheries within Icelandic jurisdiction.

The UoAs are the same multispecies fisheries as other MSC certified fisheries, including the recently certified anglerfish, Icelandic cod, haddock, halibut, Greenland halibut, Atlantic wolffish, plaice, blue ling and tusk. In fact lemon sole is a by-catch species for the other UoAs under assessment (percentage of total catch in 2016: 32% bottom trawlers; 4% Nephrops trawlers and 64% Danish seine). As such it is clear that the UoAs have the same environmental impacts and are subject to the same management

system as other MSC certified fisheries which concern major target species such as cod. Although several out-of-scope species are affected by the fisheries (see section 3.4.6) there are no UoAs which have main catches that are considerable (i.e. more than 10% of total catch), and there are no national or international requirements set catch limits for the ETP species which were identified in the present assessment (see section 3.4.7).

The ISF Iceland lemon sole fishery is within the scope of the MSC standard. The CAB confirmed the following:

- The fishery does not target amphibians, birds, reptiles, or mammals and does not use poisons or explosives.
- The fishery is subject to Icelandic jurisdiction and is not conducted under a controversial unilateral exemption to an international agreement.
- No entity within the client group has been successfully prosecuted for violations against forced labour laws.
- There are mechanisms for resolving disputes through negotiation, the Directorate of Fisheries, the Ministry of Industries and Innovation, the Icelandic courts, and ultimately the Council of Europe court. Disputes are not common within the fishery.
- The fishery is neither an enhanced nor introduced species based fishery (ISBF) (see FCR 7.4.3 and 7.4.4).
- There are no inseparable or practically inseparable (IPI) species caught in the fishery.
- The CAB reviewed previous assessment and surveillance reports and other available information to determine the units of assessment required.
- The ISF Iceland lemon sole fishery has not failed an assessment within the last two years.
- The client has confirmed willingness to share its certificate.
- The fishery has elements overlapping with other certified fisheries within the Icelandic EEZ. These fisheries are ISF Iceland cod, haddock, ISF Iceland saithe and ling, ISF Iceland golden redfish, as well as Icelandic gillnet lumpfish and ISF Norwegian and Icelandic herring trawl and seine.

Statement of ISF´s Policy on Certificate Sharing Arrangements for the ISF Iceland lemon sole fishery

Iceland Sustainable Fisheries (ISF) ehf. confirms its willingness to share certificate for MSC certification of the ISF Iceland lemon sole fishery, including any further potential extension of the scope of that certificate. Lemon sole will be eligible for marketing with reference to the certificate, provided the fish is caught, supplied and/or sold to Iceland Sustainable Fisheries ehf, and/or its authenticated certificate sharers.

Any Icelandic holders of permits, issued by the Icelandic Directorate of Fisheries, for the fishing of lemon sole and/or processors and/or traders of this species of fish derived from the above fishery, are invited to apply to ISF ehf. for the sharing of the certificate and its potential scope extension.

Applicants will be eligible to enter into certificate sharing agreement with the ISF ehf. on the basis of:

a) Equitable sharing of internal and external costs incurred due to the assessment processes and
b) full compliance with the MSC Fisheries Standards and Certification Requirements, including any conditions and recommendations set for the certification and subsequent programs of corrective action to address such conditions and recommendations.

3.1.2 Final Units of Certification

(For completion in Final Report.)

3.1.3 Total Allowable Catch (TAC) and Catch Data

Table 3-2: TAC and Catch Data for Lemon sole.

TAC	*Year*	*2016/2017*	*Amount (tn)*	1087
UoA share of TAC	*Year*	*2016/2017*	*Amount (tn)*	1085.6
UoC share of total TAC	*Year*	*2016/2017*	*Amount (tn)*	1085.6
Total green weight catch by UoC	*Year (most recent)*	*2016/2017*	*Amount (tn)* *Bottom trawl:* *Nephrops trawl:* *Danish seine:*	 48 35 886
	Year (second most recent)	*2015/2016*	*Amount (tn)* *Bottom trawl:* *Nephrops trawl:* *Danish seine:*	 517 61 1143

3.2 Overview of the fishery

Lemon sole is taken as part of a multispecies demersal fishery. Demersal fisheries have a long history in Iceland, but mechanisation began with the first trawler in Iceland arriving in 1905, replacing the decked sailboats. During much of the 20th century, British and German vessels dominated the foreign demersal fisheries and Norwegian vessels the pelagic fisheries. However, most foreign fleets were excluded from Icelandic waters as the exclusive economic zone was extended from 4 miles in 1952 to 200 miles in 1975.

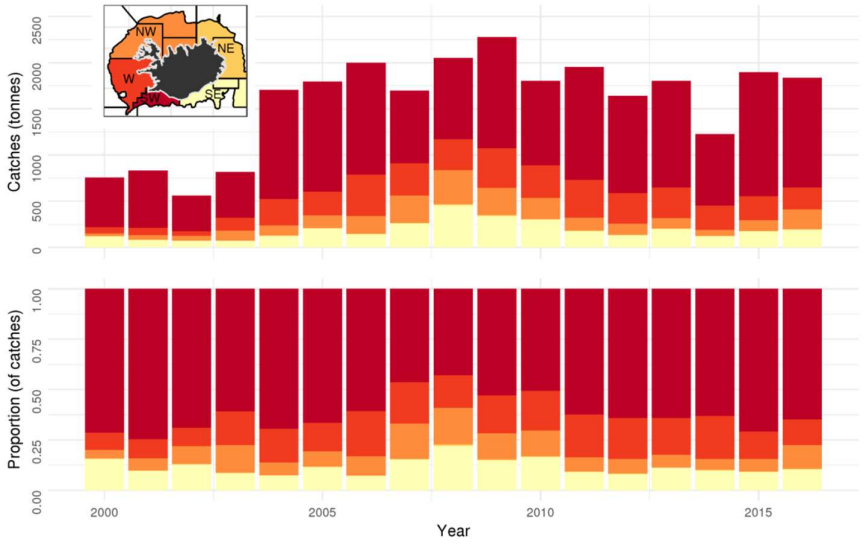


Figure 3-1. Spatial distribution of the Icelandic fishery by fishing area from 2000-2016 according to logbooks. All gears combined. Source: MFRI, 2016.

Total fishery catches (all commercial species) in Icelandic waters increased from roughly 200,000t prior to the First World War, to about 700,000t between the wars, to 1.5 million t after the Second World War. Catches then declined again primarily because of the collapse of the herring stocks. Production increased again in the late 1970s and has fluctuated between 1 and 2 million tonnes per year since. These fluctuations are explained by the volatile changes in the size of the capelin stock, which makes up roughly half of the total recent catch. Lemon sole catches are shown in table 3-2 and Figure 3-1.

Most vessels operate in mixed fisheries and fishing is generally seasonal, with vessels changing gear and targeting different stocks through a typical year as they try to catch their quotas. For example, purse seiners catch capelin during part of the year, herring in other seasons and sometimes trawl for shrimp during other parts of the year. Many of the smaller shrimp boats switch seasonally between Danish seine, gillnet, shrimp trawl and longline. Large trawlers may fish for cod or haddock in one season, Greenland halibut in another, redfish the third and then go for cod or shrimp in distant waters.

Lemon sole is mainly caught in demersal seine and bottom trawl, amounting to more than 95% of the landings in most years (Figure 1; Table 3-2). This proportion has been relatively stable through the years, with demersal seine taking more than half of the catches.

Table 3-3. Total number of vessels within each gear category in 2016. All vessels may vary operations and gears throughout the year.

Gear category	*Number of vessels*
Bottom trawl	71
Nephrops trawl	12
Danish seine	44

Since 2000, around 45-85 trawlers (demersal- and Nephrops trawlers) and 28-50 seiners have reported catches of lemon sole (1000 kg or more). Since 2000 the number of bottom trawlers has decreased but their numbers have remained stable since 2011, while the number of seiners have been decreasing over the entire period (Table 3-3).

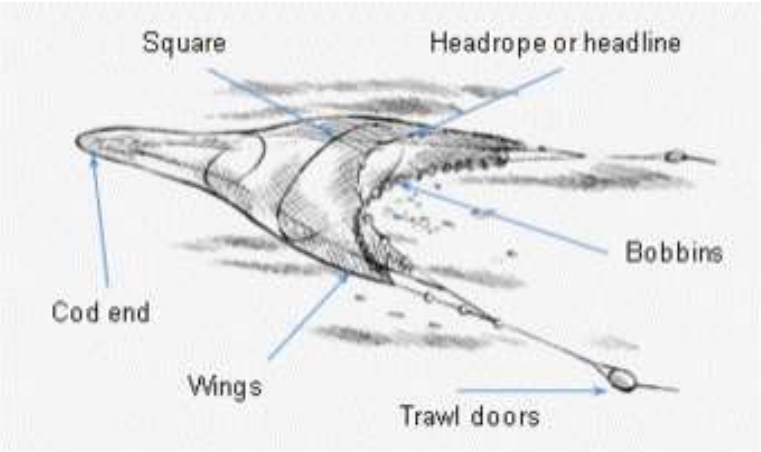


Figure 3-2. Sketch of a trawl.

Gear types

Trawls are funnel shaped bags of net that are dragged horizontally in the ocean. They are either bottom trawls or pelagic trawls (Fig. 3-2) and are further adapted to a type of fisheries, such as Nephrops trawls. In the groundfish fisheries, the minimum mesh size is 135 mm (Nephrops trawls have a smaller mesh of 79-99mm) and selectivity devices are required in some fishing areas.

Danish seine is only suitable for fishing on smooth sandy or muddy sea beds. It cannot be operated on hard rocky sea beds as the gear would get damaged too easily (Fig. 3-3). The gear consist of a lightly made net usually with only a footrope often called a 'grass rope'. This is fixed to the fishing line of the net in bights with two or three lead rings threaded on the bight. The lead rings and bight of soft rope are the only contact with the seabed, the actual net skimming a few inches above the seabed. The light contact of the rope bights on the seabed is enough to prevent the fish escaping underneath the footrope. The net is towed by long lengths of leaded rope that are laid on the seabed, these are towed over the seabed with a lot of tension in them therefore are very light on the seabed, just scuffing enough to create a light sand cloud to herd the fish into the net. The main seabed impact from anchor seine would be the deployment of the anchor on the seabed. Boats using Danish seine in Iceland ranges from 20 to 300 GT targeting cod, haddock and variety of flatfishes, e.g. plaice, dab, lemon sole and witch. It is important to stress that the net is not towed for long along the sea flor and the impact on the benthos would be limited in comparison with trawl activity.

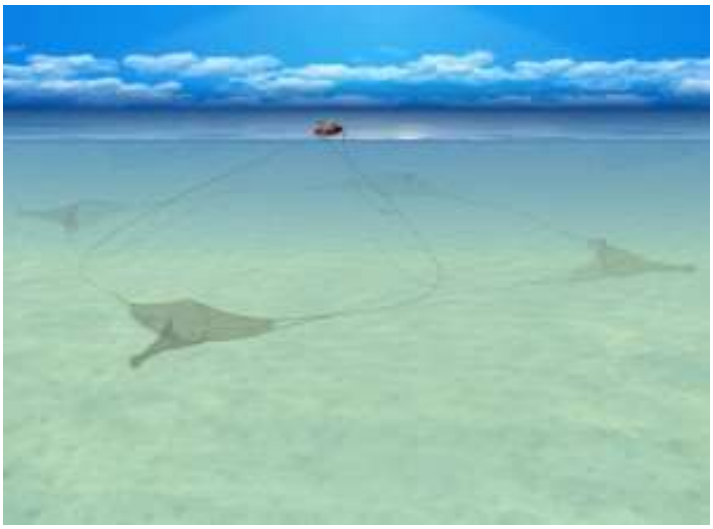


Figure 3-3. Sketch of a Danish Seine trawl.
Source: http://www.afma.gov.au/portfolio-item/danish-seine/

Location and season

The general fishing grounds for lemon sole are on the west and south coasts (Figure 3-4). Hardly any catch is recorded north and east of Iceland. No obvious changes are observed in the general distribution of the fishing grounds in recent years.

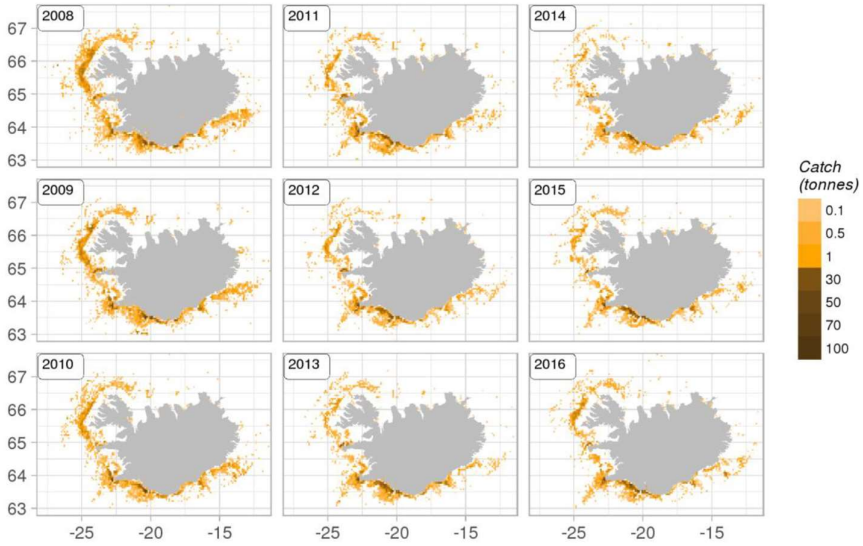


Figure 3-4. Geographical distribution of the Icelandic fishery since 2008. Reported catch from logbooks. Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

3.3 Principle One: Target Species Background

Most of the information utilized in the present chapter as well as in the Principles 1 scoring tables in Appendix 1.1 is sourced from MFRI technical report published in MFRI website for 2017 (hereafter: MFRI 2017; https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf)

3.3.1 The biology of lemon sole (*Microstomus kitt*)

Lemon sole is found all around Iceland, but the highest abundance and the main fishing grounds are off the West and Southwest coast. Lemon sole is a demersal and shallow water species, mainly found on a sandy or gravel substrate and occurring mostly at 20-200 m depths.

Females grow a little larger than males, only a small proportion of males become larger than 35 cm, whereas about the same proportion of females grows larger than 40 cm. Size at sexual maturity differs between the sexes. On the main spawning grounds off the south coast, about half of the males have reached maturity at the length of 13 cm, but females reach that level at 24 cm length.

Status of the stock

CPUE estimates of lemon sole in Icelandic waters are not considered representative of stock abundance as changes in fleet composition, technical improvements and differences in gear setup among other things have not been accounted for when estimating CPUE.

Non-standardized CPUE in demersal seine (kg/set) is calculated as the total weight in sets in which lemon sole was more than 10% of the catch. CPUE of lemon sole in demersal trawl has been slowly increasing since 2002. In the years 2000-2014, according to logbooks, lemon sole CPUE gradually increased from 200 to around 400 kg/set (Figure 3-5). In the years 2015 and 2016, however, the CPUE was 600 and 550 kg/set, respectively.

Total fishing effort for lemon sole in demersal seine is estimated as the number of sets where lemon sole was more than 10% of the total catch. The fishing effort fell to a low in 2002 and rose to a peak in 2004. After 2004 it has been decreasing more or less continuously. This is both due to the fact that fewer seiners are fishing and catch per unit effort is higher. For demersal trawl, fishing effort during the last 16 years was highest in 2006-2011 (Figure 3-5).

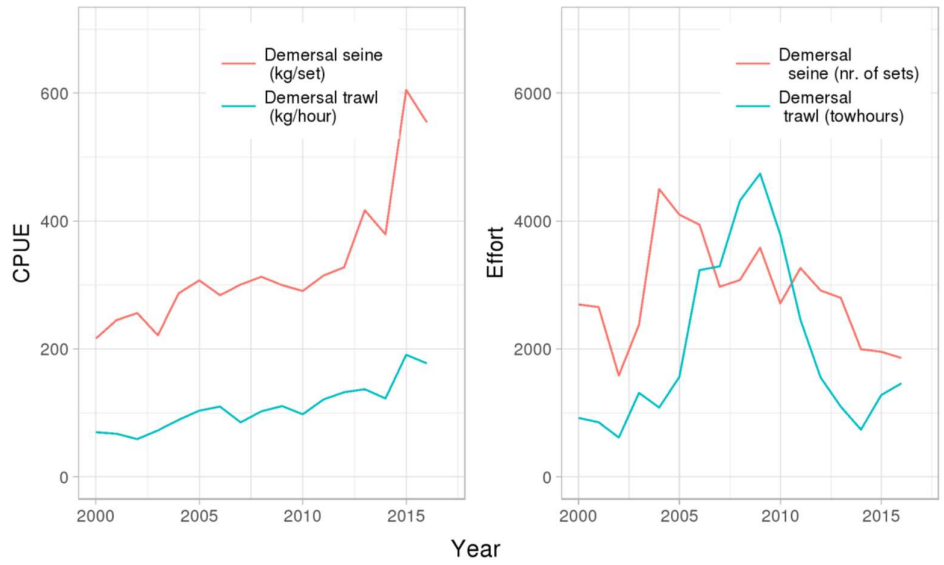


Figure 3-5. Lemon sole. Raw CPUE (left) and fishing effort (right) from demersal seine (kg/set or nr. of sets) (in red) and demersal trawl (kg/hour or towhours) (in blue). Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

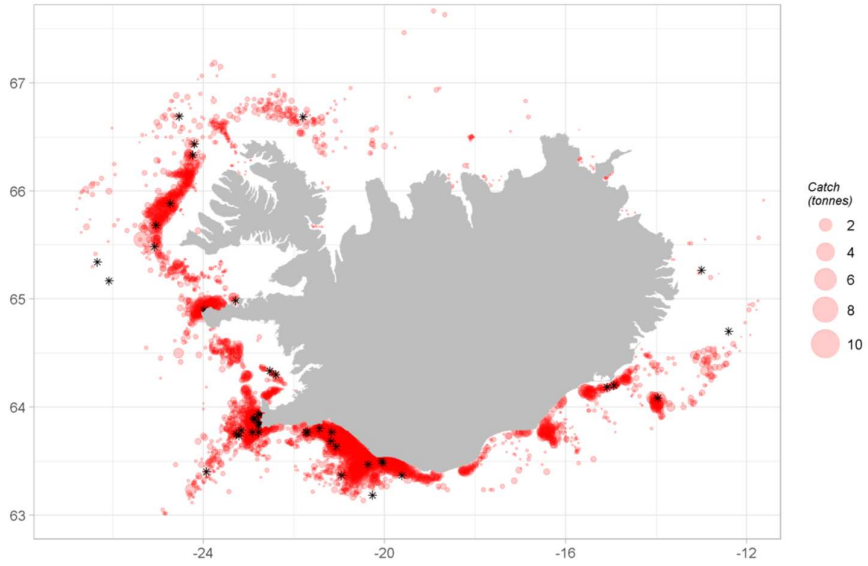


Figure 3-6. Lemon sole. Fishing grounds in 2016 as reported in logbooks (red) and positions of samples taken from landings (asterisks). Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

Otoliths have been collected from commercial catches since 1999. Annually 11-38 samples have been collected from demersal seine and 3-21 samples from demersal trawl, or a total of 275-1100 and 100-500 otoliths respectively (Table 3-4, Figure 3-6). Samples were not taken from other gears, as they represent a small proportion (~5%) of the total catch.

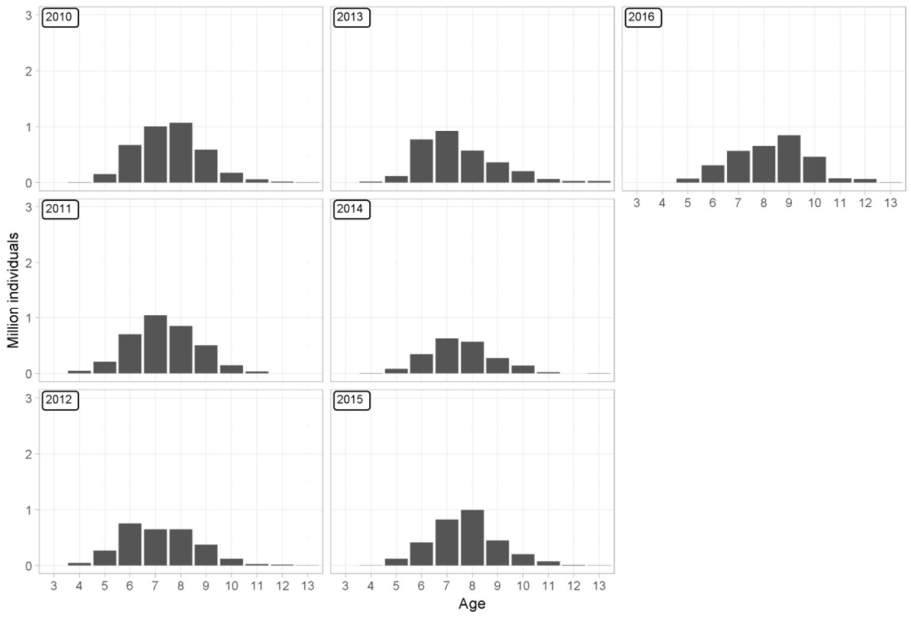


Figure 3-7. Lemon sole. Estimated age distribution of landed catch based on landings and otoliths collected from landed catch. Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

In 2010-2015 the majority of the catch was 6-8 years old lemon sole, or about 70% of landings in numbers (Figure 3-7). The proportion of these age classes in the catch then decreased in 2016, when 8 and 9 year old fish were the majority of the catch.

Table 3-4. Lemon sole. Number of samples and aged otoliths from landed catch.
Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

Year	***Demersal seine***		***Demersal trawl***	
	Samples	Otoliths	Samples	Otoliths
2010	23	575	21	506
2011	36	875	12	300
2012	37	925	14	361
2013	36	899	8	200
2014	20	500	8	200
2015	28	700	17	420
2016	27	675	17	425

Length distribution of landed lemon sole have remained stable since 2001, however there has been a slight shift towards larger fish since 2014 (Figure 3-8).

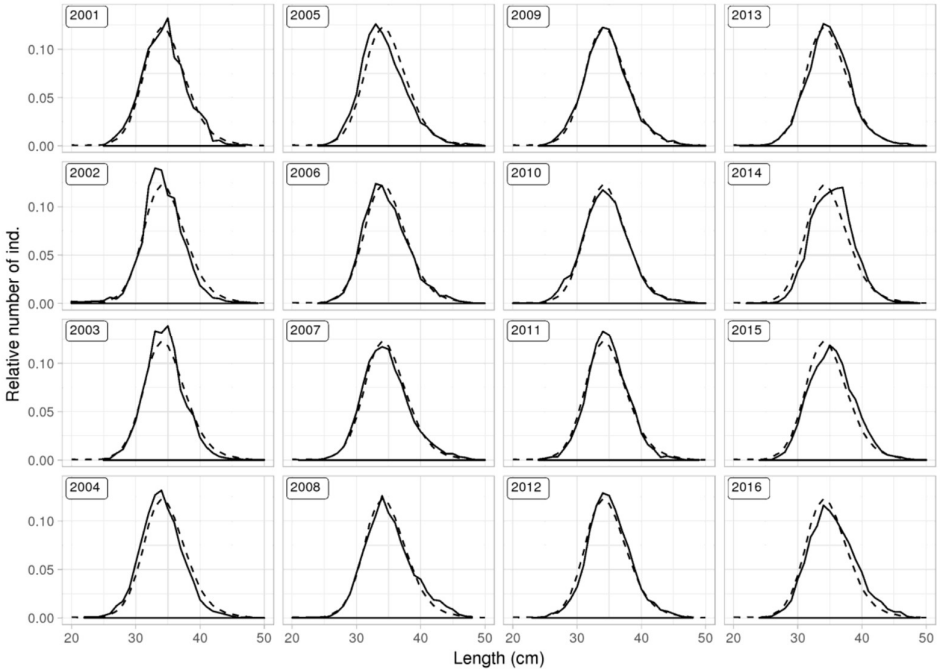


Figure 3-8. Lemon sole. Length distribution from landed catch. The dotted line represents the mean length distribution for all years. Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

The Icelandic spring groundfish survey (hereafter spring survey, IS-SMB), which has been conducted annually in March since 1985, covers the most important distribution area of lemon sole. In addition, the Icelandic autumn groundfish survey (hereafter autumn survey, IS-SMH) was commenced in 1996. However, a full autumn survey was not conducted in 2011 due to a labour dispute and therefore the results for 2011 are not presented.

The spring survey is considered to measure changes in abundance/biomass better than the autumn survey. It may not, however, adequately cover the main recruitment grounds for lemon sole as the main nursery areas are thought to be in shallow water in habitats unsuitable for demersal trawling. In addition to these two major surveys, a designated flatfish survey with beam trawl was started in 2016 and will be expanded in 2017 to cover most of the recruitment grounds of lemon sole and other flatfish species. The plan is to incorporate this survey in the stock assessment for lemon sole in the future.

Figure 3-9, shows both a recruitment index based on abundance of lemon sole smaller than 20 cm, and trends in various biomass indices. Survey length distributions are shown in Figure 3-10 and Figure 3-11, abundance and changes in spatial distribution in Figure 3-12 - Figure 3-15.

Total biomass index and the biomass index for lemon sole larger than 30 cm (harvestable part of the stock) has been variable in recent years, with large fluctuations between years (Figure 3-9). The index for lemon sole larger than 39 cm has been increasing recently. The index of juvenile abundance (<20 cm) has decreased in the last six years after large peak in 2011 which was observed only in spring survey. The results from the shorter autumn survey are by and large similar to those observed from the spring survey, except for the juvenile abundance index that shows a different pattern than the spring survey.

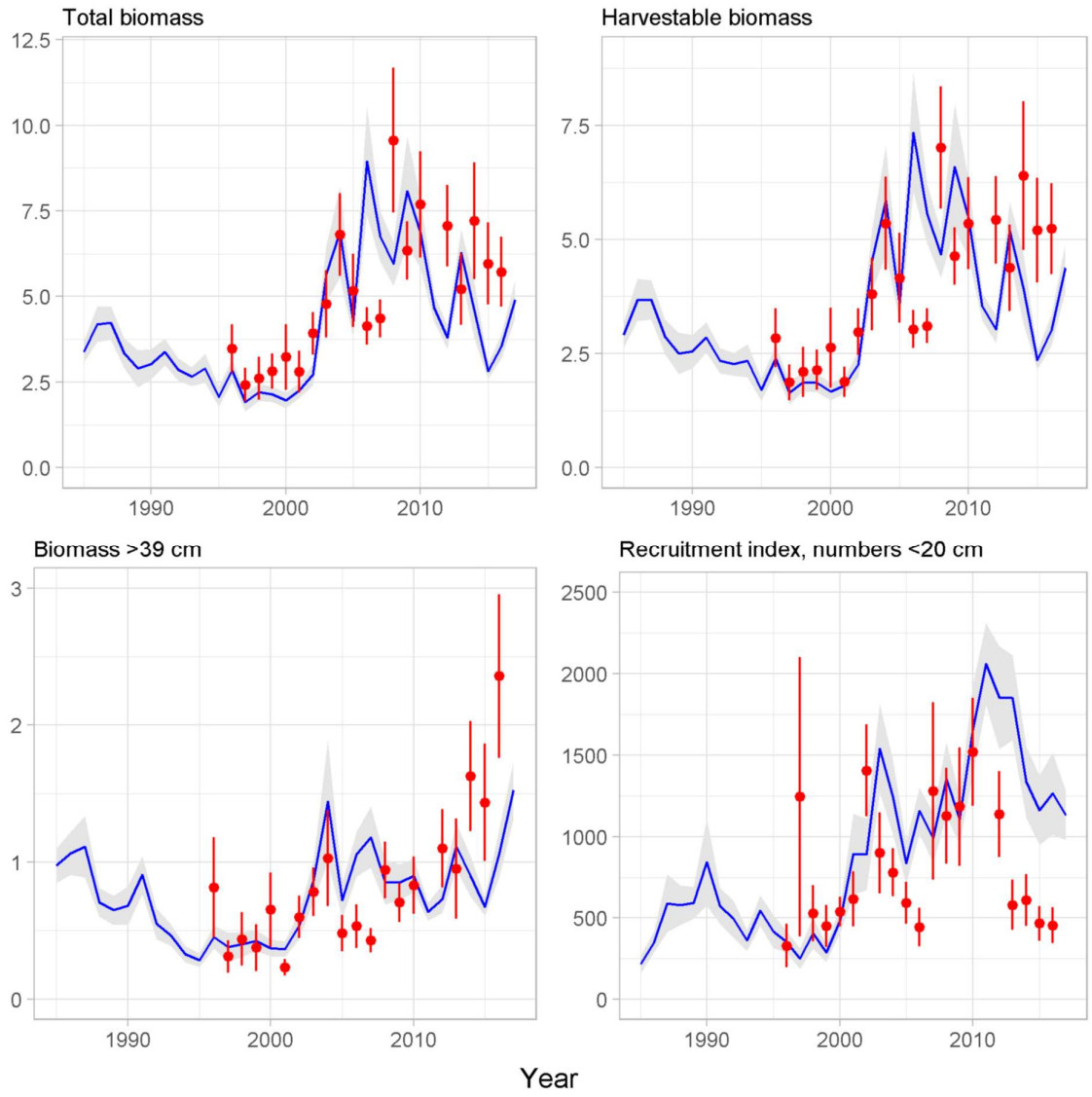


Figure 3-9. Lemon sole total biomass indices (upper left) and harvestable biomass indices (>30 cm) (upper, right), biomass indices of larger ind. (>39 cm) (lower left) and juvenile abundance indices (<20 cm) (lower right) from the spring survey (blue) from 1985 and autumn survey (red) from 1996, along with the standard deviation. Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

Like in samples from the commercial catch, the size distribution in the spring survey has been stable, with little variation over time (Figure 3-10). Data from the autumn survey tells a similar story (Figure 3-11).

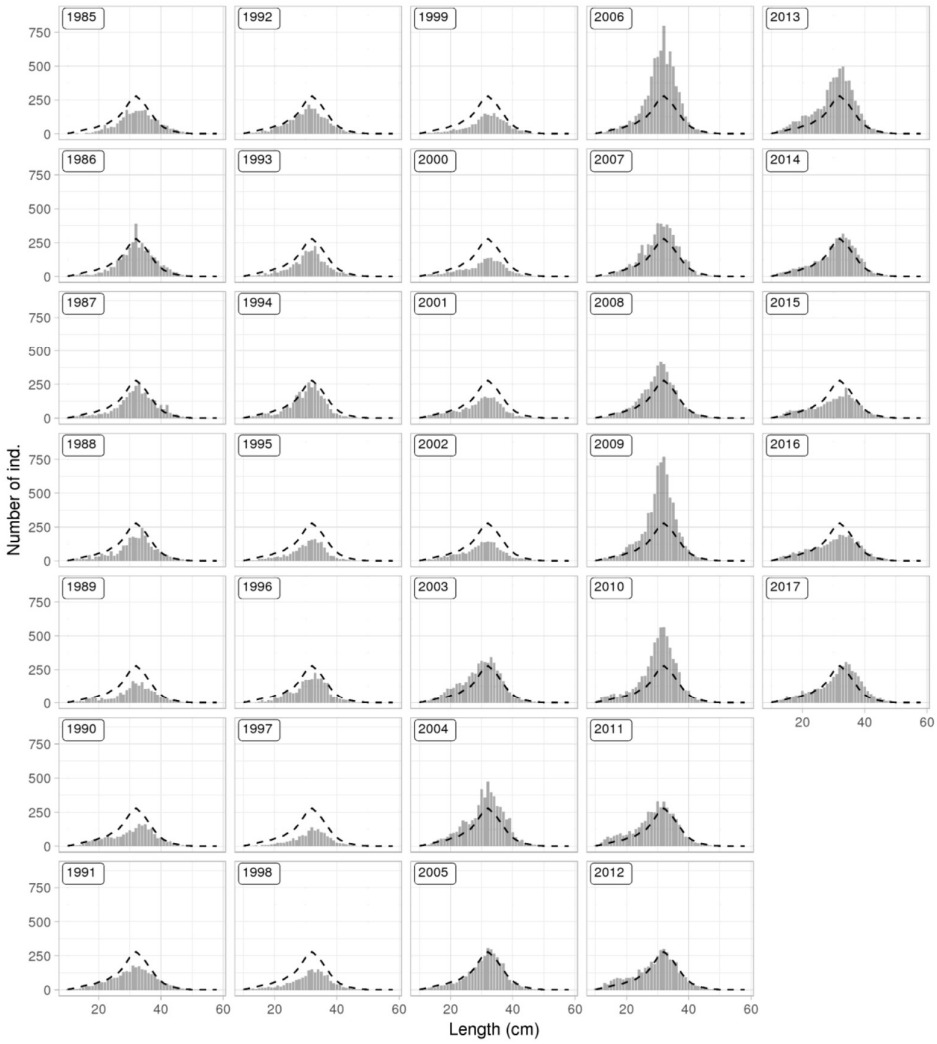


Figure 3-10. Lemon sole. Length distribution from the spring survey. The dotted line shows mean length for all years combined. Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

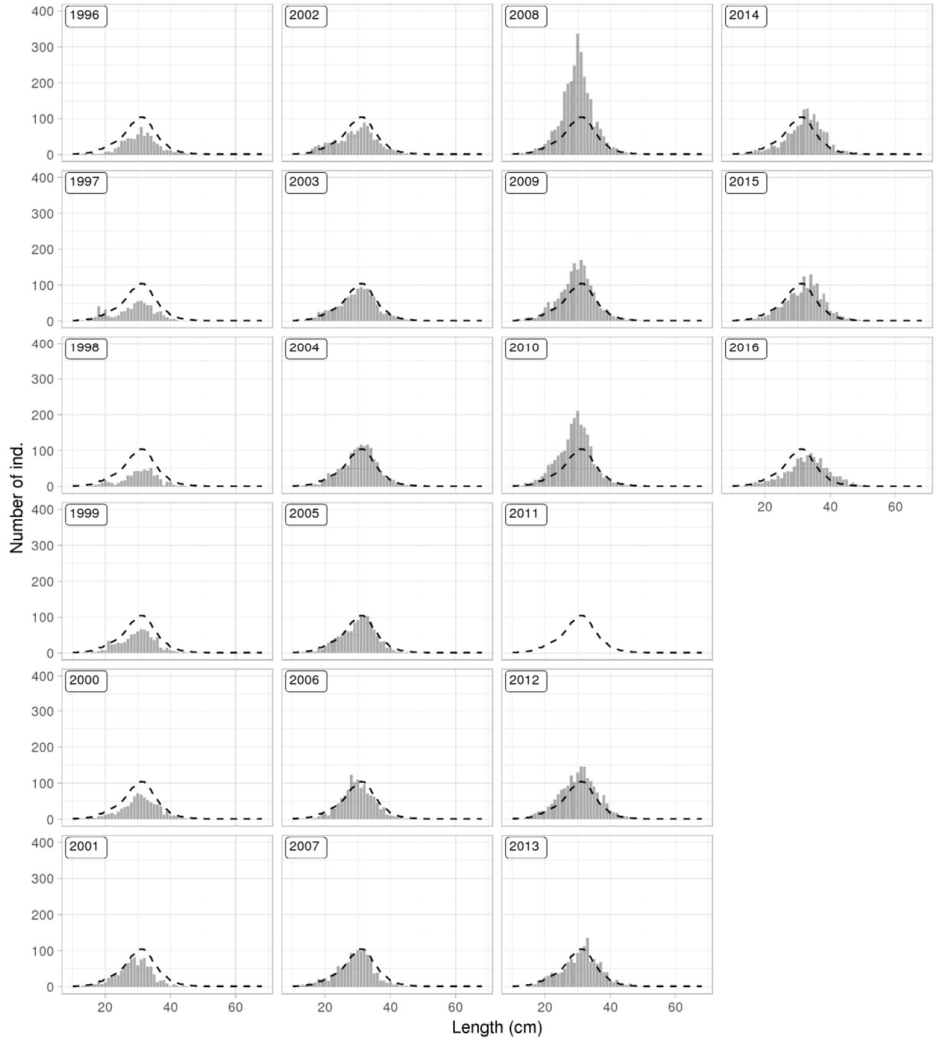


Figure 3-11. Lemon sole. Length distribution from the autumn survey. The dotted line shows mean length for all years combined. Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

Lemon sole were mostly caught on the main fishing grounds in the southwest and west part of the country in the spring survey in 2017, while considerable amount was also caught deep off the southeast coast (Figure 3-12). The coldest waters off the northeast and east coast are almost devoid of lemon sole. Spatial distribution of lemon sole in the spring survey has been relatively stable since the survey was started in 1985 (Figure 3-13). The increase in estimated biomass after 2002 occurred more or less evenly in all areas, although in years with exceptionally high biomass estimates (i.e. 2006 and 2009) the increase was mostly in the SW area.

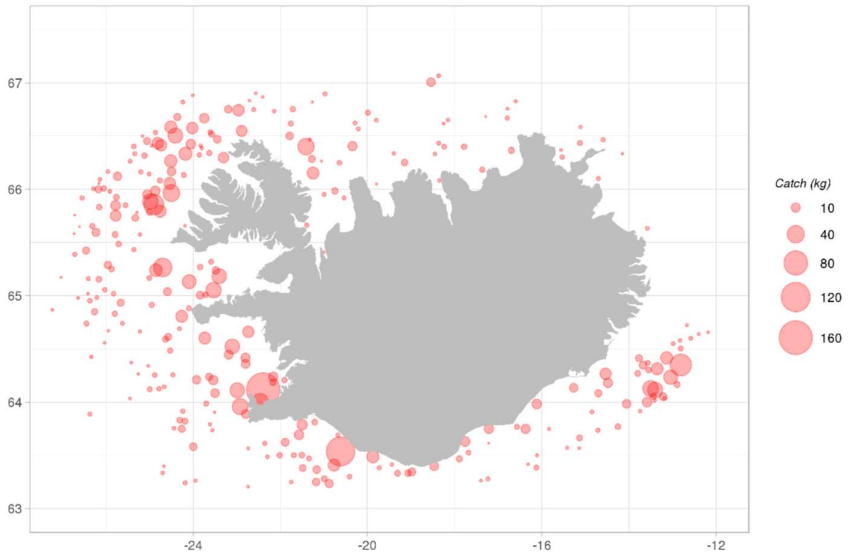


Figure 3-12. Lemon sole. Spatial distribution in the spring survey in 2017.
Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

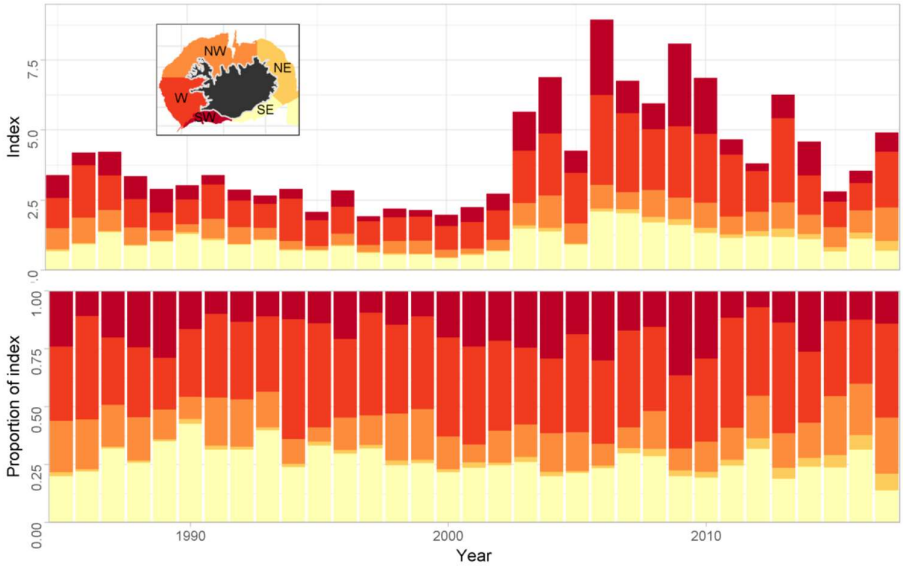


Figure 3-13. Lemon sole. Spatial distribution of biomass index from the spring survey in 1985-2017.
Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

Lemon sole were mainly caught in the west and northwest of the country in the autumn survey in 2016 with some lemon sole also caught in the southeast (Figure 3-14). The majority of lemon sole in the autumn survey has been caught in the west and northwest of the country. In the last two years of the survey, there has been a slight increase in the abundance of lemon sole in the W and NW areas, but decrease in the SE area (Figure 3-15).

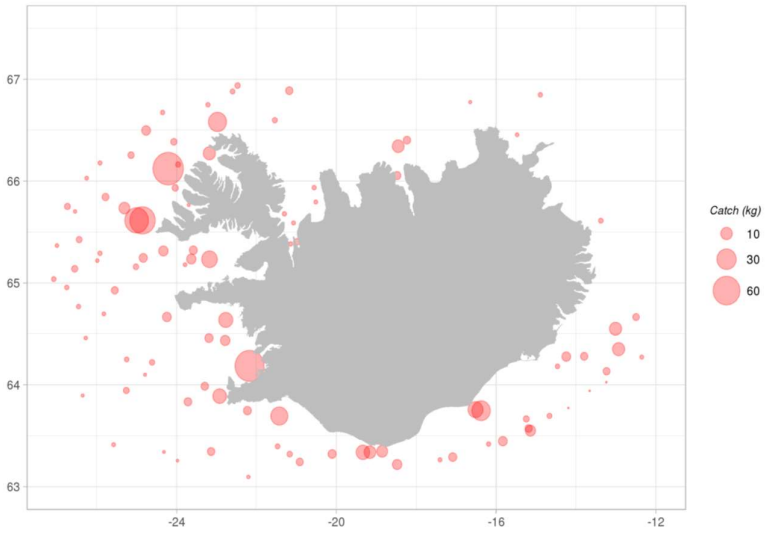


Figure 3-14. Lemon sole. Spatial distribution in the autumn survey in 2016.
Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

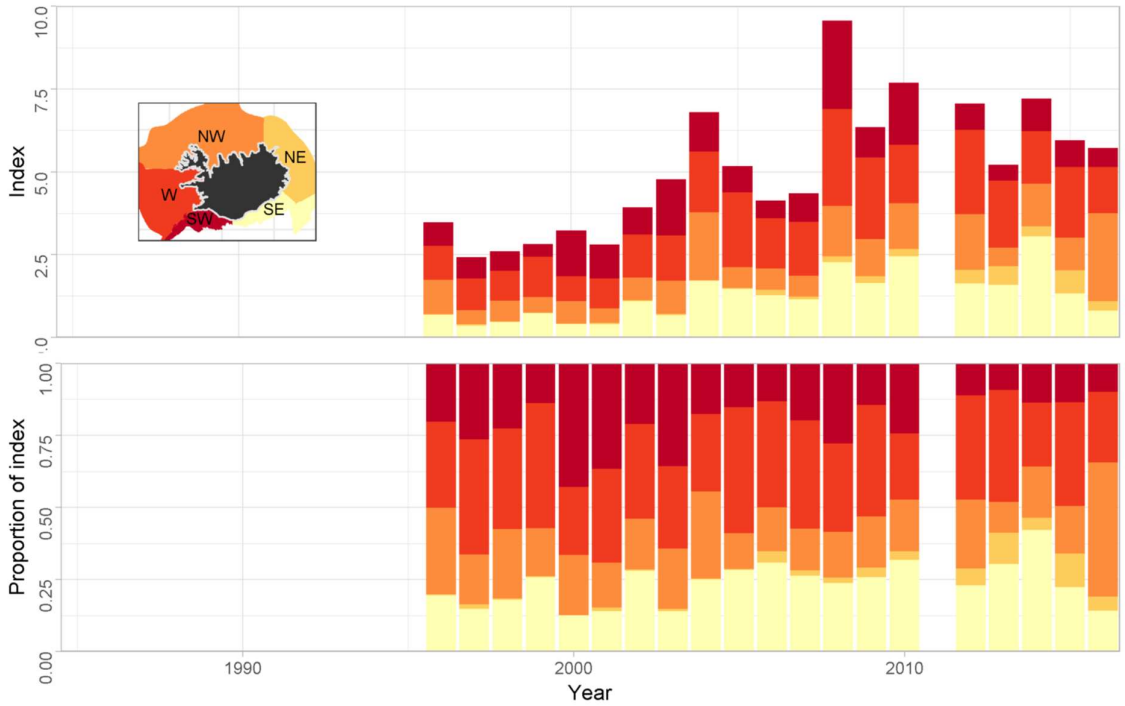


Figure 3-15. Lemon sole. Spatial distribution of biomass index from the autumn survey in 1996-2016.
Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

3.3.2 Lemon sole management in Iceland

The Ministry of Industries and Innovation (MII) is responsible for management of the Icelandic fisheries and implementation of legislation. Lemon sole was included in the ITQ system in the 1999/2000 quota year and as such subjected to TAC limitations.

Between 2005 and 2009, the TAC was set higher than recommended by Marine Research Institute (MRI), but this practice stopped in the 2010/2011 quota year (Table 3-5). No formal management plan exists for this stock.

Figure 3-16 shows the net transfers in the Icelandic ITQ-system. From 2003-2008 (positive values in Figure 3-16) there was a net transfer of other species being transferred to lemon sole quota. However, from 2009-2015, there was little lemon sole quota transferred to other species until two years ago when there was a considerable amount transferred to lemon sole from other species quota.

Table 3-5. Lemon sole. Recommended TAC, national TAC set by the Ministry, and landings (tonnes).
Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

FISHING YEAR	REC. TAC	NATIONAL TAC	CATCH
1999/00	1400	1400	1400
2000/01	1400	1400	1400
2001/02	1400	1400	1000
2002/03	1600	1600	1100
2003/04	1600	1600	2100
2004/05	1600	1600	2600
2005/06	1600	1800	2500
2006/07	1600	2000	2900
2007/08	1600	2200	2600
2008/09	1800	2200	2700
2009/10	1800	2200	2000
2010/11	1800	1800	1740
2011/12	1800	1800	1800
2012/13	1400	1400	1460
2013/14	1600	1600	1430
2014/15	1600	1600	1760
2015/16	1300	1300	1720
2016/17	1087	1087	
2017/18	1304		

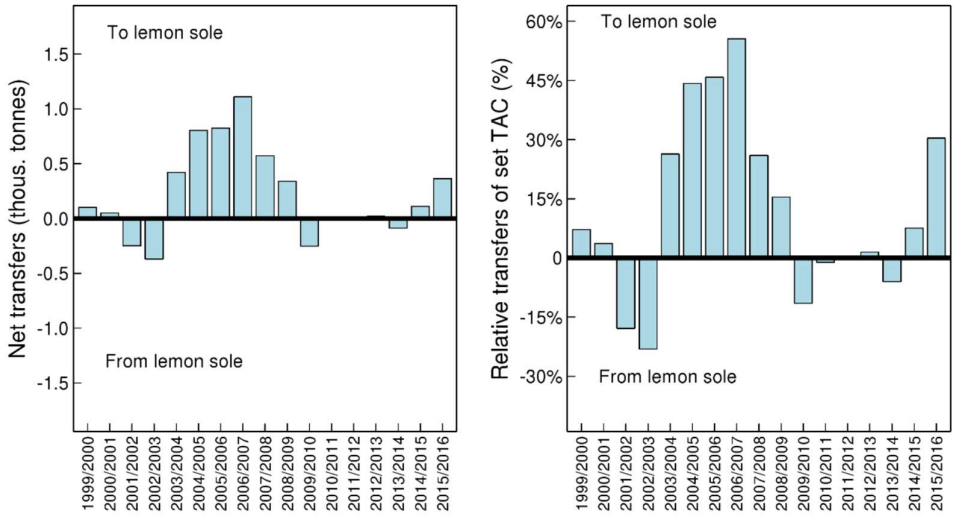


Figure 3-16. Lemon sole. Net transfers of quota to/from lemon sole in the Icelandic ITQ system by fishing year. Positive values indicate that other species are being transferred to lemon sole but negative mean that lemon sole quota is being converted to other species.

Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

The 2017 advice follows the ICES framework for stocks where reliable stock biomass indices are available, but analytical age-length assessments are not feasible (Category 3 stocks). Spring survey biomass index of lemon sole 30 cm and larger, along with catch, is used to calculate Fproxy (catch/survey biomass). The target Fproxy was defined based on the mean of the reference period of 2010-2015 (Figure 3-17). Analysis of age disaggregated catch data from the reference period in 2016 suggested that fishing mortality was too high and the average fishing mortality needed to be lowered by at least 20%. The advice from 2016 and onwards is therefore based on multiplying the most recent index value with target Fproxy that is average Fproxy of the reference period reduced by 20%. The advice for the 2017/2018 is therefore the spring survey biomass index, 4382 * target Fproxy 0.38 or 1665, but since that is more than 20% increase from last year, an uncertainty cap is applied, bringing the recommended TAC down to 1304 tonnes (Table 3-6).

Table 3-6. Lemon sole. Advice calculations.

Source: https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

Index 2017	4382	
Target F_{proxy}	0.8 * 0.48 = 0.38	
Advice 2016	1087	
Index 2017 x Target F_{proxy} / Advice 2016	1.53	
Uncertainty cap	Applied	20%
Catch advice	1087 * 1.20 = 1304 t	

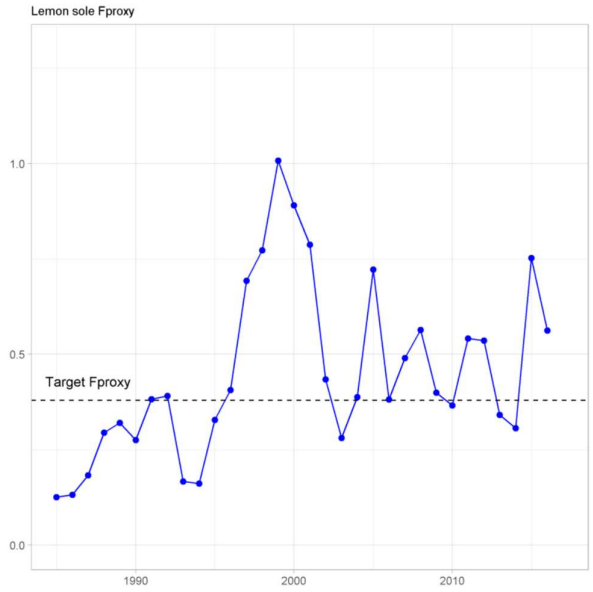


Figure 3-17. Lemon sole. Fproxy (catch/survey biomass). The Fproxy is set as 80% of the mean of the reference period of 2010-2015. *Source:* *https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf*

3.4 Principle Two: Ecosystem Background

3.4.1 Description of the Ecosystem

Iceland is situated just south of the Arctic Circle in the central North Atlantic. The island has the Irminger Sea to the west, the Iceland Sea to the north, the Norwegian Sea to the east, and the Iceland Basin to the south (Hansen and Osterhus 2000). There are maritime boundaries with Norway in the north, Greenland in the west and north-west, and the Faroe Islands in the south-east. Several submarine ridges divide these oceanic regions: the Iceland-Faeroe Ridge to the east of Iceland, the Reykjanes Ridge to the south of Iceland, and the Greenland-Iceland Ridge to the northwest of Iceland (Malmberg 2004). The Reykjanes Ridge is volcanically active and acts as a natural boundary between southern and northern water masses since it's steep seamounts separate depths of up to 3000 m on each side (Malmberg 2004). The Icelandic EEZ encloses a sea area of 758,000 km², of which ca. 212,000 km² are less than 500 m deep.

Three major current systems influence Icelandic waters, including the warm and saline Irminger current, which is an offshoot from the Gulf Stream flowing from the south, the intermediate East Icelandic current from the north-east, and the very cold and less saline East Greenland current flowing from the north-west *(*Figure 3-18. (a) North Atlantic circulation and (b) North Icelandic shelf circulation pattern. Arrows shown in blue correspond to cool and relatively fresh Arctic-sourced waters; arrows shown in red are warm and saline Atlantic-sourced waters; dashed lines correspond to deep currents whilst the solid arrows denote surface currents. The dashed black line in a) refers to the approximate position of the North Atlantic Polar Front. DWCZ, deep water convection zones; EGC, East Greenland Current; EIC, East Icelandic Current; GS/NAC, Gulf Stream/North Atlantic Current; IC, Irminger Current; iNIIC, inner NIIC; ISC, Icelandic slope current; NIIC, North Icelandic Irminger Current; NIJ, North Icelandic Jet; oNIIC, outer NIIC; PF, polar front; SIC, South Icelandic Current; SPG, Sub-Polar Gyre. Source: Reynolds et al. (2016).18*)*.

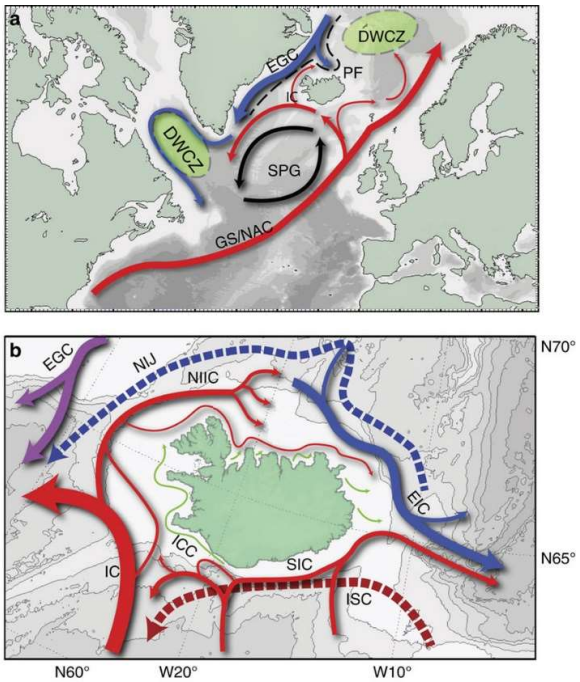


Figure 3-18. (a) North Atlantic circulation and (b) North Icelandic shelf circulation pattern. Arrows shown in blue correspond to cool and relatively fresh Arctic-sourced waters; arrows shown in red are warm and saline Atlantic-sourced waters; dashed lines correspond to deep currents whilst the solid arrows denote surface currents. The dashed black line in a) refers to the approximate position of the North Atlantic Polar Front. DWCZ, deep water convection zones; EGC, East Greenland Current; EIC, East Icelandic Current; GS/NAC, Gulf Stream/North Atlantic Current; IC, Irminger Current; iNIIC, inner NIIC; ISC, Icelandic slope current; NIIC, North Icelandic Irminger Current; NIJ, North Icelandic Jet; oNIIC, outer NIIC; PF, polar front; SIC, South Icelandic Current; SPG, Sub-Polar Gyre. Source: Reynolds et al. (2016).

The East Icelandic current consists of merged cold Arctic waters and warmer Atlantic waters, whilst the East Greenland current consists of Arctic waters. The Irminger current flows around the western, north-western and northern parts of Iceland. The precise locations of the cold and warm water fronts shift from year to year resulting in highly variable local conditions, in particular on the northern Icelandic Shelf. Nevertheless, as a result of the hydrographic and bathymetric conditions the Icelandic ecoregion is considered to be made up of four key areas which differ in terms of species composition:

i. Northern deep: Beyond the shelf break to the north and east of Iceland, where depths exceed 500 m and Artic water is dominant.

ii. Northern shelf: Continental shelf to the north and east of Iceland, where depths are generally less than 500 m, and a mixture of coastal, Atlantic and Arctic water is found.

iii. Southern deep: Beyond the shelf break to the south and west of Iceland, where depths exceed 500 m and Atlantic water is dominant.

iv. Southern shelf: Continental shelf to the south and west of Iceland, where depths are generally less than 500 m, and a mixture of coastal and Atlantic water is found.

Primary production over the Icelandic Shelf is high, and productivity is highest over the southwestern shelf (ICES, 2016). The onset of the annual phytoplankton spring blooms generally takes place between mid-April and mid-May, however a trend towards a later onset of blooms has been observed (MFRI, 2016). Variations in phytoplankton biomass and the timing of phytoplankton blooms have led to a decreasing trend in euphausiid abundance in the south-west, south and south-east of Iceland during the last fifty years, and from 2010 copepod biomass in spring has been lower than the long-term mean observed between 1960 and 2014. These changes are in contrast to previous decades, when mesozooplankton biomass fluctuated without trends on the Icelandic shelf. Such changes have

important impacts on the marine environment since euphausiids in particular are a vital source of food for pelagic fish, such as herring and capelin, and support the larval and fry stages of all fish stocks. The abundance of krill is said to strongly affect the survivability of larval fish that have just begun to hunt for food (MFRI, 2016). For instance, MFRI studies have shown the correlation between the abundance of krill to the south-west in the spring and the number of cod fry in August and the recruitment of cod joining the stock.

Changes in sea temperatures have also had considerable effects on the fish fauna of the Icelandic ecosystem. During the last two decades, Atlantic water masses have been dominant (in contrast to previous decades), and temperatures on the western and northern parts of the Icelandic Shelf have increased. This has led to an increase in the abundance of previously rare warm water species, and a shift in the distribution of several demersal species. For example, haddock, anglerfish, witch, dab, tusk and ling have shown a clockwise northern movement from the south-western waters off Iceland in which they were previously restricted to the north-western and northern waters. Conversely stock abundance and distribution of several cold water species such as Greenland halibut has declined in the region (Asthorsson et al. 2007, Valdimarsson et al. 2012). Over the last decade, the summer feeding grounds of capelin have moved further north from Iceland and also somewhat westward towards the colder waters off eastern Greenland, whilst Atlantic mackerel has extended its feeding grounds from the Norwegian Sea to Icelandic waters (Asthorsson et al. 2007). As a result, pelagic mackerel and semi-pelagic blue whiting have been found and fished in east Icelandic water in large quantities. During the same period, Norwegian spring spawning herring has progressively been recorded once again on its traditional feeding grounds to the north and east off Iceland. These significant changes in the distribution and migration patterns of marine species found in Icelandic waters have been linked to a number of factors, including hydrographic conditions, changes in prey availability and stock densities (MFRI, 2016).

Research-vessel surveys indicate that shrimp biomass in Icelandic waters, both in inshore and offshore waters, has been declining in recent years, and the stock of northern shrimp collapsed in 2000. The driving factors are thought to include temperature changes, high levels of predation (due to increasing biomass of younger cod, haddock and whiting), and unsustainable levels of fishing mortality (MFRI, 2016). Consequently, the shrimp fishery has been reduced and is now banned in most inshore areas (ICES, 2016).

Fisheries have an important impact on Icelandic ecosystems, with the bulk of fisheries taking place over the continental shelf at depths of less than 500 m. Overall fishing effort of trawlers, longliners, gillnets, seines and Danish seines has decreased since 2005, however an increase in the fishing effort of pelagic trawlers and jiigers has been noted (MFRI, 2016). Over 25 commercially exploited stocks of fish and marine invertebrates are present in Icelandic waters. The main demersal species include cod, haddock, saithe, redfish, Greenland halibut and various other flatfish, wolffish, tusk, and ling. The main pelagic species are capelin, summer-spawning herring, Norwegian spring-spawning herring, and mackerel.

Several species included on the OSPAR list of threatened and / or declining species are known bycatch species in Icelandic fisheries. Only limited information is available on the impacts of fisheries on such species, however landings are generally small. A species which has been significantly impacted by fishing in Icelandic waters is Atlantic halibut (*Hippoglossus hippoglossus*), for which biomass decreased between 1985 and 1995, and has remained at a very low level since. A number of additional management measures have recently been introduced (including a total ban on all fishing of Atlantic halibut and a mandatory release of viable Atlantic halibut), and a small biomass increase was observed between 2015 and 2016 (MFRI, 2016).

While this general description of the Icelandic ecosystem has included detail on the range of fishing methods operated in Icelandic waters, the remaining sections will focus on the UoAs under assessment: bottom trawl, Danish seine and Nephrops trawl.

3.4.2 Species Allocation

A review was conducted through the assessment process of all species that the fishery might have a an impact on. This generated a list of ETP species which overlap with the fishery operations, and species reported in landings or in relevant scientific literature. Of species/stocks identified as potentially having an interaction with the UoAs under assessment:

- 30 have been identified as primary species (Table 3-7a, b, c). That is, they are subject to some level of management with the general objective of maintaining these stocks as close to MSY level as is feasible.
- 21 have been identified as secondary species, which includes all species not allocated to primary or ETP (Table 3-7a, b, c), and includes 3 out-of-scope species.
- 20 have been identified as ETP species present in Icelandic waters mainly based on their presence on international lists of vulnerable and endangered species (CITES Appendix 1, IUCN Redlist Status for out-of-scope species, AEWA Table 1 - Column A); of these ETP species one species that overlaps with fishing operations of the UoAs under assessment was identified (Table 3-8).

3.4.3 Landings Profiles

The Icelandic Fisheries Management Act requires that all catches (including both commercial and non-commercial species) are landed; therefore, no discarding of any bycatch species should take place. Management measures that reduce discarding have been in place since 1991, and although there is no systematic monitoring of discarding, scientific evidence indicates that discards are, overall, a minor portion of total landings (Pálsson et al., 2012, 2013). Research by MFRI and by the Directorate of Fisheries (DF) indicate that the most important discards in the Icelandic fisheries are of cod and haddock. Discards of these two species have been estimated on a regular basis by the MFRI since 2001 by comparing length composition samples taken at sea and from landings (making the assumption that discarding only occurs as high grading). Estimated discards of cod and haddock have declined in recent years and were at a minimum in 2011 in all gears. Moreover, based on the available Icelandic landings data it is evident that catches of low commercial value are indeed landed (e.g. dogfish, black scabbard-fish, ribbonfish, and mackerel shark). The discarding ban, measures which reduce the incentive to discard, and the landing of catches of low commercial value suggest that the total catch is retained and landings data represents the approximate total catch of the fisheries.

The landings profiles consist of the sum of the landings for trips in the years 2013-2017 inclusive for the UoAs under assessment. The criteria for allocation of species between minor and main follows the methodology in CR2.0 GSA3.4.2.2.

Information on resilience of each species was obtained from www.fishbase.org, and included size, fecundity, growth rates and trophic level, following procedures for scoring productivity in PSA (see CR2.0 SA3.4.2.2 and Annex PF Risk Based Framework), where a productivity score of greater than or equal to 2 indicated the species was less resilient. In cases where information on productivity was missing or could not be found, a higher risk score was allocated. A 2% threshold on the catch was applied for less resilient species and 5% for more resilient species. Landings greater than this threshold would indicate that the species was 'main'.

*Table 3-7a. **Bottom trawl (TB)** landings profile from 2013-2017. PSE indicates whether the species is addressed as primary, secondary or ETP. The main and minor species allocation is based on their proportion of the catch, with the exception that all out-of-scope species are consider main.*

English name	PSE	Resilience	Type	Landings (kg)	TB %	Category
Atlantic Cod	Primary	High	Fish	196378345	42.79%	Main
Golden redfish	Primary	Low	Fish	89011964	19.40%	Main

English name	PSE	Resilience	Type	Landings (kg)	TB %	Category
Saithe	Primary	High	Fish	80396184	17.52%	Main
Haddock	Primary	High	Fish	47088031	10.26%	Main
Deepwater redfish	Primary	Low	Fish	9293572	2.13%	Main
Plaice	Primary	High	Fish	7928912	1.73%	Minor
Atlantic wolffish	Primary	Low	Fish	7526946	1.64%	Minor
Ling	Primary	High	Fish	5012762	1.09%	Minor
Greenland halibut	Primary	Low	Fish	5011172	1.09%	Minor
Greater silver smelt	Primary	High	Fish	3391658	0.74%	Minor
Lemon sole	P1 target species	High	Fish	1995690	0.43%	N/A
Whiting	Secondary	High	Fish	1395228	0.30%	Minor
Spotted wolffish	Primary	Low	Fish	1083902	0.24%	Minor
Blue ling	Primary	Low	Fish	1004753	0.22%	Minor
Mackerel	Primary	High	Fish	462971	0.10%	Minor
Anglerfish / Monkfish	Primary	High	Fish	462071	0.10%	Minor
Witch	Primary	High	Fish	316444	0.07%	Minor
Megrim	Secondary	High	Fish	244661	0.05%	Minor
Norway redfish / Small redfish	Primary	Low	Fish	221085	0.05%	Minor
Atlantic halibut	Secondary	Low	Fish	169482	0.04%	Minor
Tusk	Primary	High	Fish	137665	0.03%	Minor
Black scabbardfish	Secondary	Low	Fish	86489	0.02%	Minor
Blue Skate / Common Skate	Secondary	Low	Ray	75465	0.02%	Minor
Starry ray	Secondary	Low	Ray	54715	0.01%	Minor
Common dab	Primary	High	Fish	36157	0.01%	Minor
Roundnose Grenadier	Secondary	Low	Fish	33578	0.01%	Minor
Lumpfish	Primary	High	Fish	29187	0.01%	Minor
Spiny dogfish / Picked dogfish	Secondary	Low	Shark	13069	0.00%	Minor
Greenland shark	Secondary	Low	Shark	12039	0.00%	Minor
Long rough dab	Primary	High	Fish	11918	0.00%	Minor
Orange roughy	Secondary	High	Fish	8562	0.00%	Minor
Roughhead grenadier	Secondary	Low	Fish	2261	0.00%	Minor
Shagreen ray	Secondary	Low	Ray	1613	0.00%	Minor
Leafscale gulper shark	Secondary	Low	Shark	1348	0.00%	Minor
Northern wolffish	Secondary	Low	Fish	1143	0.00%	Minor
Norway lobster	Primary	Low	Crustacean	897	0.00%	Minor
Porbeagle	Secondary	Low	Shark	618	0.00%	Minor
Northern shrimp	Primary	Low	Crustacean	529	0.00%	Minor
Atlantic bluefin tuna	Primary	Low	Fish	235	0.00%	Minor
Turbot	Secondary	High	Fish	134	0.00%	Minor
Greater eelpout	Secondary	Low	Fish	55	0.00%	Minor
Herring	Primary	High	Fish	42	0.00%	Minor
Blue whiting	Primary	High	Fish	14	0.00%	Minor
Grand Total				458903566		

Table 3-7b. ***Danish seine (DS)*** *landings profile. PSE indicates whether the species is addressed as primary, secondary or ETP. The main and minor species allocation is based on their proportion of the catch, with the exception that all out-of-scope species are consider main.*

English name	PSE	Resilience	Type	Landings (kg)	DS %	Category
Atlantic Cod	Primary	High	Fish	39828196	43.44%	Main
Plaice	Primary	High	Fish	17561332	19.15%	Main
Haddock	Primary	High	Fish	13042725	14.22%	Main
Lemon sole	P1 target species	High	Fish	5022879	5.48%	N/A
Saithe	Primary	High	Fish	4077122	4.45%	Minor
Atlantic wolffish	Primary	Low	Fish	3376745	3.68%	Main
Witch	Primary	High	Fish	2664533	2.91%	Minor
Golden redfish	Primary	Low	Fish	2138391	2.33%	Main
Common dab	Primary	High	Fish	1803379	1.97%	Minor
Ling	Primary	High	Fish	839955	0.92%	Minor
Starry ray	Secondary	Low	Ray	324807	0.35%	Minor
Megrim	Secondary	High	Fish	270699	0.30%	Minor
Anglerfish / Monkfish	Primary	High	Fish	254995	0.28%	Minor
Whiting	Secondary	High	Fish	240498	0.26%	Minor
Blue Skate / Common Skate	Secondary	Low	Ray	80874	0.09%	Minor
Blue ling	Primary	Low	Fish	70276	0.08%	Minor
Long rough dab	Primary	High	Fish	47872	0.05%	Minor
Atlantic halibut	Secondary	Low	Fish	27671	0.03%	Minor
Lumpfish	Primary	High	Fish	7484	0.01%	Minor
Leafscale gulper shark	Secondary	Low	Shark	4526	0.00%	Minor
Spotted wolffish	Primary	Low	Fish	2951	0.00%	Minor
Spiny dogfish / Picked dogfish	Secondary	Low	Shark	2233	0.00%	Minor
Mackerel	Primary	High	Fish	1547	0.00%	Minor
Sea cucumber	Primary	High	Holothurian	801	0.00%	Minor
Tusk	Primary	High	Fish	336	0.00%	Minor
Shagreen ray	Secondary	Low	Ray	270	0.00%	Minor
Turbot	Secondary	High	Fish	132	0.00%	Minor
Greenland shark	Secondary	Low	Shark	128	0.00%	Minor
Greenland halibut	Primary	Low	Fish	43	0.00%	Minor
European Flying Squid	Secondary	High	Cephalopod	20	0.00%	Minor
Northern wolffish	Secondary	Low	Fish	8	0.00%	Minor
Grand Total				91693428		

Table 3-7c. ***Nephrops trawl (TN)*** *landings profile. PSE indicates whether the species is addressed as primary, secondary or ETP. The main and minor species allocation is based on their proportion of the catch, with the exception that all out-of-scope species are consider main.*

English name	PSE	Resilience	Type	Landings (kg)	TN %	Category
Atlantic Cod	Primary	High	Fish	7987632	27.60%	Main
Golden redfish	Primary	Low	Fish	7717214	26.67%	Main
Ling	Primary	High	Fish	3184015	11.00%	Main
Norway lobster	Primary	Low	Crustacean	2134824	7.38%	Main
Saithe	Primary	High	Fish	2108757	7.29%	Main
Witch	Primary	High	Fish	1806706	6.24%	Main
Anglerfish / Monkfish	Primary	High	Fish	991632	3.43%	Minor
Megrim	Secondary	High	Fish	940793	3.25%	Minor
Haddock	Primary	High	Fish	589877	2.04%	Minor
Whiting	Secondary	High	Fish	455915	1.58%	Minor
Blue ling	Primary	Low	Fish	348649	1.20%	Minor
Atlantic wolffish	Primary	Low	Fish	287265	0.99%	Minor
Lemon sole	P1 target species	High	Fish	256309	0.89%	N/A
Blue Skate / Common Skate	Secondary	Low	Ray	67855	0.23%	Minor
Atlantic halibut	Secondary	Low	Fish	25016	0.09%	Minor
Plaice	Primary	High	Fish	17279	0.06%	Minor
Starry ray	Secondary	Low	Ray	7321	0.03%	Minor
Tusk	Primary	High	Fish	4543	0.02%	Minor
Spotted wolffish	Primary	Low	Fish	3770	0.01%	Minor
Long rough dab	Primary	High	Fish	951	0.00%	Minor
Greater silver smelt	Primary	High	Fish	557	0.00%	Minor
Norway redfish / Small redfish	Primary	Low	Fish	482	0.00%	Minor
Common dab	Primary	High	Fish	477	0.00%	Minor
Mackerel	Primary	High	Fish	442	0.00%	Minor
Shagreen ray	Secondary	Low	Ray	294	0.00%	Minor
Greenland halibut	Primary	Low	Fish	222	0.00%	Minor
Spiny dogfish / Picked dogfish	Secondary	Low	Shark	180	0.00%	Minor
Northern wolffish	Secondary	Low	Fish	113	0.00%	Minor
Greenland shark	Secondary	Low	Shark	94	0.00%	Minor
Porbeagle	Secondary	Low	Shark	82	0.00%	Minor
Turbot	Secondary	High	Fish	36	0.00%	Minor
Lumpfish	Primary	High	Fish	23	0.00%	Minor
European Flying Squid	Secondary	High	Cephalopod	4	0.00%	Minor
Grand Total				28939329		

Table 3-8. Bycatch data for demersal otter trawl, including bottom trawl and Nephrops trawl (MFRI, 2017b)

English name	Scientific name	Icelandic name	Observed			Raised (annual)			Average
			2014	2015	2016	2014	2015	2016	3.4.3.1.1.1.1.1.1
Harbour seal	*Phoca vitulina*	Landselur	0	1	0	0 (0)	86 (100)	0 (0)	**28 (100)**
Grey seal	*Halichoerus grypus*	-	0	0	1	0 (0)	0 (0)	62 (101)	**22 (100)**
Northern gannet	*Morus bassanus*	Súla	1	1	0	56 (98)	86 (100)	0 (0)	**45 (99)**

Observer bycatch data for demersal otter trawl, including bottom trawl and Nephrops trawl is shown in Table 3-8. Data has been analysed by MFRI and based on the proportion of observer coverage within the fleet, the value is raised to provide annual average levels of interaction of these species with demersal otter trawl. This represents the most up-to-date data available, based on observer data from 2014 to 2016. Observer data from Danish seine vessels recorded zero bycatch interactions (MFRI *pres. Communication*).

3.4.4 Primary Species

The primary species consist of managed stocks that are not covered under Principle 1 since they are not included in the UoA but which (i) are within scope of the MSC programme and (ii) for which management tools and measures are in place such as an assessment of status of the stock using implicit or explicit reference points. The species composition associated with each gear is determined by the catch profiles (Table 3-9).

Table 3-9 Primary species list, including English, scientific and Icelandic names, level of resilience and main or minor categorization for bottom trawl (TB), Danish seine (SD) and Nephrops trawl (TN).

English name	Species	Icelandic	Resilience	TB	SD	TN
Fish						
Anglerfish / Monkfish	*Lophius piscatorius*	Skötuselur	High	Minor	Minor	Minor
Atlantic bluefin tuna	*Thunnus thynnus*	Túnfiskur	Low	Minor		
Atlantic Cod	*Gadus morhua*	Þorskur	High	Main	Main	Main
Atlantic wolffish	*Anarhichas lupus*	Steinbítur	Low	Minor	Main	Minor
Blue ling	*Molva dypterygia*	Blálanga	Low	Minor	Minor	Minor
Blue whiting	*Micromesistius poutassou*	Kolmunni	High	Minor		
Common dab	*Limanda limanda*	Sandkoli	High	Minor	Minor	Minor
Deepwater redfish	*Sebastes mentella*	Djúpkarfi	Low	Minor		

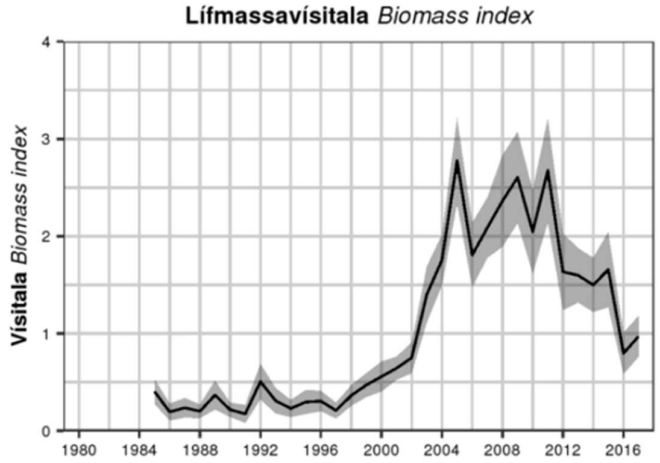
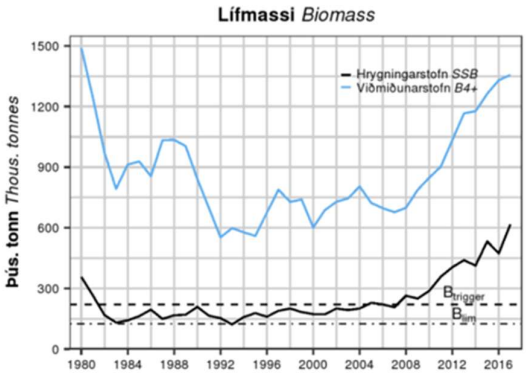
Golden redfish	*Sebastes marinus*	Gullkarfi	Low	Main	Main	Main
Greater silver smelt	*Argentina silus*	Gulllax	High	Minor		Minor
Greenland halibut	*Reinhardtius hippoglossoides*	Grálúða	Low	Minor	Minor	Minor
Haddock	*Melanogrammus aeglefinus*	Ýsa	High	Main	Main	Minor
Herring	*Clupea harengus*	Síld	High	Minor		
Lemon sole	*Microstomus kitt*	Sólkoli	High	P1 target species		
Ling	*Molva molva*	Langa	High	Minor	Minor	Main
Long rough dab	*Hippoglossoides platessoides*	Skrápflúra	High	Minor	Minor	Minor
Lumpfish	*Cyclopterus lumpus*	Grásleppa	High	Minor	Minor	Minor
Mackerel	*Scomber scombrus*	Makrill	High	Minor	Minor	Minor
Norway redfish / Small redfish	*Sebastes viviparus*	Litli karfi	Low	Minor		Minor
Plaice	*Pleuronectes platessa*	Skarkoli	High	Minor	Main	Minor
Saithe	*Pollachius virens*	Ufsi	High	Main	Minor	Main
Spotted wolffish	*Anarhichas minor*	Hlýri	Low	Minor	Minor	Minor
Tusk	*Brosme brosme*	Keila	High	Minor	Minor	Minor
Witch	*Glyptocephalus cynoglossus*	Langlúra	High	Minor	Minor	Main
Crustacean						
Northern shrimp	*Pandalus borealis*	Rækja	Low	Minor		
Norway lobster	*Nephrops norvegicus*	Humar	Low	Minor		Main
Holothurian						
Sea cucumber	*Cucumaria frondosa*	Sæbjúga	High		Minor	

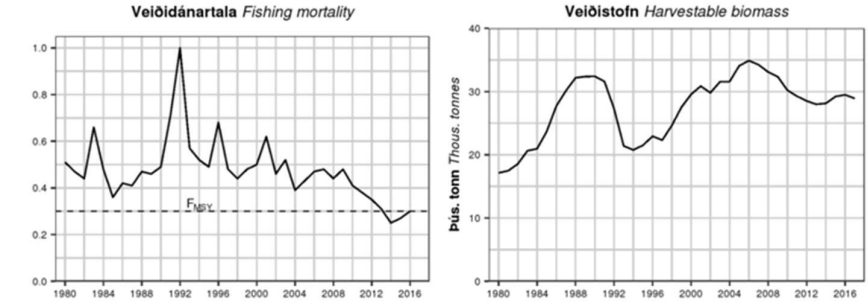
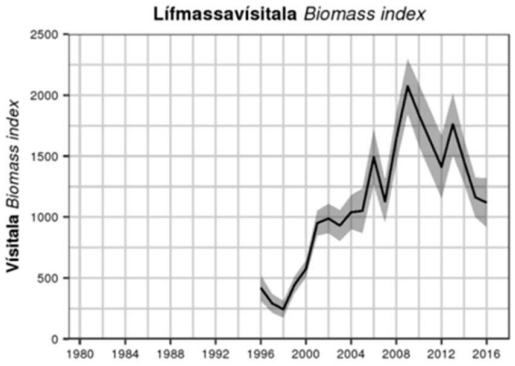
3.4.4.1 Outcome Status

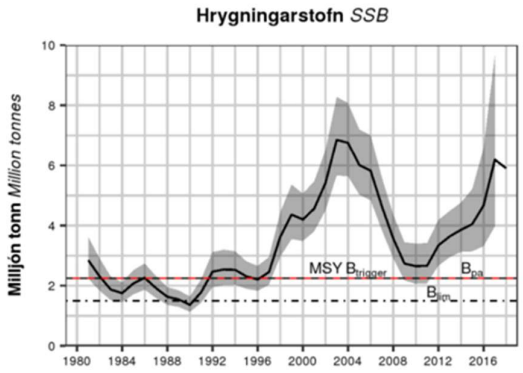
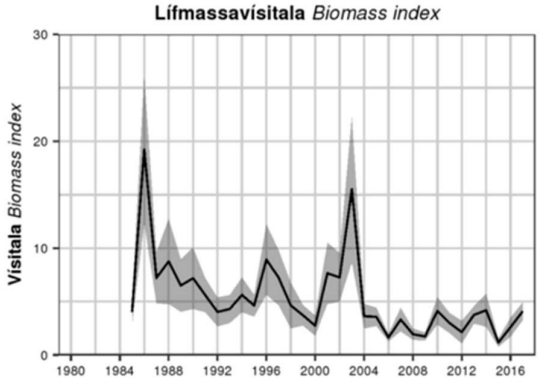
The status of each primary species is summarised in Table 3-10.

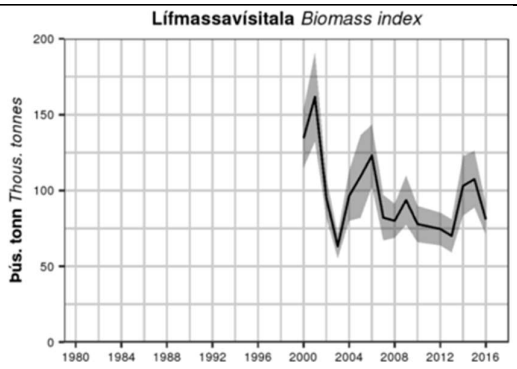
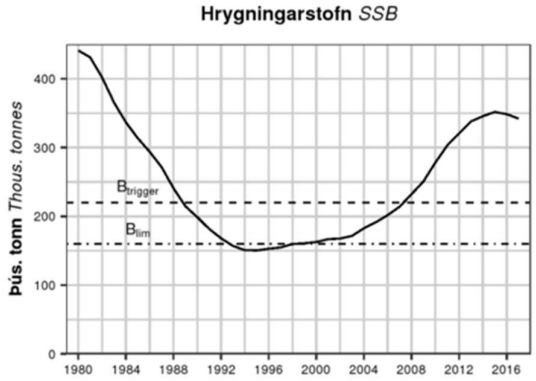
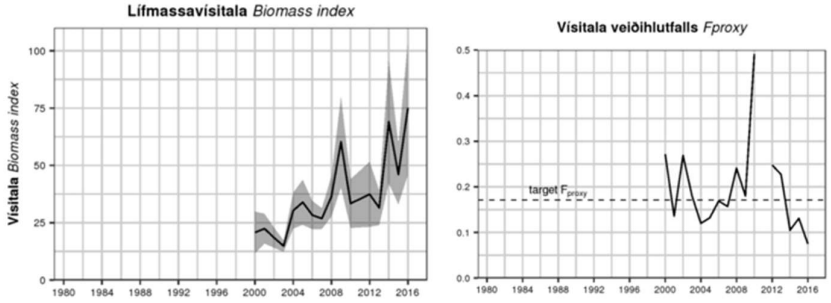
Table 3-10 Stock status for primary species The status score is indicative of the scoring guidepost for PI 2.1.1 (see justification tables for explicit requirements of outcome performance indicators). Data, graphs and infomration is taken from the latest ICCAT / ICES / MFRI advice as listed in the references.

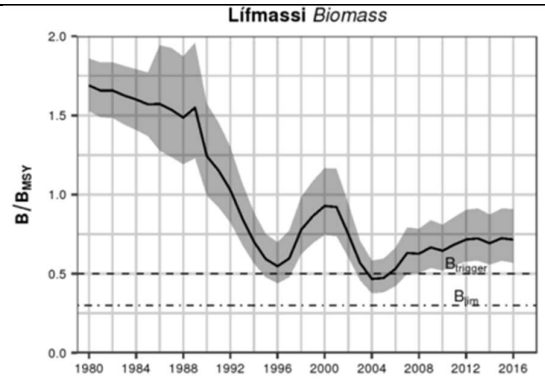
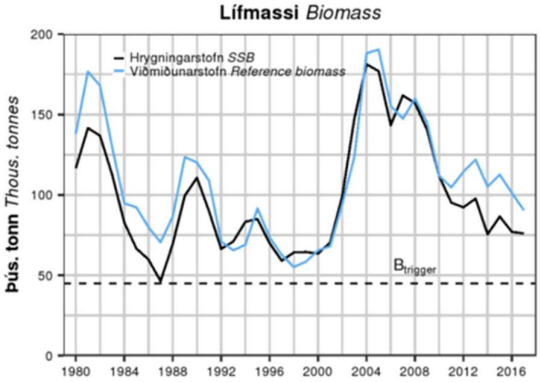
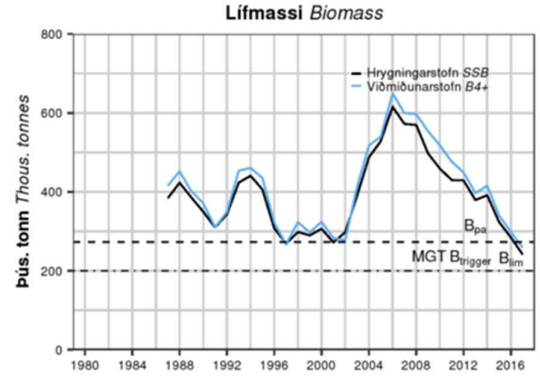
Stock	Justificaiton	Status
Anglerfish / Monkfish	The biomass index has been relatively low in the period 1985-2002, followed by a strong increase towards a maximum in 2005. From 2005 to 2011 the biomass remained at high levels fluctuating around 3 kg/km2. Since then the biomass has decreased but it remained above the levels observed at in the first part of the series. The recruitment index showed a similar pattern (MFRI, 2017). Taking into account that the biomass observed in 2017 is still higher than the biomass observed in the period 1985-2002 and that the high recruitment observed in 2000 has originated from the biomass observed in 1998, which was lower than 2017, it can be argued that the stock is highly likely to be above the point where recruitment would be impaired. Biomass is not however, fluctuating round maximum sustainable yield (MSY).	**80**

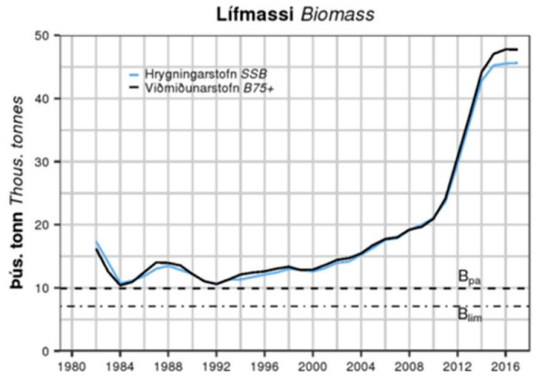
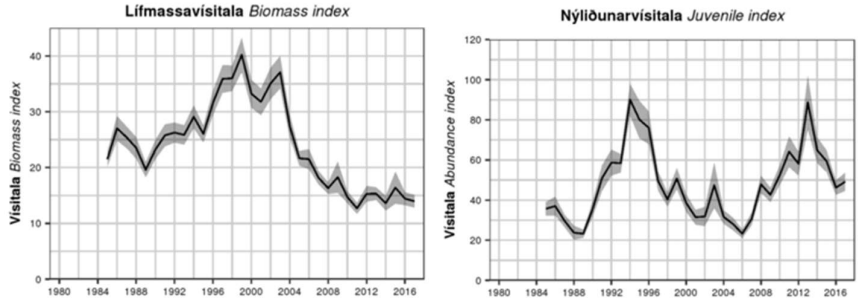
	 ***Anglerfish Biomass Index (MFRI, 2017)***	
Atlantic bluefin tuna	The latest stock assessment for Atlantic Bluefin tuna was undertaken by the International Commission for the Conservation of Atlantic Tunas (ICCAT) in 2014 (ICCAT, 2015). The perception of the stock status derived from the 2014 updated assessment suggested that fishing mortality for both younger and older fish have declined during the recent years, while SSB has increased. F_{2013} appears to clearly be below the reference target $F_{0.1}$ (F_{MSY} proxy), while current SSB is most likely to be above the level expected at $F_{0.1}$. It is highly likely that the stock is above the point of recruitment impairment (PRI), but there is not certainty that it is fluctuating around MSY.	**80**
Atlantic Cod	Estimated spawning stock biomass (SSB) has increased since 2008 and is currently (in 2017) at a historic high, since records began in 1980. The fishing harvest rate has declined and is at its lowest value in the assessment period. SSB has been above $B_{trigger}$ since 2007 and in 2017 SSB was more than double $B_{trigger}$ indicating that biomass is highly likely to be above or fluctuating around MSY.  ***Atlantic cod spawning stock biomass (MFRI, 2017)***	**100**
3.4.4.1.1.1.1	Atlantic wolffish abundance is tracked in the spring groundfish survey. The survey also provides a recruitment index as it catches wolffish before they recruit to the fishery. The survey suggests that the fishable stock biomass decreased by more than half in 1985–1995 but has generally increased since then, and in 2015 the index is above average. Recruitment was high from 1991–1998, but has decreased since to the lowest level in 2016. Increases in fishable stock indices from 1995–2008 correspond to the high recruitment indices in earlier years. Fishing mortality has decreased since the late 1990s when levels greatly exceeded F_{MSY}, fell below F_{MSY} from 2013-2015, and is current at F_{MSY}.	**80**

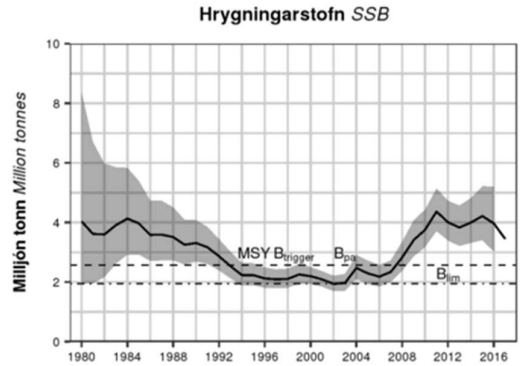
	Based on the above average harvestable biomass, together with fishing mortality at F_{MSY}, the stock is highly likely to be above its PRI. However, it is unknown if the stock is fluctuating around the biological MSY level.  **Atlantic wolffish fishing mortality and harvestable biomass (MFRI, 2017)**	
Blue ling	The Icelandic autumn trawl survey was used as a biomass indicator. The reference F_{MSY} proxy (catch divided by survey biomass and equivalent to a harvest rate) used to provide advice is estimated as the average F_{proxy} for the reference period 2002 to 2009. MFRI considers the stock above possible biomass reference points. The fishing mortality proxy measure is estimated to have been below the reference F_{proxy} in the last three years and reached a record low in 2016. Overall, there are indications that fishing mortality has been decreasing in the last three years, but recruitment is expected to be low over the next few years due to a low juvenile abundance index recorded since 2010. Based on blue ling biomass being higher than the average biomass index and fishing mortality below F_{MSY} proxy it is highly likely that blue ling is above PRI, but its status relevant to MSY is unknown.  ***Blue ling biomass index (MFRI, 2017)***	**80**
Blue whiting	SSB has been above B_{pa} and MSY $B_{trigger}$ since 1996. SSB has undergone fluctuations, peaking in 2003 and lows seen in 2010; however it is currently high and over 2 times the MSY $B_{trigger}$ limit. It is therefore highly likely that blue whiting is above PRI and above or fluctuating around MSY. Fishing mortality has been at or below F_{pa} for the entire time series (since 1980). Fishing mortality has been declining since 2015, but remains above F_{MSY}.	**100**

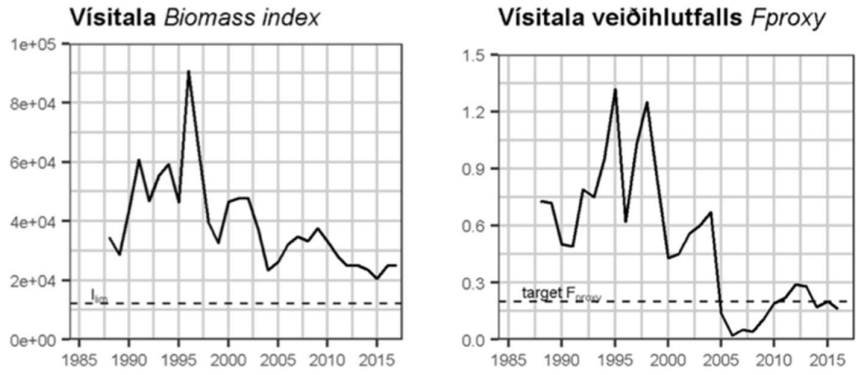
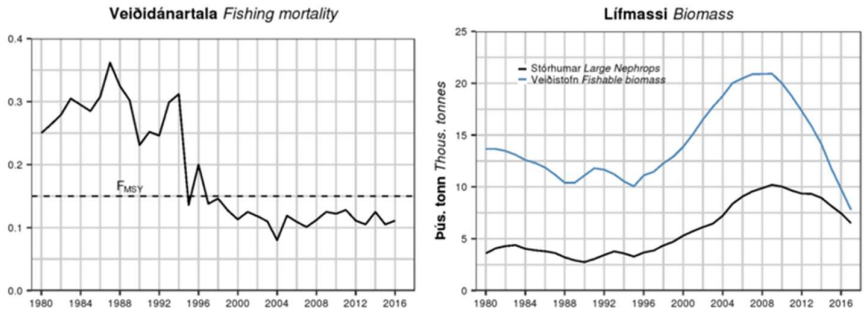
	 ***Blue whiting SSB (MFRI, 2017)***	
Common dab	Dab CPUE has decreased during 1997-2000, increased again 2001-2002, but has now been very low since 2006. The biomass index has fluctuated since 2004, was low 2006-2009, slightly higher from 2010-2014, decreased in 2015 and increased from 2016-2017. Based on age data, fishing mortality has been very high in last years, mostly on 4-6 year old fish. Most reports suggest maturity is reached at 2-3 years old, so many dab may be able to spawn before being subject to the high fishing mortality. The scientific advice has suggested a precautionary TAC of 500t, which is around the dab bycatch, so would effectively exclude a directed fishery. This further suggests that the stock should be considered in recovery. Given the low indices and high fishing mortality, it is not clear that the stock is highly likely to be above the PRI.  **Common dab biomass index (MFRI, 2017)**	**80**
Deepwater redfish (Icelandic slope)	It is assumed that the deepwater redfish landed in association with the lemon sole fisheries is from the Icelandic slope stock. This is because the fishery does not operate in deeper water (>500m) and is demersal so catches would not include the pelagic or deep stocks of this species. For Icelandic slope deepwater redfish, the stock size indicator (survey biomass index) declined from 2001 to 2003, increased from 2003-2006 and decreased in 2007, but has been more stable in the following years. The CPUE has slightly increased annually since a record low in 1994, especially in recent 3–4 years, and is now 40% higher than in 1994 (ICES 2017). Although the absence of any indications of incoming cohorts raises concerns about the future productivity of the stock, the level of biomass seems stable and is considered to be highly likely above PRI. Status with respect to MSY is unknown.	**80**

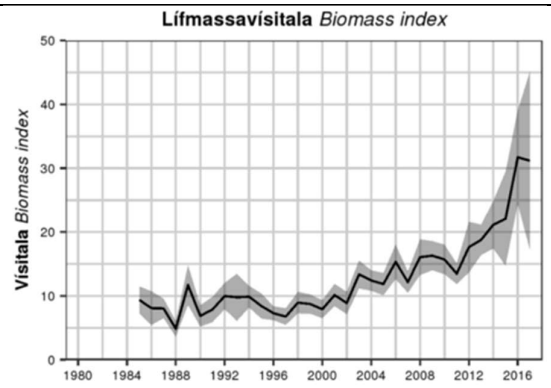
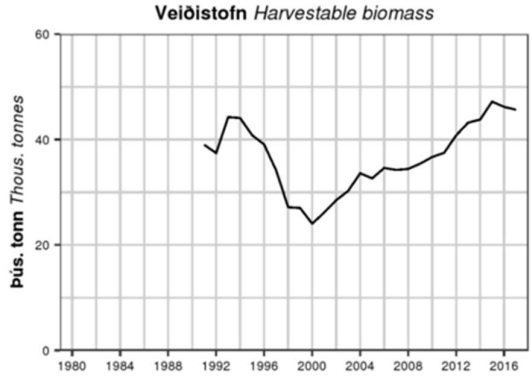
	 **Deepwater redfish biomass index (MFRI, 2017)**	
Golden redfish	SSB has steadily increased for the past 20 years, has been above $B_{trigger}$ since 2000. Fishing mortality since 2010 has been estimated to be around FMSY. It is highly likely that SSB is above PRI, given the status of SSB with respect to $B_{trigger}$ and B_{lim}. SSB in 2017 was just below 350 thousand tonnes, $B_{trigger}$ is approximately 220 thousand tonnes and therefore 2 times $B_{trigger}$ = 440 thousand tonnes. Taking the MSY biological reference point to be 2 x $B_{trigger}$, Golden redfish SSB is therefore not at or fluctuating around MSY.  **Golden redfish SSB (MFRI, 2017)**	**80**
Greater silver smelt	The biomass indicator shows an increasing trend since 2000, it increased in 2014, decreased in 2015 and increased to a time-series high in 2016. The Fproxy has decreased since 2010 and has been below the FMSY proxy since 2013. FMSY proxy is currently at its lowest in the time-series. Trends in the biomass index and fishing effort indicate that it is highly likely to be above PRI. Biological reference points for MSY are not available, and therefore it cannot be determined with certainty that the stock is fluctuating around MSY.  **Greater silver smelt biomass index and Fproxy (MFRI, 2017)**	**80**
Greenland halibut	The biomass has been above Blim for the time-series (since 1980) and has been above Btrigger since 2006. It is therefore highly likely to be above PRI. Biomass is currently below B_{MSY} (i.e. $B/B_{MSY}<1$), and has been since 1992, so the stock is not fluctuating around MSY.	**80**

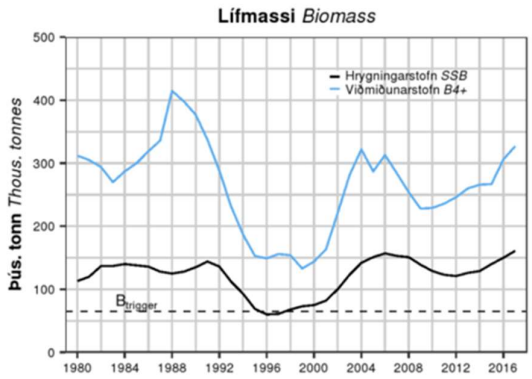
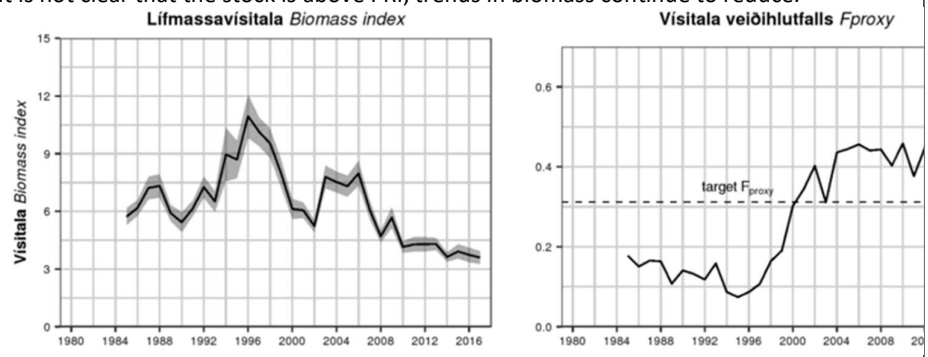
	 **Greenland halibut biomass relative to B_{MSY} (MFRI, 2017)**	
Haddock	Haddock SSB has decreased from record highs in 2004, but remains above management $B_{trigger}$. Harvest rate in 2015–2016 is estimated close to its lowest level in the assessment period and is currently close to HR_{MGT}. Recruitment in 2010–2015 was low but is estimated high for 2016 and 2017 close to geometric mean (MFRI, 2017). SSB has been at or above Btrigger for the entire time series and therefore it is highly likely that biomass is above PRI. SSB is currently approximately 75,000 tonnes. Assuming B_{MSY} equates to 2 x $B_{trigger}$ (=90,000), this biomass is below the level considered consistent with MSY .  **Haddock biomass, SSB and reference biomass (45m and larger) (MFRI, 2017)**	**80**
Herring (Iceland and Norwegian Spring Spawning)	There are several stocks of herring caught around Iceland. Summer spawning herring is considered well above its B_{lim} and MSY $B_{trigger}$ point, so can be considered as around the MSY level. The Norwegian spring spawning herring stock has been declining and estimated to be below MSY $B_{trigger}$ in 2014. MFRI (2017) stock assessment for herring indicates SSB to be above MGT $B_{trigger}$, above B_{lim} but below B_{pa} in 2017. Harvest rate has been above HR_{MGT} since 2012. The stock is considered to be highly likely above PRI, but below biological MSY levels.  **Herring biomass (MFRI, 2017)**	**80**

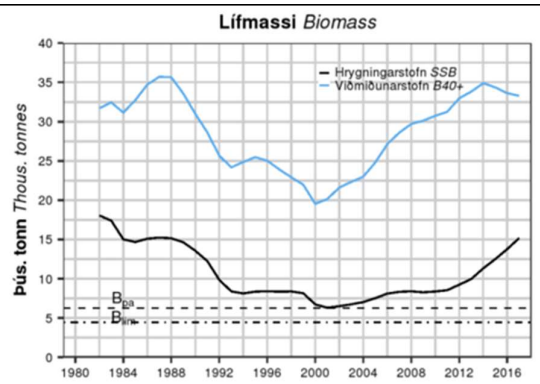
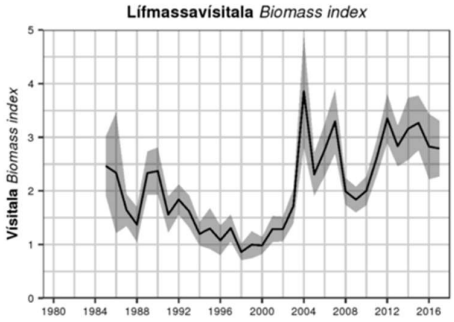
Ling	Ling SSB and the reference biomass (for ling >75 cm) have increased significantly since 2010 and in 2017 are among the highest recorded in the time-series. B_{pa} = MSY $B_{trigger}$ = 9,930 tonnes; in 2017 the SSB was approximately 47,000 tonnes (i.e. >4 x MSY $B_{trigger}$). There is evidence that the stock is above PRI. The stock is considered to be at or above MSY, its most productive in the time series. Harvest rate has decreased since 2008 and is now the lowest in the time series, but above HR_{MGT}.  **Ling biomass (MFRI, 2017)**	**100**
Long rough dab	Survey indices for long rough dab indicate that the stock declined rapidly in 2003–2008, over a period where landed catch was well below set TAC. It is therefore unlikely that the decline in the stock was solely due to fishing (MFRI, 2017). Stock size is close to an all-time low, but recruitment has been high recently, which might lead to increase in stock size over the next few years. This is evidenced through the juvenile index which has been increasing and is now above the average for 1985-2014. Given that the stock is at its lowest levels in the time series, it is unclear whether the stock is above PRI. The MFRI has recommended no TAC, no direct fishing of long rough dab and that main spawning areas will be closed during spawning to promote rebuilding. Long rough dab is therefore only caught as bycatch, in very low levels. The high juvenile index in recent years is evidence of rebuilding. Overall evidence of recovery and the demonstrably effective strategy allow SG80 to be met.  **Long rough dab biomass index and juvenile index (MFRI, 2017)**	**80**
Lumpfish	The MFRI advice is based on a maximum harvest rate not exceeding the 1985–2011 average. The objective to prevent the female lumpfish biomass not falling below the historical minimum. These imply reference points for the survey indices and an appropriate HCR. The female biomass is well above its historical low point, indicating that the stock is highly likely to be above its PRI. Note that male biomass shows a long term decline and is near its historical minimum in 2014 since 1985. F_{proxy} has fluctuated greatly during the last thirty years, but but has been below the target value since 2014 (MFRI, 2017). Lumpfish fishery is managed by a TAC, which will be updated after the spring 2018 survey and related updates to the biomass index.	**80**

	 **Lumpfish female biomass index and fishing mortality (MFRI, 2017)**	
Mackerel (North East Atlantic)	Based on the MFRI (2017) stock assessment, mackerel SSB has increased since 2006 and has remained above MSY $B_{trigger}$ (=B_{pa}) since 2009. The fishing mortality has declined from high levels in 2001–2004 but remains above F_{MSY}. There has been a succession of large year classes since the early 2000s (MFRI, 2017). Given that the SSB is well above Blim and has been above MSY $B_{trigger}$ and B_{pa} since 2009, it is highly likely that the stock is above PRI. Current levels of SSB are estimated at approximately 3.5 million tonnes, with MSY $B_{trigger}$ = 2.75 million tonnes. The stock is therefore not considered to be fluctuating around MSY (i.e. SSB is currently less than 2x MSY $B_{trigger}$).  **Mackerel spawning stock biomass (MFRI, 2017)**	**80**
Northern shrimp (Inshore)	There are 9 separate management units for inshore Northern shrimp based around different fjords. These are likely separate populations, but there is no information on the degree to which their recruitment is connected. It is unclear whether they should be treated as separate stocks or a metapopulation. It is assumed they form a metapopulation, but the lack of increase in some populations despite very low catches may suggest their connectivity is limited. Note that many changes in population are attributed to cod and haddock predation. The TAC is set based on the biomass surveys. Overall, the fishery is responsive to the perceived stock status, so should not be hindering any recovery.	80
Northern shrimp (Offshore)	There is one recognised management unit for offshore Northern shrimp. As for inshore shrimp, the abundance of offshore shrimp is inversely related to the abundance of cod in the same areas. The total stock biomass index of offshore shrimp appears to show a long term downward trend since the 1990s. The value of the shrimp biomass index has been relatively stable between 2012 and 2017, with the exception of the 2015 value which was the lowest in the time series. The F_{proxy} increased between 2006 and 2012, and the Fproxy in 2014-2016 was close to the target F_{proxy}. MFRI use I_{lim} as a proxy for B_{lim} based on a biomass index value of 20% of the mean of the three highest indices. The biomass index is currently above I_{lim} which is evidence that the stock is highly likely to be above PRI. There are no precautionary or $B_{trigger}$ reference points, however, current stock levels and the downward trend in biomass index since the 1990s indicate that the stock is not fluctuating around MSY.	80

	 **Northern shrimp (Offshore) biomass index and fishing mortality (MFRI, 2017)**	
Nephrops (Norway lobster)	Fishing mortality for nephrops has decreased significantly relevant to levels in the 1980-1990s, and has been below F_{MSY} since 1997. Biomass levels peaked in 2008, but have dropped since then. Recruitment has decreased since 2005, with sharp declines since 2009 and has never been lower. Based on the 2017 stock assessment, harvestable biomass has decreased sharply and is at its lowest level. MFRI advise catch levels based on the MSY approach and a TAC continues to be set for nephrops.  **Nephrops fishing mortality and biomass (MFRI, 2017)**	**80**
Norway redfish / Small redfish	Catches of this aggregating fish species have been sporadic, with notable landings from 1997-200 and 2010-2016. Catches are typically 500-1,000 tonnes, but peaked in 2010 at 2,600 tonnes. The Norway redfish is slow-growing and long-lived and thus it is important that effort be limited. The fishery is managed by a TAC which is set based on MFRI advice following the precautionary approach. The biomass index of Norway redfish has been increasing since 2000, with rapid increase since 2011. In 2016 and 2017 the biomass index was at the highest recorded in the time series (since 1985) and more than three times higher than in 2000. It appears that current catches are having limited impact on stock and the status of the stock appears good. Based on the biomass index being the highest on record, it is highly likely that the stock is above PRI. The stock status with respect to MSY is unknown.	**80**

	 **Norway redfish biomass index (MFRI, 2017)**	
Plaice	Since 2016, a new analytical age-based model has been used by MFRI. This new model has indicated that fishing mortality was overestimated in the model used in 2013–2015, and harvestable biomass was underestimated. The harvestable biomass was at a record low in 2000, but has increased steadily since then and is currently at its highest level. MFRI (2017) consider that the stock size is likely to remain stable over the next years, but considerable uncertainty is present in the assessment due to a lack of recruitment data. Available data indicates that recruitment has been stable since 1994 and catches have been stable since 2000. Fishing mortality has decreased since 1997 and has been fluctuating around F_{MSY} since 2011. The TAC is set at F_{MSY} and a seasonal closed area is used to help protect the spawning stock. Given the stock assessment results, and current increasing trend in harvestable biomass, it is highly likely that the stock is above PRI. The stock status with respect to MSY is unknown.  **Plaice harvestable biomass (MFRI, 2017)**	**80**
Saithe	Saithe SSB is currently at the time-series maximum and over 2 x MSY $B_{trigger}$ (SSB = 160,000; MSY $B_{trigger}$ = 65,000 t), this indicates that the stock is at or above MSY levels, with a high degree of certainty that the stock is well above PRI. The harvest rate has declined from 2009 and is presently estimated below HR_{MGT}. Recruitment has been relatively even in the last decade, and well above the average seen since 1980 (MFRI, 2017).	**100**

	 **Saithe biomass (MFRI, 2017)**	
Sea cucumber	The distribution and abundance of sea cucumbers is very patchy. Biomass swept-area surveys have been conducted on three fishing grounds within two of the three areas sea cucumbers occur. Landings have been recommended to not exceed 10% of the estimated stock biomass in each area. The fishery is expanding, and it appears likely that a significant proportion of the biomass is unexploited (i.e. outside currently fished areas). Therefore, it is highly likely above PRI at the current time. Status relevant to MSY is unknown.	**80**
Spotted wolffish	The recruitment index, total biomass index and fishable biomass index has been decreasing in recent years. In 2017 the biomass index was at its lowest level since measurement started in 1985. The juvenile index has increased slightly since 2015, but remains very low. F_{proxy} has been high since 2000 and despite a decrease from 2013 onwards, fishing mortality remains above target F_{proxy}. It is not clear that the stock is above PRI, trends in biomass continue to reduce.  **Spotted wolffish biomass index and fishing mortality (MFRI, 2017)**	**80**
Tusk	The tusk biomass has increased since 2000 and has been above B_{lim} and at or above B_{pa} for the entire time series. MSY $B_{trigger}$ is the same as the B_{pa} reference point; set at 6,240 t, the SSB in 2017 was approximately 15,000t which is > 2 x MSY Btrigger. There is a high degree of certainty that the stock is well above PRI and at or above MSY. SG100 is therefore met. Recruitment in 2011-2014 was very low, but has increased substantially since and was its highest on record in 2017. Harvest rate has declined dramatically since 2010 and has been below HR_{MGT} since 2015. Tusk is managed by a TAC that follows MFRI advice and areal closures are in place for known nursery areas off the southeast and southern coast of Iceland.	**100**

	 **Tusk biomass (MFRI, 2017)**	
Witch	Witch biomass index has been high since 2004. The recruitment index has, however, declined since 2009, and reached an all- time low in 2016. However, as yet the stock biomass does not appear to be affected by the decline in recruitment. F_{proxy} has remained relatively low over the last five years and has been at or below target F_{proxy} since 2012. Since 2010, the catch of witch has remained fairly stable. Witch is mainly caught by Danish seine and nephrops trawl fisheries. Given the stock stability throughout recruitment decline it is highly likely that the stock is above PRI.  **Witch biomass (MFRI, 2017)**	**3.4.4.1.1**

3.4.4.2 Management

The exploitation rates of most Icelandic stocks are controlled by setting appropriate Total Allowable Catches (TACs) which are implemented via an individual transferable quota (ITQ) system.

Other management measures that limit expoitation rates include:

- Controlling fleet capacity through fishing licences,
- Temporary closed areas to protect juvenile / nursery grounds when catches indicate a high proportion of small sized fish;
- Closed areas to protect spawning grounds for specific species;
- Closed areas to protect critical habitats;
- Technical gear restrictions including setting minimum mesh sizes.

Management of all primary species with a TAC is carried out under the same system as described in the Principle 3 (see section 3.5.3).

In order to manage bycatch of non-target species, the Icelandic Fisheries Management Act requires that all catches shall be landed; therefore, discarding is illegal. There are several features in the fisheries management system which reduce the incentive to discard:

- Fishers can land small or undersize fish, with only 50% of the weight being charged against the annual catch quota up to a certain limit (generally 10% of the total landings of each species). This part of the catch should be separated from the rest when the vessel comes into harbour.
- When landing, up to 5% of the total catch (0.5% in case of pelagics) can be classified as being of a low commercial value and should not be subtracted from the quota allocated to the vessel. This part of the catch should be sold at an authorized auction and the proceeds go towards funding marine research (Verkefnasjóður sjávarútvegsins). This part of the catch should be separated from the rest when the vessel comes into harbour.
- There is strict surveillance of fishing vessels (including observers on board) and stiff penalties are imposed for violations of Individual Transferable Quotas (ITQ) rules and regulations.

Any remaining levels of discarding in fisheries is routinely assessed by the Marine and Freshwater Research Institute (MFRI).

The compliance of Icelandic fisheries is monitored by the Directorate of Fisheries and the Icelandic Coast Guard. Breach of regulations leads to a warning or a fine. Repeated offences lead to heavy fines, revocation of the vessel's license to fish and possibly a prison sentence. All landings must be accountable against quota and a vessel owner has 3 days from the point of landing to ensure quota is in place – if quota can not be obtained, then the fishing vessel licence is revoked until the quota issue has been resolved.

3.4.4.3 Information

All Icelandic fishing vessels are equipped with a Vessel Monitoring System (VMS), regardless of the gross tonnage (GT) or length of the vessel. VMS is monitored by the Coast Guard and Directorate of Fisheries (DF) and used for safety as well as vessel compliance. Onboard a fishing vessel the VMS would never be switched off, as this would trigger search and rescue protocols, for example Coast Guard helicopter and/or redirection of other vessels in the area to assist with the search.

Log books are required on-board all fishing vessels, containing information on fishing practices such as location, dates, gear and catch details. Vessels above 6 GT in size are required to use an electronic logbook, whilst smaller vessels are allowed to fill in logbooks manually, and all logbooks must be made available to inspectors from the DF and to MFRI for scientific purposes.

A team of inspectors from DF monitors landing and weighing practices and inspectors may board fishing vessels to monitor catch composition, handling methods and fishing equipment. Following a random investigation, inspectors can join the vessel to the same fishing ground the vessel visited during the previous fishing trip, in order to examine their fishing practices.

At landing, the catch of each vessel is weighed by certified weighers and logged into the electronic database by dates and regions, species and quantities. This allows the use of the DF database to trace the origin and date of each catch and to compare catches by an individual vessel with other vessels fishing at the same location and date.

Landings data are monitored for any discrepancies, such as species composition, and any detected discrepancies can lead to further inspections. An observer system is operated by the DF, both at landing sites and on board vessels. Icelandic observers are placed on-board all types of Icelandic fishing vessels, including bottom trawl, Dainsh seine and Nephrops trawl, primarily to monitor length and maturity of catches and to record by-catch. Observers aim to go on 1-2% of all fishing trips and coverage is good for the largest fisheries (e.g. bottom trawlers). A lower number of trips is monitored for the smaller fisheries (e.g. Danish seines). Allocation of observers to fishing vessels is generally random, and vessels cannot refuse the presence of observers on board. Observers may also be placed on specific vessels if fishing effort and/or catch data showed anomalities. DF observers have annual meetings with MFRI scientists during which observers are trained in species identification, sampling protocols are discussed, and observer handbooks are distributed.

In addition to DF monitoring and enforcement, the Coast Guard also monitors fishing activities in Icelandic waters, e.g. via VMS, including surveillance of areas closed for fishing.

3.4.5 Bait Species

There are no bait species associated with the bottom trawl, Danish seine or Nephrops trawl fisheries.

3.4.6 Secondary Species

Secondary species are species that are part of the catch but that are:

i. Not covered by Principle 1,
ii. Not considered primary species (e.g. managed) and
iii. Are out of the MSC scope but are not assigned as ETP species (see section 3.4.7).

Secondary species for this assessment are listed in Table 3-11 and Table 3-12. It is noted that some of these species, such as Atlantic halibut and whiting are monitored and managed to a degree, but the stock status has not yet been evaluated against reference points and they are not managed using TAC. These species, for this current assessment, have been allocated to the secondary species group.

None of the secondary species are 'main' (i.e. >5% of the catch, of >2% of the catch for less resilient species). However, three 'out of scope' species are considered as 'main': two marine mammal species and one seabird species, that are potentially vulnerable to these fisheries. This has been informed by MFRI bycatch data (MFRI, 2016).

Table 3-*11: Secondary species list, in-scope species, including English, scientific and Icelandic names, level of resilience and main or minor categorization for bottom trawl (TB), Danish seine (SD) and Nephrops trawl (TN).*

English name	Species	Icelandic	Resilience	TB	SD	TN
Fish						
Atlantic halibut	*Hippoglossus hippoglossus*	Lúða	Low	Minor	Minor	Minor
Black scabbardfish	*Aphanopus carbo*	Stinglax	Low	Minor		
Greater eelpout	*Lycodes esmarkii*	Dílamjóri	Low	Minor		
Megrim	*Lepidorhombus whiffiagonis*	Öfugkjafta	High	Minor	Minor	Minor
Northern wolffish	*Anarhichas denticulatus*	Blágóma	Low	Minor	Minor	Minor
Orange roughy	*Hoplostethus atlanticus*	Búrfiskur	High	Minor		
Roughhead grenadier	*Macrourus berglax*	Snarphali	Low	Minor		
Roundnose Grenadier	*Coryphaenoides rupestris*	Slétti langhali	Low	Minor		
Turbot	*Psetta maxima*	Sandhverfa	High	Minor	Minor	Minor
Whiting	*Merlangius merlangus*	Lýsa	High	Minor	Minor	Minor
Cephalopod						
European Flying Squid	*Todarodes sagittatus*	Smokkfiskur	High		Minor	Minor
Elasmobranchs						
Blue Skate / Common Skate	*Dipturus flossada*	Skata	Low	Minor	Minor	Minor
Shagreen ray	*Leucoraja fullonica*	Náskata	Low	Minor	Minor	Minor
Starry ray	*Amblyraja radiata*	Tindaskata	Low	Minor	Minor	Minor

English name	Species	Icelandic	Resilience	TB	SD	TN
Greenland shark	*Somniosus microcephalus*	Hákarl	Low	Minor	Minor	Minor
Leafscale gulper shark	*Centrophorus squamosus*	Rauðmagi	Low	Minor	Minor	
Porbeagle	*Lamna nasus*	Hámeri	Low	Minor		Minor
Spiny dogfish / Picked dogfish	*Squalus acanthias*	Háfur	Low	Minor	Minor	Minor

Table 3-12: Secondary species list, out of scope species, including English, scientific and Icelandic names, level of resilience and main or minor categorization for bottom trawl (TB), Danish seine (SD) and Nephrops trawl (TN).

English name	Species	Icelandic	Resilience	TB	SD	TN
Pinneped						
Harbour seal	*Phoca vitulina*	Landselur	Low	Main		Main
Grey seal	*Halichoerus grypus*	Útselur	Low	Main		Main
Bird						
Northern gannet	*Morus bassanus*	Súla	Low	Main		Main

3.4.6.1 Outcome status – 'in scope' species

All finfish landings of secondary species are minor, and in many cases negligible. Overall, the fishing effort of Icelandic vessels corresponds to the productivity of the main target stocks (cod, haddock, saithe, ling, herring, capelin etc.), which provides protection to these target stocks as well as to non-target species.

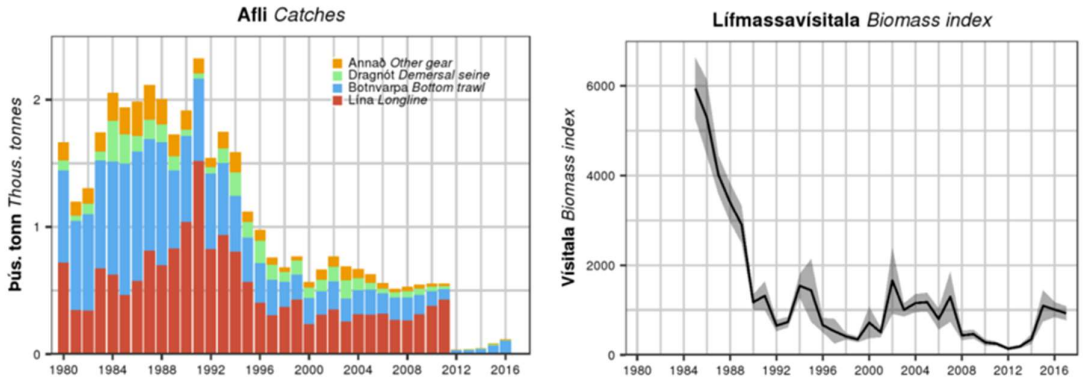


Figure 3-19. Catches and biomass index for Atlantic halibut (MFRI, 2017)

Discarding by Icelandic vessels is banned, but may occur in small quantities. An exception to the discard ban is the requirement to return viable Atlantic halibut to sea. In 2012 a regulation was issued to ban all targeted fishing for this species, stipulating that all viable fish must be released. These measures were adopted because the recruitment and biomass indices of Atlantic halibut decreased rapidly between 1985 and 1992, and have remained low since (MFRI, 2017). Atlantic halibut is now only caught as bycatch in bottom gears (MFRI, 2017). Catches of Atlantic halibut recorded for the UoAs under assessment are very low, ranging from 5 tonnes (Danish seine and Nephrops trawls) to 34 tonnes (bottom trawlers) on average per year (based on 2013-2017 catches), and making up <0.1% of total catches of the UoAs (see landings profiles above). Moreover, since the ban on Atlantic halibut

landings was introduced in 2012, catches have almost ceased completely, although a slight increase is noted in 2016 (Figure 3-19).

3.4.6.2 Outcome status – 'out of scope' seabirds

Seabirds use sea cliffs around the Icelandic coast as nesting sites and breeding colonies of seabirds are found all around Iceland. Since the early eighties, the populations of seabirds have in general reduced significantly which most likely has been driven by changes in food availability (Hundeide, 2015). Seabirds are most vulnerable to be caught by fishing gear while feeding relatively close to the shore, in particular gillnets and longlines. It should be noted that Icelandic populations of several breeding seabirds are declining, for reasons which are unclear but which are thought to be related to changes in climate and oceanographic conditions in the Arctic regions.

Interactions with towed gears such as trawls and Danish seines are minimal (MFRI, pers. communication). Only one species of seabird – the northern gannet - is included as an out-of-scope species based on small levels of recorded bycatch interaction, for bottom trawl and Nephrops trawl only. The latest population size, average annual bycatch and proportion of population impacted is presented in Table 3-13 for northern gannet.

Table 3-*13: Northern gannet population size, average annual bycatch in demersal otter trawl (including bottom trawl and Nephrops trawl) and relative proportion of population impacted.*

Species	Icelandic Population Size (Individuals)[1]	Average annual bycatch[2]	% population impacted
Northern gannet	63,000	45	0.07%

[1] Source: BirdLife International (2015) European Red List of Birds
[2] Source : MFRI, 2017, bycatch report.

Northern gannet

The northern gannet is found on both sides of the Atlantic Ocean; breeding sites include northern France, the United Kingdom, Ireland, Iceland, Norway and the eastern tip Quebec (Canada) (del Hoyo et al. 1992). The Icelandic population was estimated to number 31,500 breeding pairs (63,000 in total) in 2005-2008 (Arnthór Garðarsson. 2008a, cited in Birdlife International, 2015). This strictly marine species wanders mostly over continental shelves, feeding on shoaling pelagic fish which are mostly caught by plunge-diving from great heights. It also follows trawlers and will form large congregations where food is plentiful. Breeding is highly seasonal starting between March and April, usually in large colonies on cliffs and offshore islands, but also sometimes on the mainland. Both short and long term population trends for this species have been estimated to be increasing in Iceland, and the species was recently given an IUCN status of 'Least Concern' in Europe (see status on http://www.iucnredlist.org/).

According to the most recent bycatch estimates available from the MFRI, demersal otter trawl (including bottom trawl and Nephrops trawl) account for a maximum of 45 northern gannet deaths a year. Based on the estimated Icelandic population size of 63,000 individuals, an average annual catch of northern gannets caught as bycatch would account for only 0.07% of the total estimated Icelandic population per year. Gillnets equate to 292 nothern gannets deaths per year, and long line 207 deaths per year, which combines to account for 0.79% of the population. Increasing population trends indicate that the species is highly likely to be above biologically based limits, and the limited interaction, both for bottom trawl and Nephrops trawl, together with cumulative impacts from other gears, are highly unlikely to have a significant effect on the population size.

3.4.6.3 Outcome status – 'out of scope' marine mammals

A range of marine mammals inhabit Icelandic waters including four species of seals (harbour, harp, grey and ringed) and harbor porpoise. Other marine mammals, including whales and dolphins are considered under ETP.

Of the marine mammals present, two species are recorded within MFRI bycatch data as having interactions with demersal otter trawl, including bottom trawl and Nephrops trawl. These species are: harbor seal and grey seal. The latest population sizes, average annual bycatch and proportion of populations impacted is presented in Table 3-14 for marine mammals.

Table 3-*14: Harbour seal and grey seal population size, average annual bycatch in demersal otter trawl (including bottom trawl and Nephrops trawl) and relative proportion of population impacted.*

Species	Icelandic Population Size (Individuals)	Average annual bycatch[3]	% population impacted
Harbour seal	7,652[1]	28	0.37%
Grey seal	4,100[2]	22	0.54%

[1] Source: Þorbjörnsson, 2017.

[2] Source: Guðjón Már Sigurðsson pers. communication, 4 April 2018.

[3] Source : MFRI, 2017, bycatch report.

Harbour seal

Harbour seals are one of the most widespread of the pinnipeds. They are found throughout coastal waters of the northern hemisphere, from temperate to polar regions. Available data show that the Eastern Atlantic harbour seal population is relatively large and widespread. A decline in numbers has recently occurred or is still occurring in some areas (e.g., Shetland and Orkney Islands, Firth of Tay), but in other parts of the range numbers are thought to be stable or increasing (Baltic Sea, southern Scandinavia). As a result, the Eastern Atlantic harbour seal does not meet any of the IUCN criteria for 'threatened' categories, and is listed as 'Least Concern' (Bowen, 2016).

However, despite the species' potential for long-distance movements, harbour seals are known to be regionally philopatric on a scale of several hundred kilometres. Studies of the *Phoca vitulina* population structure have shown that there are in fact a number of distinct population units in the North Atlantic, including a distinct population in Iceland (Stanley et al., 1996; Goodman, 1998; Andersen and Olsen, 2010; Andersen et al., 2011). A census of the Icelandic harbour seal population carried out in 2016 indicated a continuing decline. The estimated population size (7652 individuals) was 77% smaller than when first estimated in 1980, and 32% smaller than in 2011, when the last complete population census was undertaken (Figure 3-20. Icelandic harbour seal population trend in 1980-2016. Mean values (blue), as well as the 95% confidence intervals are shown. Source: Þorbjörnsson, 2017.-20). In addition, the estimate was 36% lower than a government issued management objective for the minimum population size of harbour seals in Iceland. The study concluded that based on criteria used by the International Union for Conservation of Nature and Natural Resources (IUCN), the conservation status of the Icelandic population should be considered as 'Endangered'. The reasons for the observed population decline are poorly understood, but the most likely factors contributing to the downward population trend are likely to be by-catch (in static net fisheries) as well as direct hunting, which still takes place in Iceland (Þorbjörnsson, 2017).

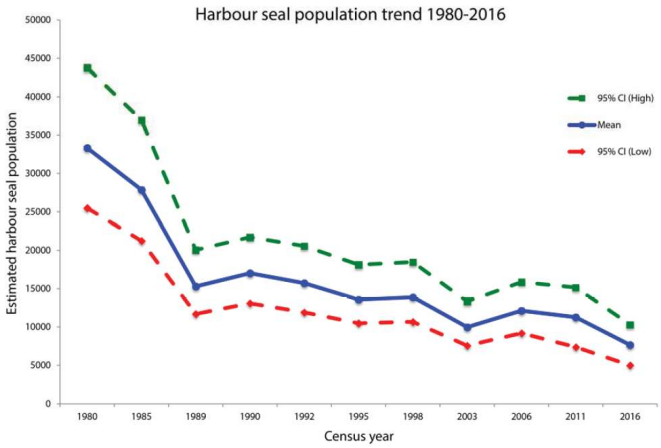


Figure 3-20. Icelandic harbour seal population trend in 1980-2016. Mean values (blue), as well as the 95% confidence intervals are shown. Source: Þorbjörnsson, 2017.

Based on the most recent MFRI data available (2014-2016), bottom trawl (including Nephrops trawl) account for a maximum of 28 harbour seal deaths per year, which would account for 0.4% of the total estimated Icelandic population per year. This percentage of bycatch is unlikely to be of concern.

Grey seal

Grey seals have a sub-Arctic to cold temperate distribution over the continental shelf in North Atlantic waters (Hall, 2002). Grey seals' diet varies by location, though they are largely benthic feeders, which in many areas primarily feed on sandeels found in sandy or gravelly benthic habitats (McConnell et al. 1999; Hall, 2002).

There are three populations isolated both geographically and by timing of reproduction: (i) the western Atlantic population (centered in northeastern North America); (ii) the eastern Atlantic population, which is concentrated around the coast of the United Kingdom and Ireland but also includes breeding colonies in Iceland, the Faroe Islands and along the mainland coast of northern Europe as far south as Brittany in France (iii) the Baltic Sea. The Icelandic population has been estimated at 4,100 individuals (MFRI, G. Sigurðsson, pers. Communication). Grey seal numbers are known to have increased strongly in recent years (including the northeast Atlantic population which is found in Iceland) as a result of measures to protect this species (Klimova et al., 2014). Based on the overall increasing population trends, this species is classified as 'Least Concern' by IUCN (European Mammal Assessment team, 2007).

The most recent MFRI data available (2014-2016), bottom trawl (including Nephrops trawl) account for a maximum of 22 grey seal deaths per year, which accounts for 0.5% of the total estimated annual number of grey seals which visit Icelandic waters to feed. This percentage of bycatch is unlikely to be of concern.

3.4.6.4 Management of Secondary Species

There are no direct management interventions for in-scope secondary species (finfish, cephalopods and elasmobranchs), with the exception of Atlantic halibut. Landings of in-scope secondary species are however small (all are minor species), and in most cases negligible. Many controls limiting exploitation of the main target stocks (cod, haddock, saithe etc.), including capacity limits, mesh size etc., will also protect non-target stocks. In addition, controls such as ITQ's will indirectly limit the quantity of non-target stocks being caught by the fisheries. With very low catches of secondary species, it is likely that further action is not required, but this has not been formally determined. Improved management of these stocks would likely lead them to be classified as primary species.

There is a requirement to release Atlantic halibut if it is viable and all directed fishing of halibut has been prohibited. Evidence from the surveys indicates that the population size has been increasing in recent years, suggesting that the current management strategy is helping in rebuildingthe stock (MFRI, 2017).

Various measures are taken to ensure the protection of juvenile fish and vulnerable habitats. This includes regulations on the type of fishing gear allowed in different areas, rules on the minimum mesh size and the closing of fishing grounds. If on board monitoring reveals that the percentage of small fish in the catch or the bycatch exceeds guideline limits, the MFRI may close the relevant fishing area for a short period of time, or for a longer period if small fish or by-catch repeatedly exceeds guideline limits.

Also, temporary closures of areas are in force to protect spawning grounds of demersal species (Figures 3-21 and 3-22). Furthermore, various long-term area closures are in place, which may apply to specific fishing gear, fishing-vessel size or all fishing for certain periods of time. For instance, in order to protect the spawning stock of cod, extensive seasonal closures are in operation during the spawning season (Regulation Nr. 30/2005); all cod fisheries are closed within 12 nautical miles along the south and west coast and within 6 nautical miles along the north and east coast in April each year. These closures and other measures will indirectly limit the level of in-scope species caught by the fisheries and are considered to form a partial strategy.

In addition, these closures and other measures will indirectly limit the level of interaction with northern gannet and grey and harbour seals, particularly for inshore areas where the presence of these species is highest.

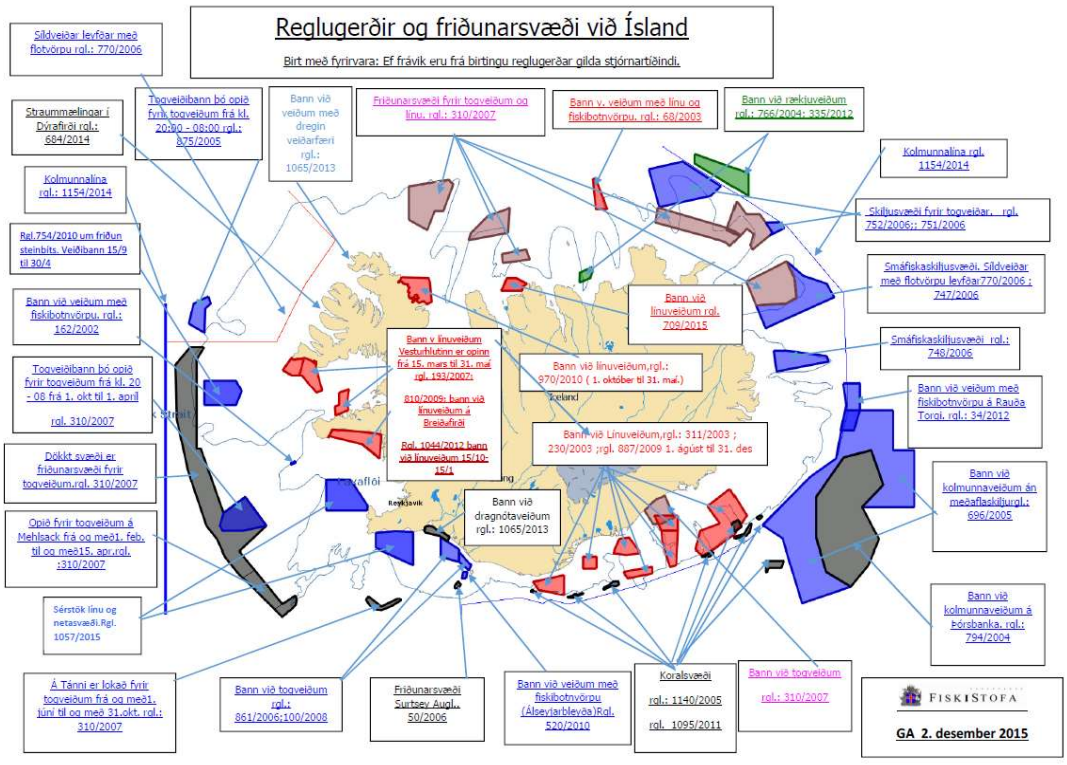


Figure 3-21. Map with information on temporarily closed areas in Icelandic waters. Source: Directorate of Fisheries (2015). A larger version is available here: http://www.fisheries.is/management/fisheries-management/area-closures/

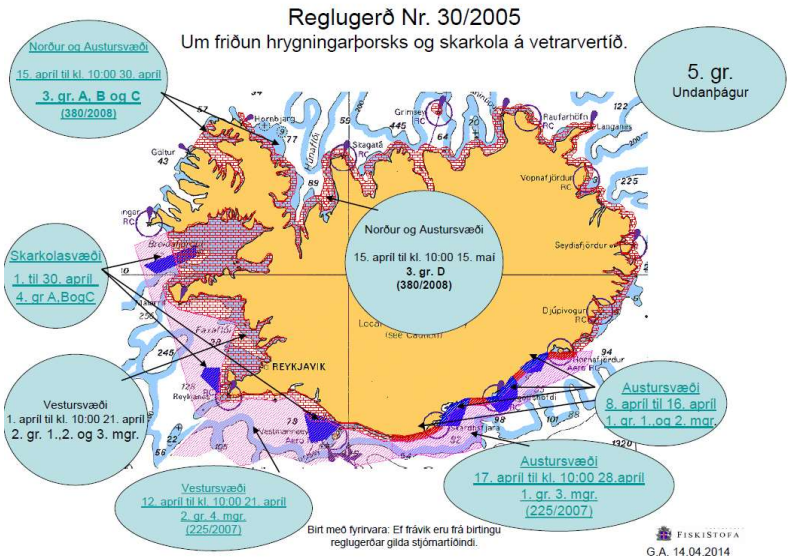


Figure 3-22. Map with information on spawning area closures in Icelandic waters. Source: Directorate of Fisheries (2015). A larger version is available here: http://www.fisheries.is/management/fisheries-management/area-closures/

Additional measures in place to manage bycatch of marine mammals and seabirds in Icelandic fisheries include:

- Marine mammal and seabird bycatch is monitored by mandatory e-Log system and onboard observers from the DF and the MFRI. Recent adaptions to the e-Log system to improve usability have improved the rate of recording (MFRI, pers. comm., and bottom trawl captain pers.comm.). Observers monitor ca. 1-2% of all Icelandic fishing, and overall the quality of the data has improved in the last 5 years (MFRI pers. comm.).
- Fishers are not allowed to offer for sale, give away, nor accept as a gift, any bird that has been killed in fishing gear.
- Any birds or mammals caught alive must be released.

3.4.6.5 Information on Secondary Species

Information on fishing impacts on in-scope secondary species is available from the same data sources as for primary species (including both fisheries dependent and fisheries independent data), except that they may be somewhat less well studied since such species are not the focus of scientific sampling programmes and research projects. The Icelandic Fisheries Management Act requires that all catches shall be landed. Discarding is thus illegal, and landings of all in-scope species, are routinely recorded. All catches landed in Iceland must be weighed using specially authorized scales and the landing data is instantly transmitted to the database of Directorate of Fisheries (DF). There are strict requirements for the keeping of log books on-board all fishing vessels, containing information on fishing practices such as location, dates, gear and catch quantity. Log books must be made available to inspectors from the DF and to MFRI for scientific purposes. A team of inspectors from DF monitors landing and weighing practices and inspectors may board fishing vessels to monitor catch composition, handling methods and fishing equipment. Following a random investigation, inspectors can join the vessel crew to the same fishing ground the vessel visited during the previous fishing trip, in order to examine their fishing practices. Also, the system of instant recordings of landings allows for the use of DF database to trace the origin and date of catch and to compare catches by an individual vessel to other vessels

fishing at the same location and date. Discrepancies in catch proportion can lead to further inspections.

Landings of some out-of-scope species secondary, such as harbour seals, have also been reported, but these are rare. Although Icelandic fishers are required to land all catches, based on the current practical interpretation of Icelandic fisheries laws, seabirds and mammals can be returned to sea, as long as such catches are recorded in logbooks by fishers (MFRI, pers. Comm.). In addition, viable Atlantic halibut must be returned to sea. The e-Log system and all data recorded by onboard observers is routinely made available to the MFRI for analysis.

Information on the status of secondary species is available from fisheries independent scientific surveys, including spring and autumn groundfish beam trawl surveys. Data coming from such surveys is not publicly available, but routinely used for scientific purposes, for instance to assess the most recent population trends of Atlantic halibut.

Such routine scientific surveys are supplemented by targeted research projects and population counts, including for out-of-scope marine mammal and seabirds. For example during June-August 2015, the MFRI participated in a large scale cetacean sightings survey (NASS-2015) conducted in cooperation with the Faroes, Greenland and Norway under coordination of the NAMMCO Scientific Committee. The Icelandic part of the survey was conducted from two research vessels and one aircraft (NAMMCO, 2016). More recently, in July - September 2017 the Icelandic Seal Center, the Vör Marine Research Center and the MFRI joined forces to carry out an aerial census of the Icelandic harbour seal in order to update the available information on population estimates, trends and current status (Þorbjörnsson, 2017). Seabird surveys are carried out by the Icelandic Institute of Natural History, as well as through *ad hoc* scientific studies (e.g. Gardarsson and Jónsson (2014) carried out a study on the status of the breeding population of great cormorants in Iceland in 2012).

Quantitative data is available to assess the magnitude of UoA-related impacts on the identified out-of-scope secondary species.

3.4.7 Endangered, Threatened and Protected Species

3.4.7.1 Definition and identification of ETP species in the UoAs

Endangered, threatened or protected (ETP) species are defined by the MSC (SA3.1.5) as species that are:

i. Recognised by national ETP legislation,
ii. Listed on Appendix I of 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),
iii. Listed in any binding agreements concluded under the Convention on Migratory Species (CMS), or
iv. Classified as 'out-of scope' (amphibians, reptiles, birds and mammals) that are listed in the International Union for the Conservation of Nature (IUCN) Redlist as vulnerable, endangered or critically endangered.

Species are not considered as ETP under MSC protocols if they:

- only appear in non-binding lists;
- are only the subject of intergovernmental recognition;
- are not included in national legislation; and
- are not subject to binding international agreement.

3.4.7.2 Legislation

Iceland has ratified a number of conventions on species protection and management, such as the Convention on Biological Diversity, the OSPAR Convention and the CITES Convention. However, Iceland is not a signatory to Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas (ASCOBANS). These conventions have established objectives for conserving endangered, threatened or protected species and habitats, and if issues are identified relating to ETP species, a number of mechanisms have been developed to detect and reduce impacts.

3.4.7.3 Outcome Status

Twelve bird, eight cetaceans, one terrestrial mammal, one seal and one marine reptile species have been identified as ETP species that have the potential to interact with marine fisheries in Iceland (see Table 3-15).

Table 3-*15: ETP species list, including English, scientific and Icelandic name and designations in Icelandic waters*

English Name	*Species*	Icelandic Name	*Type*	*IUCN Status*	*IUCN Pop. Trend*	*CITES App. I*	*AEWA*
Atlantic puffin	*Fratercula arctica*	Lundi	Bird	VU	Decreasing		
Black guillemot	*Cheppus grylle islandicus*	Teista	Bird				Y
Black-legged kitiwake	*Rissa tridactyla*	Rita	Bird	VU	Decreasing		
Black-tailed godwit	*Limosa limosa islandica*	Jaðrakan	Bird				Y
Common eider	*Somateria mollissima*	Æður	Bird	VU	Decreasing		
Common loon	*Gavia immer*	Himbrimi	Bird	VU	Decreasing		
Common pochard	*Aythya ferina*	Skutulönd	Bird	VU	Decreasing		
Gyrfalcon	*Falco rusticolus*	Fálki	Bird			Y	
Horned grebe	*Podiceps auritus*	Flórgoði	Bird	VU	Decreasing		Y
Long-tailed duck	*Clangula hyemalis*	Hávella	Bird	VU	Decreasing		
White-tailed eagle	*Haliaeetus albicilla*	Haförn	Bird			Y	
Whooper swan	*Cygnus cygnus*	Álft	Bird				Y
Blue whale	*Balaenoptera musculus*	Steypireyður	Cetacean	EN	Increasing	Y	
Bowhead whale	*Balaena mysticetus*	Norðhvalur/ Grænlandshvalur	Cetacean			Y	
Fin whale	*Balaenoptera physalus*	Langreyður	Cetacean	EN	Unknown	Y	
Humpback whale	*Megaptera novaeangliae*	Hnúfubakur	Cetacean			Y	

Minke whale	*Balaenoptera acutorostrata*	Hrefna	Cetacean			Y	
N-Atlantic right whale	*Eubalaena glacialis*	Sléttbakur	Cetacean	EN	Unknown		
Sei whale	*Balaenoptera borealis*	Sandreyður	Cetacean	EN	Unknown	Y	
Sperm whale	*Physeter macrocephalus*	Búrhvalur	Cetacean	VU	Unknown	Y	
Hooded seal	*Cystophora cristata*	Blöðruselur	Pinniped	VU	Decreasing		
Leatherback turtle	*Dermochelys coriacea*	Leðurskjaldbaka	Reptile	VU	Decreasing	Y	
Polar bear	*Ursus maritimus*	Ísbjörn	Mammal	VU	Unknown		

While 23 ETP species occur in Icelandic marine waters, it is concluded that the likelihood of interaction with some of these is sufficiently negligible to not warrant any further consideration, either because the species is not resident in Icelandic waters or at the extreme edge of its range (polar bear, leatherback turtle) or because the species is confined to coastal environments with little overlap with the fisheries which are being assessed (black tailed godwit, swan, gyrfalcon, white tailed eagle, common pochard, horned grebe, long tailed duck). However, where a potential interaction occurs with bottom trawl and Danish seine, consideration of the scale of impact is required for 8 species of whale (sei whale, blue whale, fin whale, bowhead whale, sperm whale, common minke whale, humpback whale and North Atlantic right whale), the hooded seal and the remaining 2 species of marine birds (black guillemot and Atlantic puffin).

The interaction of whales in bottom trawl, Nephrops trawl and Danish seine is considered to be negligible. According to observer reports from MFRI and personal communication with MFRI staff there has been no registration of whale interaction with the gears of commercial vessels or by MFRI during their spring and fall bottom trawl surveys in the last 5 years. Direct mortality from these fishing gears is therefore considered negligible.

The bycatch of black guillemot and Atlantic puffin in bottom trawl, Nephrops trawl and Danish seine is considered to be negligible. According to observer reports from MFRI and personal communication with MFRI staff there has been no registration of black guillemot and Atlantic puffin bycatch by commercial vessels or by MFRI during their spring and fall bottom trawl surveys in the last 5 years. Direct mortality from these fishing gears is therefore considered negligible.

Interaction of hooded seal with these fishing gears is rare because of the nature of the fishing. According to obsever reports from MFRI and personal communication with MFRI staff there has been no registration of hooded seal bycatch by bottom trawl, Nephrops trawl or Danish seine vessels, nor by MFRI during their spring and fall bottom trawl surveys in the last 5 years. Discussions with MFRI have indicated that the original conclusion of negligible bycatch in these gears remains unchanged (MFRI Pers. Comm.).

However, during the site visit anecdotal information from the Captain and skipper of a bottom trawler indicated the capture of a hooded seal within a haul in the past. While this is understood to be a rare occurance, the identification of interaction with hooded seals, together with the recorded interaction with harbour seals and grey seals, warrants the inclusion of hooded seal as an ETP species for bottom trawl and Nephrops trawl fisheries.

It is concluded that the potential for interaction with Danish seine is negligible due to the nature of fishing practises, specifically that nets are closed before hauling, reducing the likelihood of any potential for interaction with seals.

Hooded seal

Hooded seals are found at high latitudes in the North Atlantic, and seasonally they extend their range north into the Arctic Ocean. They breed on pack-ice and are associated with it much of the year, though they can spend significant periods of time in the pelagic realm (Lavigne and Kovacs 1988, Folkow and Blix 1999, Folkow et al. 2010). Four distinct populations can be found on pack ice: (i) near Jan Mayen Island, (ii) off Labrador and northeastern Newfoundland, (iii) in the Gulf of St. Lawrence, and (iv) in the Davis Strait. The total hooded seal population is currently estimated to be 650,000, including 400,000 individuals in the northwest Atlantic Ocean, and 250,000 in the Jan Mayen population (MarineBio.org). The Icelandic population has been estimated at 67,104-98,573 (Table 3-16).

With changing sea ice conditions reducing the pack ice habitat needed by all hooded seals, there is good reason to believe that numbers in all stocks might be declining. For instance, hooded seals in the Greenland 'West Ice' area continue to show a declining trend. Comparing pup production estimates for 1997 and 2012 indicates a population decrease of 3.7% per year and a reduction in population size of 43% in 15 years (Kovacs, 2016). The most recent estimate of the total size of this population is 82,830 (SE=8,028) and models suggest a continued decline of approximately 7% per year in the coming decade (Øigård et al. 2014). Overall, this stock is less than 10% of its abundance observed some 60 years ago (ICES, 2013). Overhunting was clearly involved in the collapse of this stock as quotas were being set for a population size much larger than it actually was. However, the cause of the significant on-going decline in this population is thought to be related to climate change induced changes of its sea ice breeding habitat and increased predation by polar bears and Orcas in the pupping areas (Øigard et al., 2014); prey availability might also be an issue. As a result of these population declines this species is currently classified by IUCN as 'Vulnerable' (Kovacs, 2016).

Based on the most recent MFRI data available, no hooded seal deaths were recorded by bottom trawl, Nephrops trawl or Danish seine. However, stakeholder consultation indicates they may occur. Taking a precautionary approach, the highest estimate of seal interaction for harbour and grey seals has been taken as a proxy for hooded seal interaction i.e. average annual bycatch of 28 seals. This would account for 0.03-0.04% of the total estimated annual number of hooded seals which visit Icelandic waters to feed. This percentage of bycatch is unlikely to be of concern.

Table 3-*16: Population size of hooded seal.*

Species	Icelandic Population Size (Individuals)
Hooded seal	67,104-98,573

Source: Þorsteinn Sigurðsson (MFRI) / Vottunarstofan Tún pers. communication, 30 May 2016.

3.4.7.4 Management

Various measures taken to ensure the protection of juvenile fish and vulnerable habitats in Icelandic waters (e.g. regulations on the type of fishing gear allowed in different areas, rules on the minimum mesh sizes and the closing of fishing grounds) will serve to reduce bycatch of ETP species. For instance, although not established to specifically protect such species, area closures will somewhat reduce interaction with and bycatch of ETP species.

Additional measures in place to manage bycatch of ETP species in Icelandic fisheries include:

- Marine mammal and seabird bycatch is monitored by mandatory eLog system and by onboard observers from the DF and the MFRI. Observers monitored ca. 1-2% of all fishing trips for all gears per year, and overall the quality of the data has improved in the last 5 years (MFRI pers. comm.).

- Fishers are not allowed to offer for sale, give away, nor accept as a gift, any bird that has been killed in fishing nets.
- Any birds or mammals caught alive must be released.

There are no Icelandic requirements for protection and rebuilding hooded seals. However, in 2007 the NAMMCO Management Committee for Seals and Walruses recommended a commercial catch level of zero for hooded seals, only allowing limited research catches. This species is nevertheless still being caught in large numbers by Greenland; the average catches over the last 5 years are around 1,850 animals, compared to the previous five years when the annual catch was 3,400 (NAMMCO, 2016).

3.4.7.5 Information

Fisheries are required by legislation to register all bycatch of birds and marine mammals (regulation 126/2014). MFRI registers bycatch of birds and mammals during their sampling trips on commercial vessels and also during their bottom trawl surveys since 2010. Observers from the Directorate of Fisheries have registered bycatch of birds and mammals since 2010.

The sources of information available to assess the impacts of the UoAs on ETP seabird and marine mammal species / to assess the status of such species are the same as those described in detail for out-of-scope secondary species in section 3.4.6.5. They include: data from routine recording of landings, logbook data, onboard observations, scientific surveys, population censuses carried out by various entities (including but not limited to the MFRI, the Icelandic Seal Center, the Vör Marine Research Center and the Icelandic Institute of Natural History), and scientific research projects.

As for the out-of-scope secondary species, quantitative data is available to assess the magnitude of UoA-related impacts on the identified ETP species however logbook returns have been poor, and variations in estimated numbers of bycatch species evident in the most recent data indicate that the available information may not be accurate and verifiable for all bycatch species, including for the ETP species being considered in the present assessment. Moreover, uncertainties remain on total population sizes of several species of birds and marine mammals, with only outdated information available on total population sizes for some species.

3.4.8 Habitats

3.4.8.1 Outcome Status

Iceland is located at the junction of the Mid-Atlantic Ridge and the Greenland-Scotland Ridge just south of the Arctic Circle and this is reflected in the topography around the country. The different geomorphological features of the seafloor provide a broad range of benthic habitats, with substrate characteristics often related to depth. The main substrate types around Iceland are mud, gravel and lava; hard bottoms are more common in shallower waters, whilst in deeper waters, hard bottoms are often confined to abrupt features such as ridges and seamounts. Soft sediments often dominate in the troughs and beyond the continental slope. The shelf around Iceland is narrowest off the south coast and is cut by submarine canyons around the country (ICES, 2016). Differences in oceanographic conditions in the north and south of Iceland largely determine the distribution patterns of benthic species, with warmer water species found in areas dominated by Atlantic waters to the south, and colder water species found in colder Arctic waters to the north. The Greenland-Iceland-Faroe Ridge acts as a distribution barrier for many species, and overall benthic communities are characterised by high levels of both diversity and biomass (MFRI, 2016).

In the following section the impact of the bottom trawl, Nephrops trawl and Danish seine upon (i) ***commonly encountered habitats*** and (ii) ***vulnerable marine ecosystems*** will be examined.

3.4.8.2 Commonly encountered habitats

Commonly encountered habitats are those with which the gear regularly comes into contact; such habitats are considered separately from vulnerable marine ecosystems (VMEs) for the purpose of this

assessment. The benthic habitats around Iceland are characterized by sandy and gravel substrates in shallow waters and on the ridges, with frequent lava intrusions, and muddy, high organic substrates in deeper waters (Figure 3-23: Major substrates in the Icelandic Waters ecoregion (compiled by EMODNET substrate habitats; www.emodnet-seabedhabitats.eu). Source: ICES, 2017.23). The deeper benthic areas may have dense aggregations of mobile megabenthos, particularly in organic matter−rich regions. Dropstones in a muddy or sandy environment were observed to provide a substrate for various diverse sessile epifauna (Meißner *et al*, 2014).

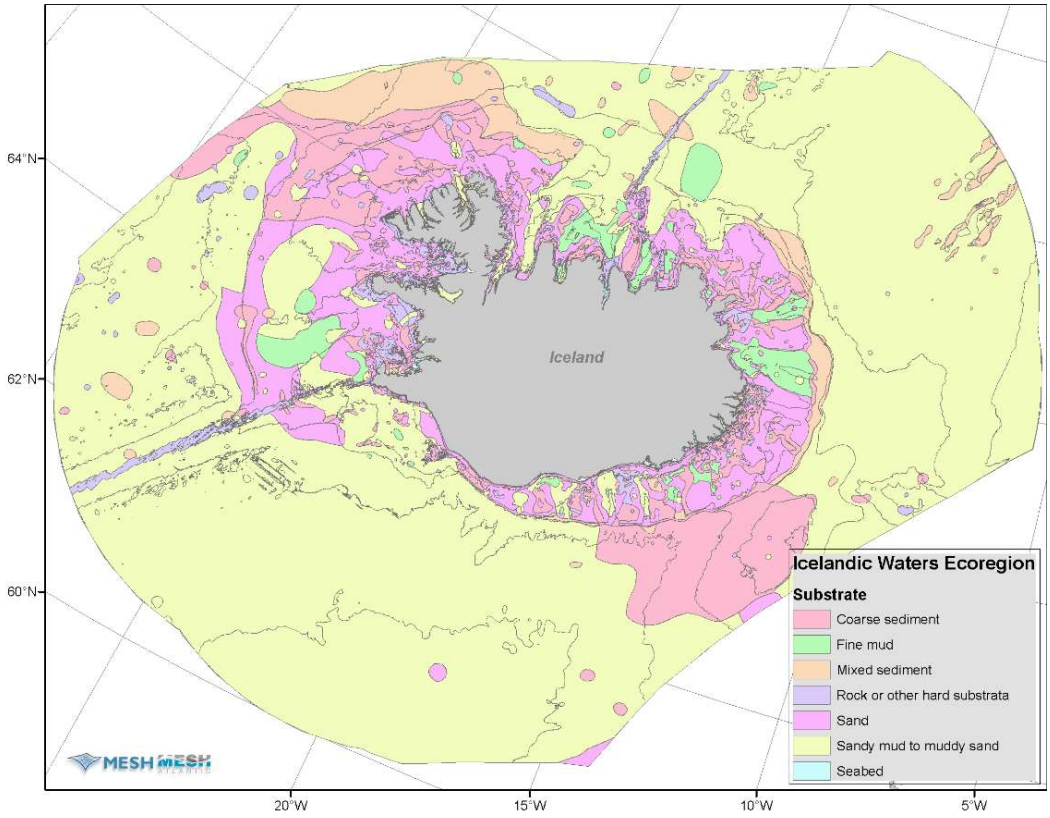


Figure 3-23: Major substrates in the Icelandic Waters ecoregion (compiled by EMODNET substrate habitats; www.emodnet-seabedhabitats.eu). Source: ICES, 2017.

Table 3-17. Commonly encountered habitats by gear type.

Gear type	***Water depth profile***	***Commonly encountered habitats***
Bottom trawl	100 – 500 m	Fishing effort is concentrated in areas with coarse sediments, but also overlaps with areas characterised by soft substrates including sand, sandy mud, muddy sand and mixed sediments (compare Figure 3-23: Major substrates in the Icelandic Waters ecoregion (compiled by EMODNET substrate habitats; www.emodnet-seabedhabitats.eu). Source: ICES, 2017. with map of fishing intensity distribution; Ragnarsson & Steingrímsson, 2003).
Nephrops trawl	100 – 500 m	Soft ground, usually soft mud that provides good burrowing habitat for *Nephrops.*
Danish seine	40 – 60 m	Danish seine cannot be used on rough grounds and is used on relatively flat sandy or muddy seabeds (Thórarinsdóttir *et al*, 2010; MFRI pers. communication).

The commonly encountered habitats are considered for each gear type in Table 3-17. Commonly encountered habitats by gear type.3-17 and maps of fishing effort by gear type (based on analysis of VMS data and landings data) are presented in Figure 3-24. Fishing effort distribution for Icelandic bottom trawl, Nephrops trawl and Danish seine (MFRI, 2017).24.

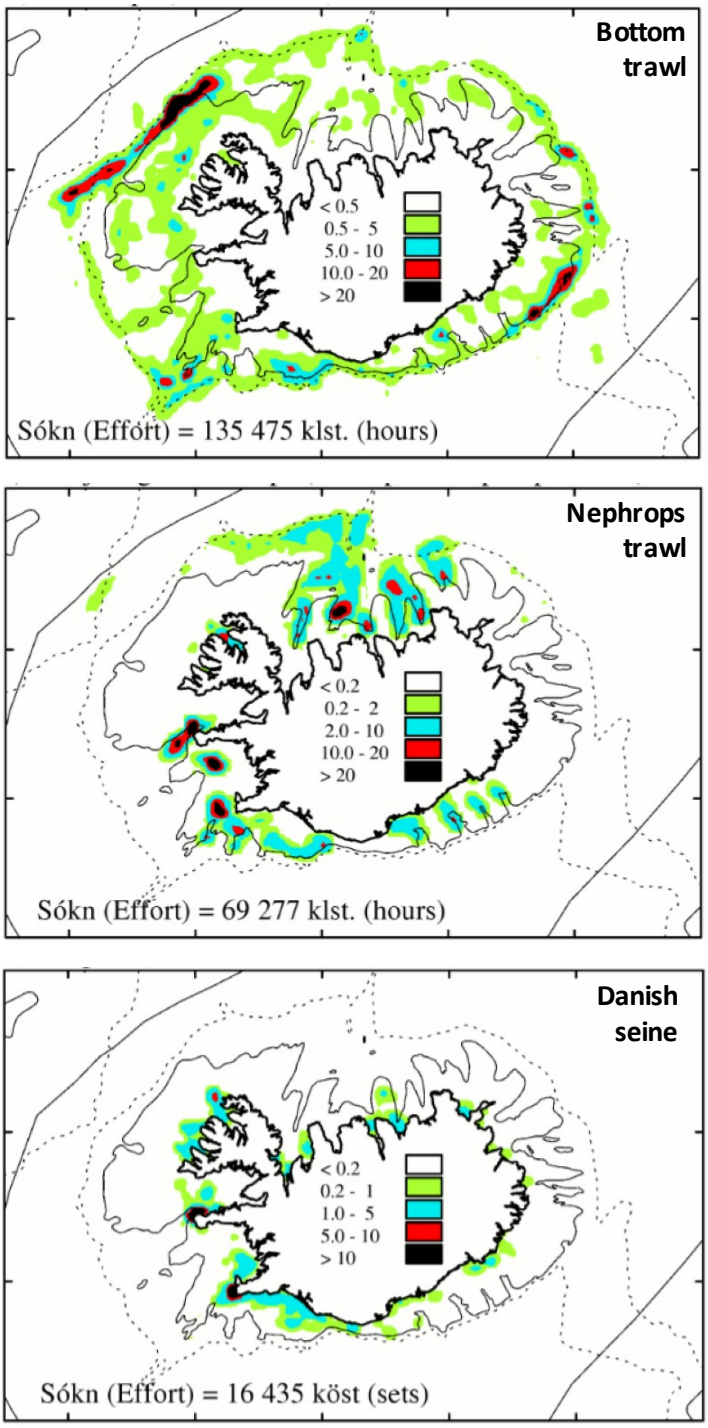


Figure 3-24. Fishing effort distribution for Icelandic bottom trawl, Nephrops trawl and Danish seine (MFRI, 2017).

3.4.8.3 Vulnerable Marine Ecosystems (VMEs)

The MESH (OSPAR/JNCC) habitat map for OSPAR threatened and/or declining habitats around Iceland is presented in Figure 3-25. MESH (OSPAR/JNCC) habitat map for OSPAR threatened and/or declining habitats for Iceland. Yellow = Lophelia, green = deep-sea sponge aggregation, pink = maerl beds, red = hydrothermal vents, dark green = Zostera beds, blue = intertidal Mytilus edulis beds.. Information on sensitive habitats in the Northeast Atlantic is available from OSPAR (2008a) and habitat related maps for Icelandic waters are provided in variety of published reports (e.g. Steingrímsson and Einarsson 2004, Garcia et al. 2006, Ólafsdóttir and Burgos 2012).

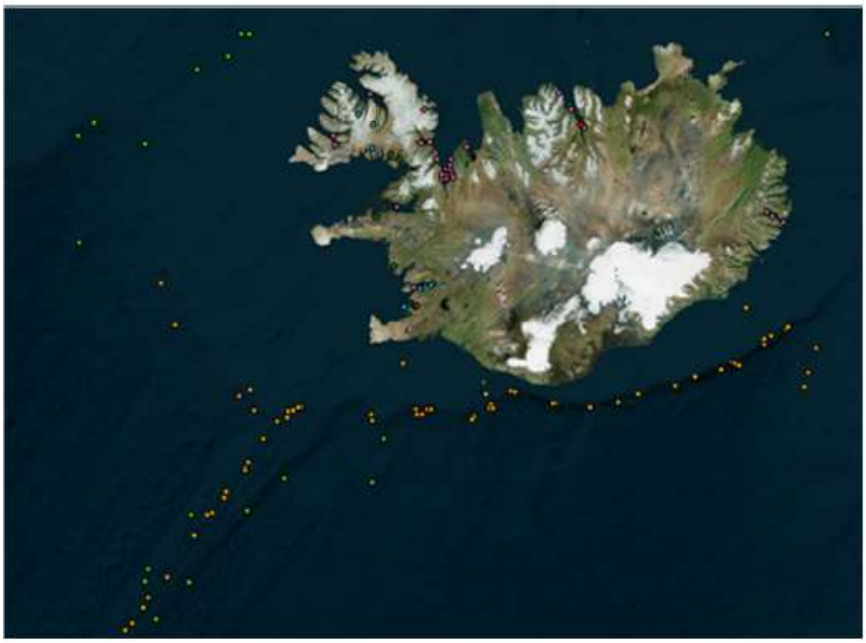


Figure 3-25. MESH (OSPAR/JNCC) habitat map for OSPAR threatened and/or declining habitats for Iceland. Yellow = Lophelia, green = deep-sea sponge aggregation, pink = maerl beds, red = hydrothermal vents, dark green = Zostera beds, blue = intertidal Mytilus edulis beds.

Based on an evaluation of the depth ranges of VMEs and the UoAs considered in the present assessment, it was determined that the following VMEs present in Icelandic waters should be taken into account:

- Maerl beds
- *Modiolus* reefs
- Reef-forming cold water coral (*Lophelia pertusa*)
- Coral gardens (incl. *Gorgonacea* and *Pennatulacea*)
- Sponges (*ostur*)
- Hydrothermal vents

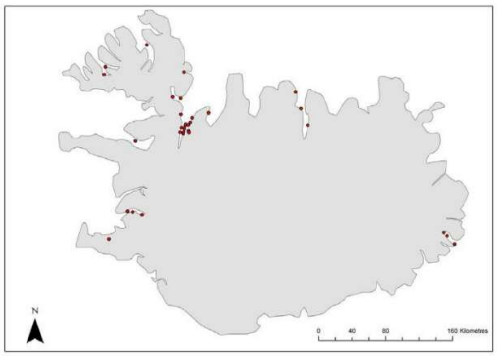
In general, vulnerable habitats around Iceland occur in deep waters and are commonly close to the continental shelf break or deeper. However, maerl beds, *Modiolus* reefs and hydrothermal vents in the Eyjafjörður fjord are examples of vulnerable habitats that occur in coastal waters.

Maerl beds

Maerl is a collective term for several species of coralline red algae (Corallinaceae) that grow unattached and can form extensive beds. Maerl beds can be found on the open coast, in tide-swept channels or in sheltered areas of marine inlets with weak currents, and are mainly found on coarse sediments such as gravels, on sands, or on muddy mixed sediments. Since coralline algae require light for photosynthesis maerl beds are generally found at depths to about 40 m. Maerl beds are an important habitat for a wide variety of marine animals and plants which live between or attached to the nodules, or which burrow in the sediment underneath the algae (Grall and Glémarec, 1997).

In Iceland maerl beds appear to be most common off the northern coast (see Table 3-18). Aðalsteinsdóttir and Garðarsson (1980) sampled a grid of stations in central Hvalfjord, showing coralline algae to be present close to the northern shore from Grunartangi to Katanes. Karl Gunnarsson (pers. communication cited in OSPAR, 2010) reports that maerl is widely distributed in northern Icelandic fjords, deep within the fjords but probably exposed to some wave action. His study at Langanes, Arnafjörður (Gunnarsson, 1977) shows the maerl to be situated on an exposed headland within the fjord. This is similar to its distribution at Hvammur, Hvalfjörður (K. Collins and J. Mallinson, unpublished observations cited in OSPAR, 2010). Icelandic maerl beds have rarely been reported below 20 m depth in Icelandic waters (MFRI, pers. communication).

Table 3-18. Maerl beds

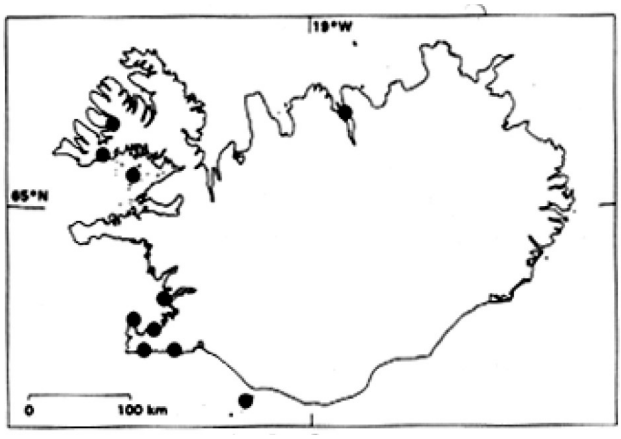
Description	Maerl: several species of coralline red algae (Corallinaceae) that grow unattached and can form extensive beds.
Occurrence in Icelandic waters	Mainly found in fjords, which are most common on the N-coast of Iceland.  *Geographic distribution of maerl grounds around Iceland. Source: OSPAR, 2010.*
Depth range	Since coralline algae require light for photosynthesis maerl beds are generally only found at depths to about 40 m. Icelandic maerl beds have rarely been reported below 20 m depth.
Depth range of fishery	40-500 m
Overlap of fishery with habitat	Potential for limited overlap with Danish seine fishing grounds located off the N- / NW-coast of Iceland.
Protection measures	None; the main impacts on maerl beds in Iceland come from dredging for fertilisers and bycatch in the scallop dredges. Harvesting of maerl in Iceland is currently taking place at 3 locations within Arnarfjörður, however scallop fishing in Iceland has declined significantly in recent years.
References	Aðalsteinsdóttir and Garðarsson 1980; Gunnarsson, 1977; OSPAR, 2010a; MFRI pers. communication

Mechanical disturbance and re-suspension of nearby sediments, particularly by direct targeted extraction (e.g. for use as fertilisers), and through bottom trawling, are the most destructive human activities affecting maerl beds. Other threats include pollution (e.g. wastewater discharge, aquaculture), which results in increased turbidity and sedimentation, but also direct habitat destruction through artisanal and recreational fishing, coastal or offshore construction activities (including submarine cables), unregulated diving activities and anchoring. Climate change is also known to affect several key species that are part of coralligenous habitats (Martin et al., 2014). The main impacts on maerl beds in Iceland come from dredging for fertilisers and bycatch in the scallop dredges (Chen 2012 and references therein). Scallop fishing in Iceland has declined significantly in recent years (in 2000 a total of 9081 tonnes of scallops were fished; during 2004-2013 there was no fishing of scallops in Iceland; in 2014 and 2015 the catch was 281 and 351 tonnes respectively).

***Modiolus* reefs**

The horse mussel (*Modiolus modiolus*) normally occurs in the form of dense beds, at depths up to 70m and may extend onto the lower shore, often in tide-swept areas (OSPAR, 2009a). *M. modiolus* beds are found on a range of substrata, from cobbles through to muddy gravels and sands, where they tend to have a stabilising effect. Communities of both epibiota and infauna associated with horse mussel beds are diverse, including species such as for instance hydroids, red seaweeds, solitary ascidians and bivalves. Overall, the distribution of *M. modiolus* appears to be mainly concentrated near the coast on the western coast of Iceland (see Table 3-19).

Table 3-19: Modiolus *reefs*

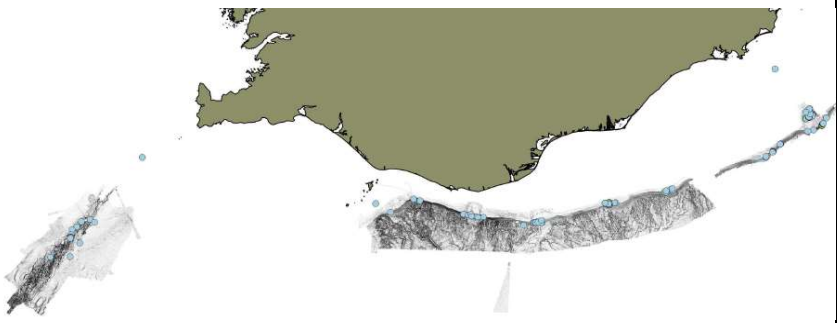
Description	Dense mussel beds formed by the horse mussel *Modiolus modiolus* which support diverse communities of epibiota and infauna.
Occurrence in Icelandic waters	*Modiolus* reefs are concentrated on the western coast of Iceland.  *Distribution of Modiolus modiolus around Iceland. Source: Ingolfsson, 1996.*
Depth range	*Modiolus* reefs have been reported at depths ranging from 5 - 50m in Icelandic waters.
Depth range of fishery	40-500 m
Overlap of fishery with habitat	Potential for limited overlap with Danish seine, bottom trawl and Nephrops trawl off the W- / SW-coast of Iceland.
Protection measures	None; the main impacts on *Modiolus* reefs in Iceland come from bycatch in the scallop dredges. Scallop fishing in Iceland has declined significantly in recent years.
References	Ingolfsson, 1996; Ospar, 2009a; MFRI pers. communication.

Activities which may impact horse mussel beds include dredge fisheries for scallops, beam and otter trawling, coastal developments, and run-off from agriculture, forestry and aquaculture. In Iceland reports from studies of the impacts of scallop dredging in Breidafjordur (off the western coast of Iceland) showed that *M. modiolus* was the most abundant by-catch species. However, the quantities picked up by the dredges indicated that even after about 30 years of fairly intensive fishing *M. modiolus* was still abundant (OSPAR, 2009a).

Reef forming corals

Lophelia pertusa is a cold-water, reef-forming coral that has a wide geographic distribution ranging from 55°S to 70°N, where water temperatures typically range between 4-8°C. The larvae settle on hard substrata in relatively deep water and newly formed colonies have been found on the legs of oil platforms. These reefs are generally subject to moderate current velocities (0.5 knots). The biological diversity of the reef community can be three times as high as the surrounding soft sediment (ICES, 1999), suggesting that these cold-water coral reefs may be biodiversity hotspots. Characteristic species include other hard corals, such as *Madrepora oculata* and *Solenosmilia variabilis*, the redfish *Sebastes viviparus* and the squat lobster *Munida sarsi*. The mapping programme from Hornafjarðardjúp shows that three different zones can be distinguished within the coral area, live coral zone, dead coral zone and coral rubble zone. The fauna composition is different between these zones. The diversity is high for the dead coral and coral rubble zones but lower for the live coral zone (Ólafsdóttir, 2009; Table 3-20).

*Table 3-20. Cold-water coral (*Lophelia pertusa*)*

Description	*Lophelia pertusa*, a cold-water, reef-forming coral
Occurrence in Icelandic waters	Slope areas off S and W-coast of Iceland and on the Reykjanes Ridge  Present occurrence (light blue dots) of *Lophelia pertusa* in Icelandic waters. Source: Ólafsdóttir et al. 2014
Depth range	Found 200-1,400 m, but concentrated 400 – 800 m
Depth range of fishery	40-500 m
Overlap of fishery with habitat	On the continental shelf close to the slope area. Several coral areas were lost to bottom trawling in the past. Several remaining areas are out of reach for bottom trawling or have been protected.
Protection measures	10 coral areas have been closed for fishing (Hafrannsóknir nr. 162, 2011). There is some natural protection along the ridges due to the complex lava rock formations. Included as a threatened or declining species and habitats (OSPAR agreement 2008-6).
References	OSPAR, 2009b; Buhl-Mortensen *et al*, 2014; Burgos *et al*. 2014; Ólafsdóttir & Burgos 2012; Steingrímsson & Einarsson 2004.

Such coldwater coral areas in Icelandic waters occur close to the shelf break off the south and west coast of Iceland at 114 – 800 m depth (Copley et al, 1996), mainly along the Reykjanes Ridge, other ridges and the continental shelf foothills. Following scientific surveys to map the distribution of *Lophelia* reefs, fourteen coral areas have been closed for all fisheries using bottom contact gear.

In common with many other corals, *Lophelia* is brittle which makes it vulnerable to physical damage, in particular from fishing gear (ACE, 2002). Based on experience from elsewhere around the worlk, in the Norwegian EEZ, for example*, L. pertusa* is estimated to cover somewhere between 1,500 and 2,000 km² of seabed, mostly concentrated between depths of 200–400 m (Fosså et al., 2002). Analysis of information indicates that one half of the total reef area of Norway has been damaged to an observable extent (Mortensen et al., 2001). The current and past distribution of *L. pertusa* reefs around the Faroe Islands also show changes, and these are thought to be due to fishing (ICES, 2001). The MFRI has an ongoing programme mapping the seabed, including the location and distribution of *Lophelia* reefs. What remains uncertain is the length of time that apparent trawl damage can be identified in reef areas after the incident. In relation to recovery, *Lophelia* corallites grow 5–10 mm per year (Mortensen & Rapp, 1998) and the growth rate of a *Lophelia* reef is estimated to be 1.3 mm per year (Mortensen, 2000). Consequently, it will take hundreds of years for a colony to reach a diameter of 1.5–2 m while it will take thousands of years to build a reef structure 10–30 m thick. Thus, it will take a significantly long time for the reefs to recover and for the restitution of their ecological function, if at all. Economic self-interest means that skippers tend to avoid known reef areas due to the potential damage to trawls or loss of nets and lines with concomitant loss of catch and loss of fishing time to repair or recover gear.

MFRI interviewed retired fishermen who fished actively prior to 1970, and carried out a questionnaire to fishermen working in the fisheries more than 30 years later (Steingrímsson and Einarsson, 2004). This information was used to assess the current status of coral areas by comparing their historical and present distribution off Iceland. It was concluded that during the 1980s and 1990s some relatively large coral grounds vanished, e.g. one on the Reykjanes Ridge (36km²) and two near the Öræfagrunn Bank (68 and 30km², respectively; Garcia et al, 2007), although it was not possible to quantify the effects of bottom trawling.

Based on analysis of logbook data about 79,000 km² were fished with towed bottom fishing gears in 2013, comprising 10% of the Icelandic ecoregion (MFRI, 2016). The total fishing effort by bottom trawls targeting fish and shrimp has decreased between 2000 and 2014 by around 40% while the *Nephrops* trawling effort has remained at similar levels. The decrease in the fishing effort varied locally, with decreases mainly noted on the southern shelf and on typical shrimp trawling grounds on the northern shelf.

Coral gardens

Coral gardens are mainly deep water habitats (OSPAR 2010b). Their main characteristic is a relatively dense aggregation of colonies or individuals of one or more coral species belonging to different taxonomic groups, such as leather corals (*Alcyonacea*), gorgonians (*Gorgonacea*), sea pens (*Pennatulacea*), and black corals (*Antipatharia*) and hard corals (*Scleractinia*). They can occur on a wide range of soft and hard seabed substrata. Soft-bottom coral gardens may be dominated by solitary scleractinians, or sea pens, whereas hard-bottom coral gardens are often found to be dominated by groups like gorgonian corals (OSPAR 2010b).

Taxonomic groups that make up coral garden habitats in Icelandic waters are found primarily in the depth range of approx. 500-1700 m. Soft corals do not form coral reefs, but where they occur they tend to be in high densities (Tendal 1992; Klitgaard and Tendal, 2001; Klitgaard and Tendal, 2004). Gorgonacea corals occur in deep waters (>500 m) off the South and West of Iceland; they are relatively uncommon on the shelf (< 500 m depth), are not found in the cold waters North East of Iceand and

only rarely in the North of Iceland. Similar patterns were observed in the distribution of Pennatulaceans off Iceland, which are relatively rare in water shallower than 500 m but more common in deep waters, especially off South Iceland. Alcyoneacea occur at depths of 500 m to 1000 m (average depth 700 m), whilst Scleractinia have a wider depth distribution of 500 m to 1500 m with an average depth of 1200 m (Figure 3-26. Boxplots showing the distribution of various groups of corals making up 'coral garden' habitat by depth (dýpi) around Iceland. (The red line should be ignored for these purposes.) Source: Ólafsdóttir et al. 2014.). Both Alcyoneacea and Scleractinia are only found in the warmer waters off the southern and western Icelandic coast. Alcyoniina are found at an average depth of 700 m and have a wide distribution around Iceland (Table 3-21).

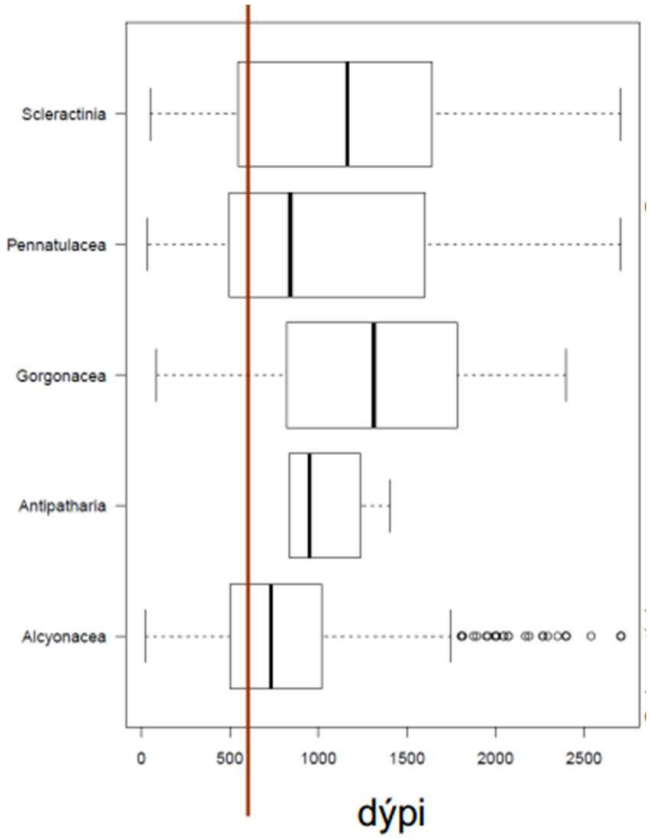
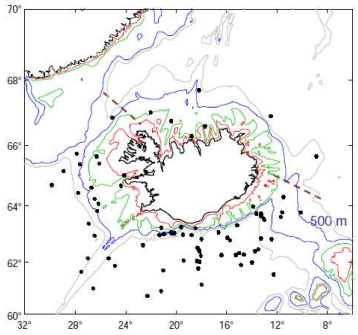
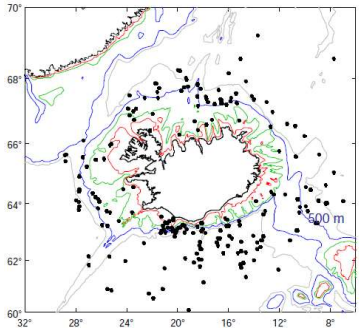
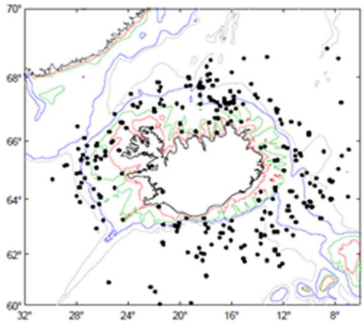
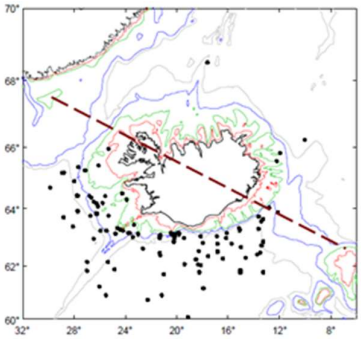


Figure 3-26. Boxplots showing the distribution of various groups of corals making up 'coral garden' habitat by depth (dýpi) around Iceland. (The red line should be ignored for these purposes.) Source: Ólafsdóttir et al. 2014.

As with the hard-coral reef features such as *Lophelia*, the soft coral species are vulnerable to direct impact damage by trawling, not least from *Nephrops* trawlers which work on mud grounds favoured by soft-coral species. Studies on the impact of Nephrops trawling indicate that fishing intensity is the major factor controlling long-term negative trends in the benthos (Ball et al. 2000). However, compared to early 1970s fishing effort had decreased by some 60–70% by the year 2000 (Garcia et.al. 2006), and during the period 2001-2013 the number of boats in the Nephrops fishery had reduced by around 50%.

Table 3-21. Coral gardens

Description	Relatively dense aggregation of colonies or individuals of one or more coral species of leather corals (*Alcyonacea*), (*Gorgonacea*), sea pens (*Pennatulacea*), black corals (*Antipatharia*), hard corals (*Scleractinia*).
Occurrence in Icelandic waters	Found in relatively high numbers in deep waters (> 500m) off Iceland Figures below present all available records of occurance i.e. each dot represents a single specimen or many.  *Alcyonacea (average depth 700 m)*  *Pennatulacea (average depth 800 m)*  *Alcyoniina (average depth 700 m)*  *Scleractinia (average depth 1200 m)* *Distribution of coral species found in Icelandic coral gardens. Source: Ólafsdóttir et al. 2014.*
Depth range	Primarily found at depths of 500-1700 m
Depth range of fishery	40-500 m
Overlap of fishery with habitat	Limited overlap with bottom trawl and Nephrops trawl at a variety of locations off the Icelandic coast.
Protection measures	None. However, a number of seasonal or annual closures to bottom trawling exist which might have beneficial effects on the coral garden habitats occurring there.
References	Klitgaard and Tendal, 2004; Garcia et al. 2007, OSPAR 2010b, Ólafsdóttir et al. 2014.

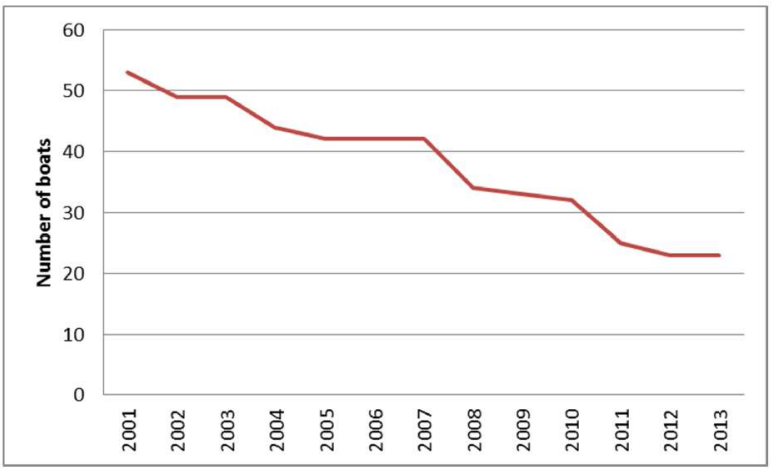
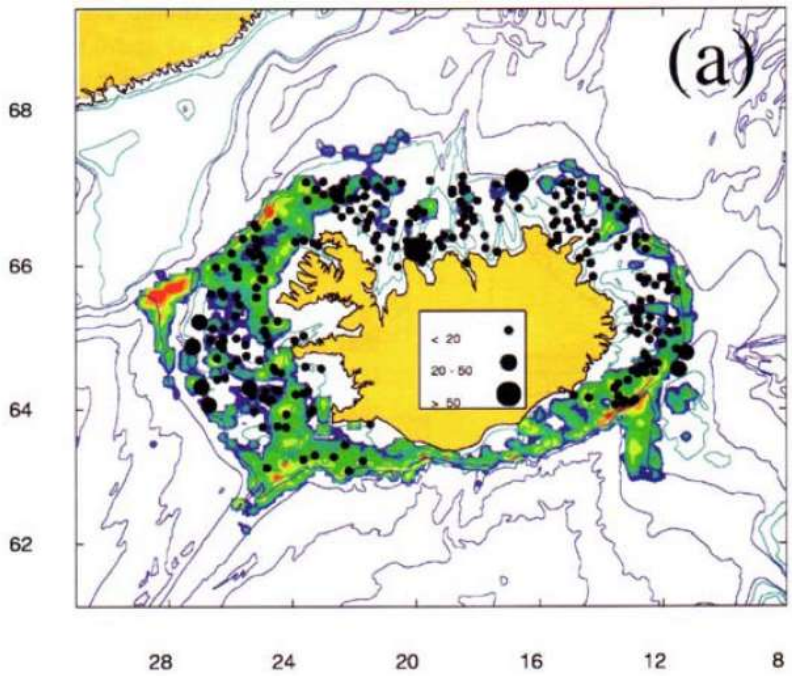


Figure 3-27. Number of boats licensed for Nephrops fishery during 2001-2013. Source: Icelandic Directorate for Fisheries database.

Deep Sea Sponges

The waters around Iceland, at least down to 500m depth, are rich in habitat forming sponge communities, "ostur", dominated by *Geodia* spp. Klitgaard and Tendal (2004) describe the composition of "ostur" from sampling sites all around Iceland, the community south of Iceland being comprising *Geodia atlantica*, *G. mesotriaena* and *G. barretti* as well as *Geodia phlegraei*. Very large catches of sponges (up to >20000 kg) were reported by Klitgaard and Tendal (2004) from the eastern and western flanks of the northern part of Reykjanes Ridge at more than 1000 m depth in Atlantic water. Bycatch analysis carried out during the 2002 groundfish survey enabled the estimation of the distribution of mass sponge occurrences on the Iceland shelf (Ragnarsson and Steingrimsson, 2003). The authors suspect that sponge bycatch is lower in areas of high fishing effort using bottom trawl gears (Table 3-22).

Table 3-22. Deep-sea sponge aggregations

Description	Principally composed of sponges from two classes: Hexactinellida and Demospongiae. They are known to occur between water depths of 250-1300m
Occurrence in Icelandic waters	 *Biomass of sponge bycatch in 2002, superimposed on fishing effort as mean annual swept area (nm^2 per 1° latitude x 1° longitude cell). Black dots indicate total biomass (kg/h otter trawl haul) of sponges in 2002 groundfish survey by Marine Research Institute. Source: OSPAR 2010d*
Depth range	250-1300 m
Depth range of fishery	40-500 m
Overlap of fishery with habitat	Limited overlap with bottom trawl, *Nephrops* trawl at a variety of locations off the Icelandic coast.
Protection measures	None. However, a number of seasonal or annual closures to bottom trawling exist which might have beneficial effects on the sponge habitats occurring there.
References	Copley et al, 1996; Garcia et al. 2007; OSPAR 2010d.

Very few species utilize the sponges as a food source; it is assumed, therefore, that the sponge aggregations provide associated species with habitat, refuge from predation or physical strain and enhanced food supply from the surrounding water. Juvenile redfish and other groundfish have been regularly observed in association with large sponges, suggesting that ostur is a suitable feeding ground for particular life-history stages of some fish species (Garcia et al, 2007).

It is well understood that direct trawl-gear impact will damage and break sponge colonies. The size structure within sponge populations indicates slow reproduction and recruitment, and high age of the large specimens. Deep sea sponges are estimated to be able to live for more that 2,300 years. A recent deep sea sponge found in waters off the Northwestern Hawaiian Islands is 3.5 m long and estimated to be hundreds if not thousands of years old (Blaszczak-Boxe, 2016). OSPAR (2010e) summarises the

prognosis of recovery for structure forming cold water sponge species according to various types of disturbance. The regeneration ability of sponges is dependent on the size of the wound relative to overall sponge size. Large wounds are considered to have a moderate chance of recovery, while breakage at base has a very poop or no recovery rate.

Consequently, it will take a long time for a sponge-dominated area to recover even after partial destruction, and repeated disturbance may lead to permanent extirpation of the species in the area. These risks, however, are mitigated by skippers' preference to avoid known areas of ostur for reasons of safety and economic common-sense. If a trawler strays into such an area it is all too easy to fill the net to an extent where it is difficult to haul, the net may burst and/or the sponge bycatch can damage the catch in the net to an extent that renders it unsalable (DNV, 2012).

Hydrothermal vents

Hydrothermal vents are found in volcanic active areas including spreading ridges and fracture zones. They are formed by seawater penetrating the upper layers of the earth's crust through channels formed in cooling lava. The seawater reacts chemically inside the crust and rises back to the sea-bed, where hydrothermal vents are formed. The biological communities associated with such vents are unique since the communities contain a high diversity of chemo-autotrophic bacteria, which form the basis of the food webs found around hydrothermal vents (OSPAR, 2010c). The main hydrothermal vent fields in Icelandic waters are located on the Reykjanes Ridge (250–350 m) (Ernst et al. 2000; German et al. 1994), near the island of Kolbeinsey on the Jan Mayen Ridge (100 m) (Fricke et al. 1989), east of Grimsey (400 m) (Hannington et al. 2001), and at Eyjafjordur, a fjord in northern Iceland (Omarsdottir, 2013; Table 3-23).

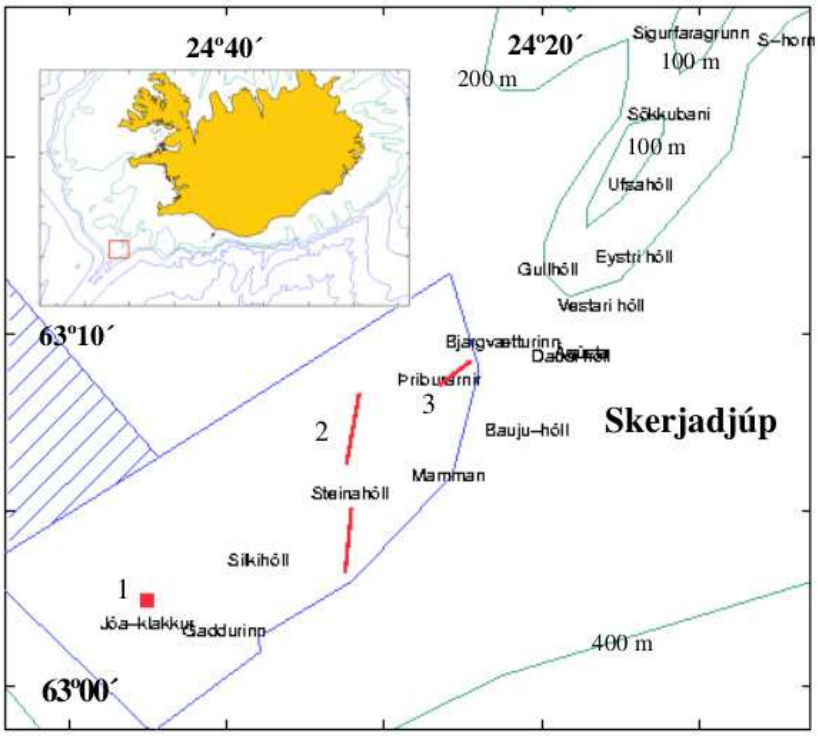
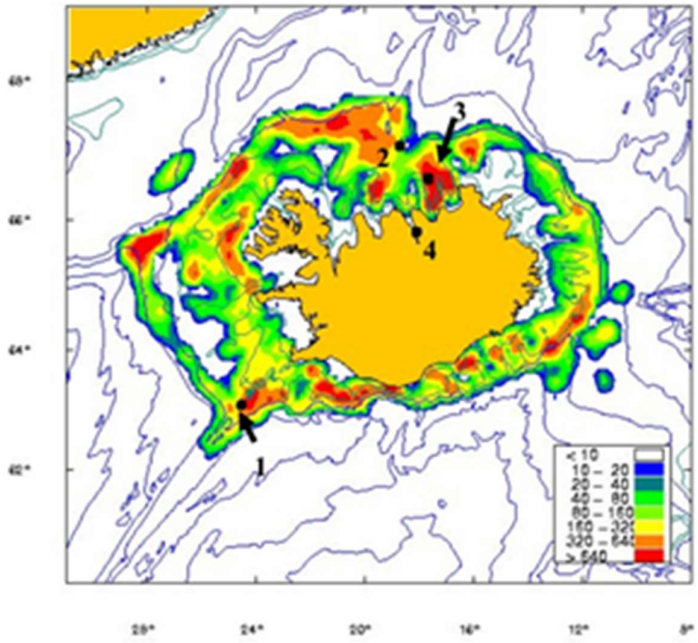


Figure 3-28. Position of the Steinahóll hydrothermal vent and occurrence of coral (indicated with red lines or square) on the Reykjanes Ridge. Area closed for demersal otter trawling (since 1994) is outlined with a blue line (closed throughout the year) and blue hatched area (trawling allowed 1 st February – 15 th April). Source: Steingrimsson and Einarsson 2004.

Available information on the macrofauna living on the chimneys found at such hydrothermal vents indicate a high diversity of benthic invertebrates occurring on and sometimes covering the cones, with the exception of the top venting opening. The main threats to hydrothermal vent systems and their associated biological communities are from poorly executed research (including collecting), seabed mining and bioprospecting (InterRidge, 2000). In order to ensure bottom trawling does not affect Icelandic hydrothermal vents, the area at Steinahóll is protected within a closed area where trawling has been prohibited since 1994 (Figure 3-28).

Table 3-23. Hydrothermal vents

Description	Hydrothermal vents are formed by seawater penetrating the upper layers of the earth's crust through channels formed in cooling lava in volcanically active areas. Such vents support unique biological communities characterised by a high diversity of chemo-autotrophic bacteria, which form the basis of food chains.
Occurrence in Icelandic waters	Hydrothermal vents are found in volcanically active areas off the N and SW-coast of Iceland.  *Location of areas of hydrothermal activity in Icelandic waters in relation to bottom trawling effort (total trawling hours 2003 [combined groundfish, shrimp and Nephrops fisheries]). (1) Steinahóll on the Reykjanes Ridge (2-4) Hydrothermal vents in the Tjornes Fracture Zone; Kolbeinsey vent fields (2), Grímsey vent fields (3) and in Eyjafjörður (4). Source: Garcia et al. 2006.*
Depth range	65 - 400 m (Eyjafjordur: 65 m; Kolbeinsey: 100 m; Steinahóll: 250 - 350 m; Grímsey: 400 m)
Depth range of fishery	40-500 m
Overlap of fishery with habitat	Limited overlap with the bottom trawl and Nephrops trawl..
Protection measures	The area at Steinahóll is protected within a closed area where trawling has been prohibited since 1994.
References	Garcia et al. 2006; OSPAR 2010c.

3.4.8.4 Management

The Ministry of the Environment has developed a National Strategy Plan for the preservation of biological diversity (Ministry of Environment 2010). Two of the key elements of this strategy are:

(a) Develop fishing methods with less impact on marine ecosystems, and
(b) Protect vulnerable benthic ecosystems.

Act 97/1997 ("um veiðar í fiskveiðilandhelgi Íslands") provides a framework allowing managers to close vulnerable habitats to fishing as and when the need arises. The Nature Conservation Act no. 44/1999 provides measures to protect marine habitats.

Iceland has ratified a number of conventions on the protection and management of marine species, such as the Convention on Biological Diversity, the OSPAR Convention and the CITES Convention. These conventions have established objectives for conserving endangered, threatened or protected species and habitats and within them a number of mechanisms have been developed to detect and reduce impacts. For example, the OSPAR Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area has identified a number of key species and habitats which are considered threatened or declining (OSPAR 2008a, 2008b). Iceland has nominated 14 areas to the OSPAR Network of Marine Protected Areas (OSPAR 2013).

Large areas of Icelandic waters are closed for fishing, some of them temporarily (hours per day, days in total or seasonal) and others permanently (years). Areas are usually closed for fishing with bottom trawl or longline due to the presence of juvenile fish over extended periods of time or in order to protect spawning grounds. Although area closures are aimed at protecting juvenile fish, the measures have a secondary effect, i.e. protecting seabed habitats from being damaged by fishing activities. In addition, several areas have been closed to fishing explicitly to protect *Lophelia pertusa* reefs (Figure 3-29). The Icelandic Coast Guard monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing.

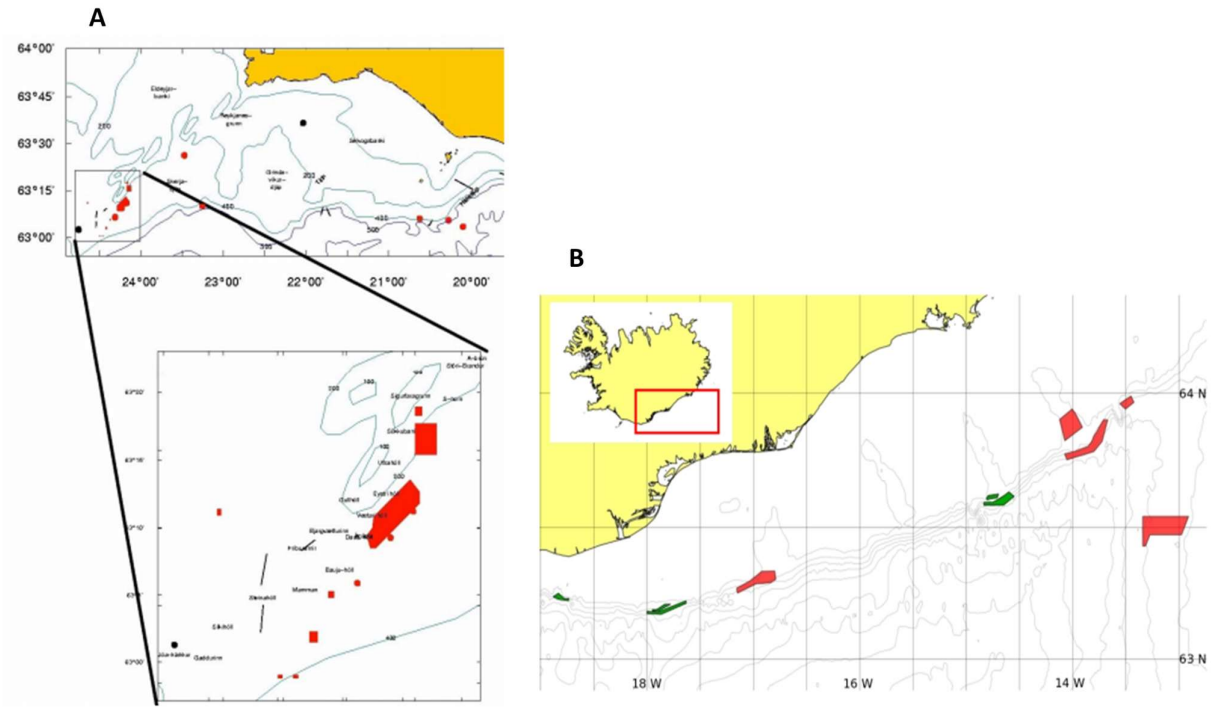


Figure 3-29. A: Coral areas off the SW coast of Iceland. B: Coral areas off SE Iceland where fishing operations have been banned since 2005 (green) and 2011 (red). Source: Ólafsdóttir and Burgos 2012.

3.4.8.5 Information

The BIOICE (Benthic Invertebrates of Icelandic waters) program was in operation in 1992-2004, and had the aim of producing a basic inventory of benthic fauna within Icelandic territorial waters. The objectives were to map the distribution of benthic invertebrates within the Icelandic EEZ, and to evaluate the species composition and biodiversity. Extensive sampling took place within Icelandic waters to achieve the project's objectives; in total, 1050 samples at 579 stations (Figure 3-30. A map of the 579 sampling stations of the BIOICE (Benthic Invertebrates of Icelandic waters) research program. Source: Omarsdottir et al. (2013).) were collected during 19 cruises at depths between 20 - 3000 m (Omarsdottir et al., 2013). Benthic samples have been collected from a variety of habitats, characterised by a range of temperature conditions (12° to -0.9°C) using a variety of sampling gear including benthic sleds, trawling, sediment sampling and deep-sea photographs. The BIOICE project has provided information on the benthic invertebrates in Icelandic waters, from which the nature, distribution and vulnerability of habitats can be inferred. The analysis of data on benthic diversity patterns has shown that a maximum of species diversity if found between 300 and 1000 m, and that species diversity appears to be particularly high south of the Greenland-Iceland-Faroe Ridge (Svavarsson, 1997; Brix and Svavarsson, 2010; Stransky and Svavarsson, 2006; Omarsdottir et al., 2013).

Following the BIOICE project, the IceAGE (Icelandic Animals, Genetics and Ecology) project has been providing information on benthic habitats around Iceland. The objectives of this project are to evaluate changes in species distributions in Icelandic waters due to temperature changes (Astthorsson et al., 2007), to use current data as well as the earlier BIOICE data to model the distributions of benthic organisms (see also Meißner et al., 2014), and to collect genetic samples in order to increase the available information on species identification (Omarsdottir et al., 2013).

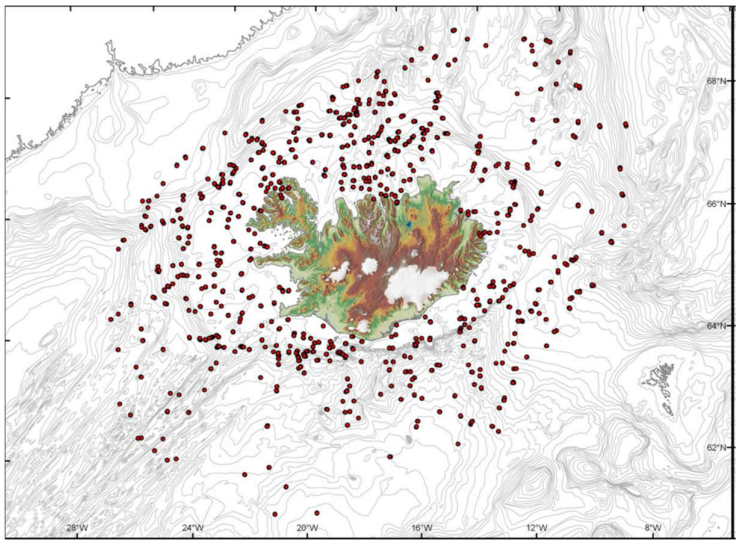


Figure 3-30. A map of the 579 sampling stations of the BIOICE (Benthic Invertebrates of Icelandic waters) research program. Source: Omarsdottir et al. (2013).

In addition to the BIOICE and IceAGE research programmes, a wide variety of research activities have been carried out / are ongoing which are providing detailed information on benthic habitats in Icelandic waters as well as impacts of fishing activities on such habitats (all information based on pers. communication with MFRI unless otherwise indicated):

- Since 2000, MFRI has maintained a programme of mapping the seabed habitats and fishing grounds using multibeam echo-sounding in co-operation with other domestic organisations,

such as Reykjavík Energy and the Science Institute of the University of Iceland; together, they contribute towards the BIOICE and IceAGE habitat mapping projects (Helgadóttir and Reynisson, 2010). The aim is to compile a comprehensive picture of the entire continental shelf; to date ca. 12% of the entire Iceland EEZ habitats has been mapped in detail using multi-beam echo-sounders (Burgos et al., 2014).

- The EU funded CoralFISHproject (http://eu-fp7-coralfish.net/) was recently completed and a report detailing the CoralFISH project is in progress. Manuscripts from the CoralFISH project have recently been submitted, one comparing fish communities inside and outside cold-water coral habitats based on longline catches, and another examining bottom fishing activities. A manuscript on coral habitat classification observed during this project has also been published (Davies et al., 2017).
- Since 2015, the bycatch of invertebrates is being monitored during the annual autumn ground fish survey in deep water carried out by MFRI. All invertebrates in the catch are identified by benthologist in those trawls observed; half of the trawls are currently observed. This data will give considerable amount of information on benthos, including sponges and corals, as well as other species vulnerable to fishing.
- In 2016, MFRI conducted a specific survey with the primary objective to map and explore possible different habitat areas in several locations north and south of Iceland. This survey was part of the general mapping of habitats within Icelandic waters, where previous surveys targeted areas with previously reported high abundance of vulnerable species, particularly coral.
- In 2018 - ongoing, several potential vent sites on the Reykjanes Ridge are planned for survey.

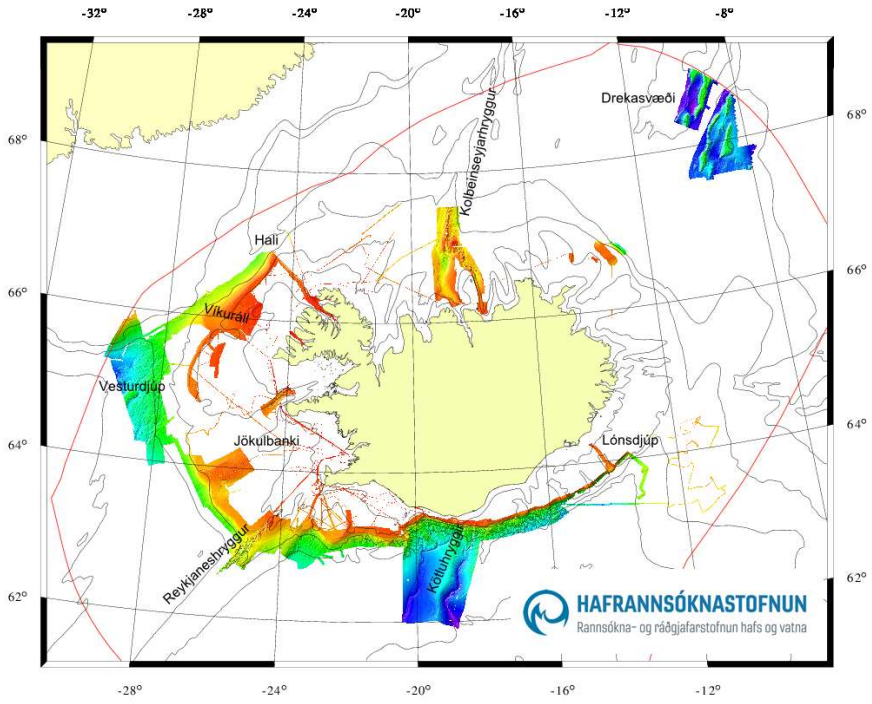


Figure 3-31. Iceland EEZ habitats which have been mapped in detail using multi-beam echo-sounders (coloured shading). Source: Burgos et al., 2014.

3.4.9 Ecosystem

3.4.9.1 Outcome Status

Icelandic marine food webs are characterized by high primary production: the total annual primary production in Icelandic waters has been estimated to be 1,220 million tonnes or 160 gCm^{-2} yr^{-1} (Thordardottir, 1994) and the annual production of *Calanus* (mainly *C. finmarchicus*) has been estimated to be about 7 gCm^{-2} yr^{-1} (other zooplankton 6 gCm^{-2} yr^{-1}). Capelin is a key species which transfers energy in the ecosystem by feeding mainly on copepods and euphausiids in waters north of Iceland, before becoming an important prey for many species, including cod, haddock, saithe, Greenland halibut, seabirds, and marine mammals (ICES, 2017). The combined annual production of pelagic fish has been estimated to be about 1.5 gCm^{-2} yr^{-1}, and of cod about 0.04 gCm^{-2} yr^{-1}. In comparison, the production of whales and seabirds is small while their food consumption is large (Astthorsson *et al.,* 2007).

Biomass estimates for stocks of fish, whales and seabirds in Icelandic waters and production estimates of *Calanus finmarchicus* and other zooplankton species have been used to calculate the biomass of individual components in the Icelandic marine ecosystem (Figure 3; Astthorsson et al. 2007). In total, the biomass of all the major components is about 56 million tonnes wet weight, phytoplankton being the largest component (29 million tonnes), followed by zooplankton (17 million tonnes, whereof *C. finmarchicus* is about 7 million tonnes), pelagic fish (8.8 million tonnes), demersal fish species (1 million tonnes, i.e. cod, haddock and saithe), baleen whales (900.000 tonnes), seabirds (14,000 tonnes) and seals (2,000 tonnes) (Astthorsson et al., 2007). The annual consumption of fish, cephalopods, and crustaceans by cetaceans within Icelandic waters has been estimated at 6.3 million tonnes (ICES, 2017).

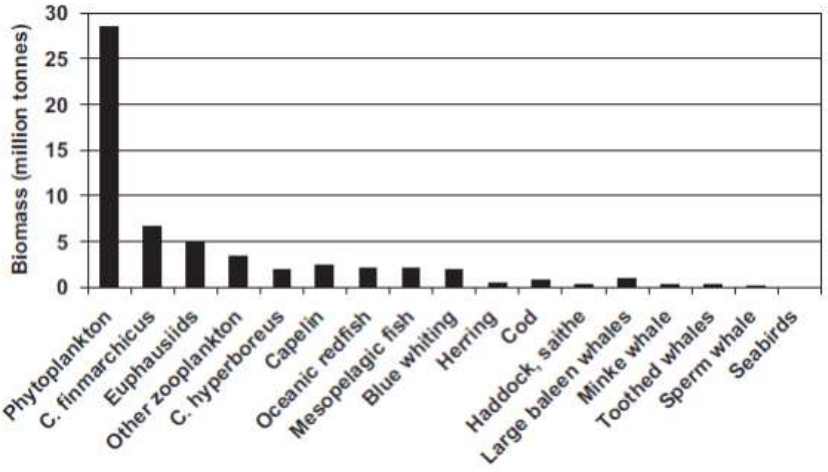


Figure 3. Ecosystem Biomass. Estimated wet biomass of the main components in the Icelandic marine ecosystem. Source: Astthorsson et al. 2007.

The feeding habits of demersal fish, marine mammals and seabirds in Icelandic waters were studied in detail during a multi species research project in 1992-1995 (MRI, 1997). These studies have shown that capelin (*Mallotus villosus*) is a key prey species and that cod (*Gadus morhua*) is a major fish predator in the marine ecosystem around Iceland. Other important predators include several whale and seal species as well as seabirds. The data from the multi species project has been used to assess the key factors that determine diet composition in some of the most important demersal fish species in Icelandic waters. Two major feeding guilds were identified among the main predators: (i) species preying mainly on echinoderms, supplemented with fish and other benthic invertebrates; (ii) species preying mainly on crustaceans and fish (Jaworski & Ragnarsson, 2006).

3.4.9.2 Management

The 2001 Reykjavik Conference on 'Responsible Fisheries in the Marine Ecosystem' was the starting point for ecosystem-based fisheries management at a global level, and Iceland has been a leading practitioner. The Icelandic authorities have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to protect threatened species, develop fishing methods which impact less on marine ecosystems, and which aim to protect vulnerable benthic ecosystems (Ministry of the Environment 2010). This strategic plan gives managers a framework within which to take action if evidence suggested that the bottom trawl, Nephrops trawl or Danish seine fisheries might pose a risk or harm to ecosystem structure and function (Ministry of the Environment 2010). Moreover, the Icelandic Fisheries Management Act constitutes a strategy with measures to address all main impacts of the UoAs on the ecosystem. The objective of the Act is to promote conservation and efficient utilization of marine stocks.

Key elements of the Icelandic management strategy include:

1. Closed areas: closed areas have been long-established for bottom trawl and Nephrops trawl fishing fleets.
2. Multi-species stock management: trophic relationships between key predatory commercial species such as cod and haddock with commercial prey species such as capelin, sandeel and shrimp are well understood, and integrated into fisheries management planning.
3. Key target species management: considerations include discard and other mortality, environmental changes on target stocks, multi-species considerations in mixed fisheries, physical environmental issues related to area and gear; and the understanding of ecosystem components by species / stock complexes.

3.4.9.3 Information

The MFRI maintains extensive research programmes on a number of topics, including on the status and productivity of commercial stocks, mapping of vulnerable habitats, multispecies interactions, ecosystem and fishery interactions and oceanography. Programmes are ongoing and results are routinely published in scientific literature, through ICES, and through MFRI reports. Considerable information on the Icelandic ecosystem can be accessed through the MFRI website[1].

Information on feeding habits has been used in studies on predator-prey interactions and multi-species and ecosystem modelling (Pálsson 1997, Stefánsson 2003, Barbaro et al. 2008). The multi-species programme BORMICON (Stefánsson and Pálsson 1998) is a model for an ecosystem approach to fisheries, and was developed in the 1990's using information on the Icelandic marine ecosystems, such as feeding habits of demersal fish, migration patterns of predator and prey, predation, mortality and fish growth. The programme was developed for modelling marine ecosystems in a fisheries management and biology context. BORMICON is now developed under the name GADGET[2] (Globally applicable Area-Disaggregated General Ecosystem Toolbox), which has been applied to various commercial species in Icelandic waters, such as cod (Taylor *et al*, 2007).

[1] See http://www.hafro.is/index_eng.php

[2] See http://www.hafro.is/gadget/

3.5 Principle Three: Management System Background

3.5.1 Jurisdiction

The ISF lemon sole fishery takes place in the Icelandic EEZ and is therefore a fishery that operates within a single jurisdiction.

3.5.2 Objectives

The objectives of Icelandic fisheries management, as stated in the Fisheries Management Act, are to ensure conservation and efficient utilization of marine living resources in the Icelandic EEZ; and, as stated in the Act concerning the Treatment of Commercial Marine Stocks, to encourage sustainable utilization of commercial marine stocks in order to ensure maximum long-term return for the Icelandic nation. The precautionary approach is not mentioned explicitly in either act, but the requirement to protect marine resources and take the best scientific knowledge into account, e.g. through the use of reference points, equals the requirements of the precautionary approach, as laid out in the FAO Code of Conduct. A further objective, also founded in the Fisheries Management Act, is to ensure stable employment and settlement throughout Iceland.

3.5.3 Legal basis and management set-up

Iceland has a well-established system for fisheries management in place, now codified in the 1990 Act on Fisheries Management, amended in 2006 (Fisheries Management Act). The Act details procedures for the determination of TAC and allocation of harvest rights, including permits and catch quotas. It also lays out the system for individual transferable quotas in some detail, as well as procedures for monitoring, control and surveillance and the application of sanctions. Further provisions are provided in a number of other acts, such as the 1997 Act on Fishing in Iceland's Exclusive Fishing Zone and the 1996 Act concerning the Treatment of Commercial Marine Stocks, as well as in regulations at lower levels of the legal hierarchy, issued by the relevant management authorities. Iceland is also signatory to, and has ratified, the major international agreements pertaining to fisheries management, such as the 1982 Law of the Sea Convention and the 1995 Fish Stocks Agreement. Fishing by foreign vessels is regulated by the 1998 Act on Fishing and Processing by Foreign Vessels in Iceland's Exclusive Economic Zone. Icelandic vessels' fishing outside Icelandic the Icelandic EEZ is regulated by the 1996 Act on Fishing outside of Icelandic Jurisdiction.

The Ministry of Industries and Innovation (Atvinnuvega- og nýsköpunarráðuneytið) – which has two ministers: one for Tourism and Innovation and one for Fisheries and Agriculture – is the policy-making body in Icelandic fisheries management and sets annual TAC based on scientific recommendations from the Marine Research Institute (Hafrannsóknastofnun). The Minister of Fisheries and Agriculture, in turn, is responsible for two departments: one on fisheries and aquaculture and one for food and agriculture. The Directorate of Fisheries (Fiskistofa) is the implementing body within the management system, formally subordinate to the Ministry as an agency. It issues fishing licenses, allocates annual vessel quotas and oversees the daily operation of the individual transferable quota system. The Directorate is also responsible for monitoring, control and surveillance, in cooperation with the Coast Guard (Landhelgisgæsla Íslands), which is a civilian law enforcement agency under the Ministry of the Interior (see below).

3.5.4 Stakeholders and consultation processes

Iceland has a long tradition of continuous consultation and close cooperation between government agencies and user-group organizations. As emphasized by stakeholders interviewed during the site visit, lines of communication are short in Iceland and much consultation takes place informally, in direct and often spontaneous contact between representatives of user groups and authorities. At a more formal level, all major interest organizations in the fishing industry are regularly invited to sit on committees established to review changes in legislation and management, and they meet for regular consultations with the Ministry, the Directorate and the Parliament's (Alþingi) Permanent Committee

for Fisheries and Agriculture. These include, but are not restricted to, Fisheries Iceland (Samtök fyrirtækja í sjávarútvegi – SFS), which was established in 2014 as the result of a merger between two of the most influential user-groups in Icelandic fisheries: the Federation of Icelandic Fishing Vessel Owners and the Federation of Icelandic Fish Processing Plants. Other stakeholders include the National Association of Small Boat Owners and the Icelandic Seamen's Federation. Local authorities also engage actively in fisheries issues and have easy access to the management system. All new legislation and major management initiatives are subject to public hearing, with drafts available online.

There are no environmental NGOs in Iceland at the moment that target fisheries specifically. Major international NGOs that usually engage actively in discussions about fisheries management, such as Greenpeace and WWF, do not have offices in Iceland. Local NGOs tend to prioritize nature protection on land. One exception is BirdLife Iceland (Fuglavernd), which is, among other things, concerned with bird interaction in gillnet fisheries. Also, more generally oriented NGOs such as Icelandic Environmental Association (Landvernd) and Iceland Nature Conservation Association (Náttúruverndarsamtök Íslands) are engaged in marine issues more widely, such as marine protected areas and integrated ocean management.

Consultation processes cover policies and regulatory issues, and also include discussions of the annual scientific recommendations by the Marine Research Institute. Shortly after presenting the recommendations to the Ministry, representatives of the Institute enter into dialogue with the fishing industry regarding the status of the stocks and the nature of the recommendations. The Ministry also consults with the industry before setting the final TACs.

3.5.5 Enforcement and compliance

Monitoring, control and surveillance is taken care of by the Directorate of Fisheries, in collaboration with the Coast Guard, the Marine Research Institute and coastal municipalities. The enforcement system is based on reports from the vessels, physical inspections at sea and weighing in harbour, as well as information exchange with other states' enforcement authorities. The structure and procedures of the enforcement system are codified in the Fisheries Management Act, while requirements to the weighing system are laid out in the Act concerning the Treatment of Commercial Marine Stocks and in the Regulation on Weighing and Recording of Catch.

All Icelandic fishing vessels are required to keep an electronic logbook and report catches to the Directorate of Fisheries using an electronic recording and reporting system (ERS). AIS and VMS are obligatory for all vessels regardless of size, also inshore. Inspectors from the Directorate may accompany fishing vessels on trips or operate from Coast Guard vessels. The Coast Guard has three offshore patrol vessels, as well as a number of smaller boats, helicopters and a surveillance aircraft. At-sea inspections include control of the logbook, catch and gear. If a certain amount of the catch is found to be below size limit, the inspector can initiate a short-term closure (usually two weeks) for the fishery of that particular species, vetted by the Marine Research Institute and confirmed by the Directorate of Fisheries.

Inspections are conducted using a risk-based framework ('business intelligence software') aimed at utilizing resources to optimize compliance at any given moment. Most importantly, 100 % of the landed fish is weighed by an authorized 'weighmaster', employed by the municipality and hence independent of both buyer and seller. Landing data are immediately added to the Directorate's catch database, where the reported quantities of fish are deducted from the vessel's quota. The Directorate operates a dynamic and interactive website, where stakeholders at all times can monitor the precise quota status for each species and observe the performance of individual vessels, their catch from each fishing trip and vessel quota status. The fact that the vast majority of catch is exported provides a further control mechanism enabling a mass balance comparison of fish in (i.e. landing declarations) with fish out (i.e. production or export volumes).

The sanctioning system in Icelandic fisheries is codified in the Fisheries Management Act and the Act concerning the Treatment of Commercial Marine Stocks. A system for graduated sanctions is applied. For a first-time offence, a warning ('reprimand') is given if the infringement is of a less serious nature. At the other end of the spectrum, serious or repeated deliberate violations can be liable to imprisonment for up to six years. Fines for first offences shall not exceed ISK 4,000,000,-, depending upon the nature and scope of the violation. Repeated offences shall be fined by a minimum of ISK 400,000 and a maximum of ISK 8,000,000,-. Withdrawal of fishing permit can be applied in a number of situations. As an example, if information from the Directorate of Fisheries suggests that a vessel has caught in excess of its catch quotas for any species, the Directorate must notify this to the vessel operator and master of the vessel concerned, stating in addition that the vessel's commercial fishing permit is suspended on the fourth working day thereafter unless sufficient catch quotas have been transferred to the vessel within that time. If the recipient of the notification is of the opinion that the information from the Directorate of Fisheries concerning the vessel's catch is incorrect and that the vessel has not caught in excess of its catch quotas, he/she must convey such objections to the Directorate of Fisheries within three days. If a permit is suspended for the second time during the same fishing year due to catch exceeding catch quotas, the Directorate of Fisheries shall suspend a vessel's commercial fishing permit for two weeks in addition to the time resulting from the suspension provided for in the first paragraph, for six weeks if it occurs for the third time and for twelve weeks if it occurs more often. As another example, the Directorate of Fisheries shall suspend the commercial fishing permits of vessels failing to submit catch log books; such suspensions shall remain in force until submissions are received or explanations provided for the reasons for failure to submit.

In the first instance of a violation which is liable to suspension of fishing permit, the suspension shall apply for at least one week and no longer than 12 weeks, depending upon the nature and scope of the violation. In the case of repeated violations, a suspension shall apply for at least four weeks and not longer than one year. If a vessel's commercial fishing permit has repeatedly been suspended, the Directorate of Fisheries may decide that a fishing inspector shall be stationed aboard the vessel at the expense of the vessel operator for a specific period of up to two months. The vessel operation must then pay all cost arising from the presence of the fishing inspector aboard, including salary cost. If there is suspicion of more serious infringements, the case may be transferred to the Ministry or to a court. All decisions on the suspension of harvest rights are to be made publicly available.

According to the Directorate of Fisheries, the fishery under assessment is very clean; in recent years, no 'substantial' infringements (affecting the sustainability of the stock) have been detected, only a few 'technical' infringements such as forgetting to apply for the annual renewal of the fishing license.

As follows from the above, Iceland has a comprehensive system for physical inspection of catches, through observers and spot checks at sea and, not least, 100 % coverage of independent landing checks. In addition to these coercive compliance mechanisms, various forms of norm-, legitimacy- and communication-related mechanisms have also proven to be effective in delivering compliance in fisheries. In Iceland, there is a degree of social control in the small coastal communities from which the fishery takes place ('neighbour watch'), and the high level of user-group involvement may provide regulations with a degree of legitimacy that increases fishermen's inclination to comply with them. The same applies to the relationship between fishermen and enforcement officers, which is reported to be good, not least because the Coast Guard is not only policing the fishing ground; it is also the most important service provider and search and rescue operator at sea. Further, inspectors are reported to approach the fishermen in a respectful manner and provide guidance on how to avoid infringements, thus taking a more consultative role in addition to their traditional policing role towards the fishing fleet.

4 Evaluation Procedure

4.1 Harmonised Fishery Assessment

At the time of the assessment there was no other lemon sole fishery in assessment within the Icelandic EEZ for certification against the Marine Stewardship Council's (MSC) Principles and Criteria for Sustainable Fishing.

Full reference was made to the fisheries 'ISF Iceland saithe, ling, Atlantic wolffish and plaice', 'ISF Iceland golden redfish, blue ling and tusk', and 'Icelandic gillnet lumpfish' which were assessed using version 1.3 of the MSC standard, as well as the fisheries 'ISF Icealand cod', and 'ISF Iceland haddock, anglerfish and Greenland halibut which have recently been certified using version 2.0,. Full assessment of the Icelandic anglerfish fishery was recently completed using FAM version 2.0, of which one of the lemon sole team was also involved, enabling effective harmonisation with these assessments.

In all cases, common issues relevant to vessel operations and management systems (Principles 2 and 3) were reviewed in the relevant assessment reports. This team came to their own independent conclusions based on the information available, but these were not substantially different to previous teams. Where common conditions could be applied, these were expressly harmonised with conditions already in place on relevant UoAs.

4.2 Previous assessments

The Icelandic lemon sole fishery has not undergone full MSC assessment. However it underwent partial pre-assessment as a part of a multi-species pre-assessment conducted in 2016.

4.3 Assessment Methodologies

The methodology and standard of the MSC Fisheries Certification Requirements (& Guidance) v2.0 was followed during this re-assessment. The setup of the report follows the "*MSC Full Assessment Reporting Template v2.0".*

At the time of the announcement of the assessment of this fishery, a notification was issued to stakeholders of the intention to apply the Risk Based Framework (RBF) to the evaluation of Performance Indicator PI 2.2.1 – secondary species outcome – due to possible shortage of information available on the biological status of secondary species.

Based on information provided during the site visit, notably updated catch statistics, together with data on observer coverage of interactions with out-of-scope species, the team accurately determined the secondary in-scope and out-of-scope species elements for assessment within PI 2.2.1. For these secondary species, stock status reference points are available, derived through empirical approaches. Sources of data to inform secondary species outcome status include long-term catch data (from e-Log system and certified weighers), proportion of catch by gear type, biomass / population size estimates, observer data, and data on marine mammal, elasmobranch and seabird interactions entered on the e-Log system.

The assessment team concluded that the FCR & Guidance v2.0, table 3 criterion for 2.2.1 is met, RBF is not triggered and the assessment of PI 2.2.1 is undertaken using default PISGs within Annex SA. Reference points for secondary main (out-of-scope) species assessed under 2.2.1 are presented in Table 4-1 and in Table 4-2 for minor secondary species**.**

No comments or objections were received in response to the proposed use of the Default Assessment Tree and the Risk Based Framework.

Table 4-1: Reference points for out-of-scope species

Species	Reference point	Details	Status	Management response
Harbour seal	Minimum population size: 12,000 individuals	Icelandic Government management objective set in 2006 (NAMMCO, 2006) with commitment to action should number fall below minimum population sizes.	Below min population size (7,652)	Increased monitoring, development of population models to determine cause for decline, gear restrictions and closed areas, and further management related to MSC conditions for other Icelandic set net fisheries.
Grey seal	Minimum population size: 4,100 individuals		At or above min population size (4,100 – 4,200)	Increased monitoring.
Northern gannet	Vulnerable population size: <10,000 mature individuals with a continuing decline estimated to be >10% in ten years or three generations	IUCN red list population thresholds for defining northern gannet as vulnerable.	Above vulnerable threshold and considered least concern	Conservation actions are in place within the northern gannet's extent of occurance (i.e. in European Birds Directive). Icelandic management is related to longline and set net interactions.

Table 4-2: Reference points for out-of-scope species

English name	Species	Source / reference	Detail of reference points	Management / actions
Fish				
Atlantic halibut	*Hippoglossus hippoglossus*	MFRI advice, 2018	Juvenile index and biomass index	A committee established in 2010 by the minister of fisheries due to the poor state of the Atlantic halibut stock, concluded that the most effective way to rebuild the stock would be to ban all targeted fishing. In 2012, a regulation was issued to ban all targeted fishing for Atlantic halibut and stipulating that all viable halibut in other fisheries must be released
Black scabbardfish	*Aphanopus carbo*	ICES advice, 2018	Abundance index (stock size indicator) and harvest rate	ICES assessment concludes stable harvest rates in recent years. Management advice is: annual catches of no more than 367 tonnes in subareas 1, 2, 4, and 10 and divisions 3.a and 5.a in each of the years 2019 and 2020.
Greater eelpout	*Lycodes esmarkii*	Nieto et al, 2015, IUCN red list	Population size: IUCN assessed as least concern	Landings recorded within catch statistics, management as per described in 2.1.2 and 2.2.2.
Megrim	*Lepidorhombus whiffiagonis*	MFRI advice, 2018	Juvenile index and biomass index	A TAC is not advised by MFRI (i.e. no restrictions on landings) based on status of stock relative to biomass index.
Northern wolffish	*Anarhichas denticulatus*	Nieto et al, 2015, IUCN red list	Population size: IUCN assessed as endangered	Landings are negligible; management includes monitoring via catch statistics, species ID (in comparison to Atlantic wolffish and spotted wolffish, and management as described under 2.1.2 and 2.2.2
Orange roughy	*Hoplostethus atlanticus*	ICES advice, 2016	Qualitative evaluation defining stock below reference points	ICES advises zero catch in each of the years 2017 to 2020.

English name	Species	Source / reference	Detail of reference points	Management / actions
Roughhead grenadier	*Macrourus berglax*	ICES advice, 2015	Landings data forms basis of advice	ICES advises that for the years 2016 to 2020 there should be no directed fisheries for roughhead grenadier, and bycatch should be counted against the TAC for roundnose grenadier to minimise the potential for species misreporting.
Roundnose Grenadier	*Coryphaenoides rupestris*	ICES advice, 2017	Landings data forms basis of advice	ICES advises that when the precautionary approach is applied, landings should be no more than 65 tonnes in each of the years 2018 and 2019
Turbot	*Scophthalmus maximus*	Golani et al, 2011, IUCN red list	Population size: IUCN assessed as vulnerable	Landings are negligible; management includes monitoring via catch statistics, closed areas, and management as described under 2.1.2 and 2.2.2
Whiting	*Merlangius merlangus*	MFRI advice, 2018	Juvenile index, biomass index and Fproxy	No management proposed based on current stock status
Cephalopod				
European Flying Squid	*Todarodes sagittatus*	Barratt et al, 2014	Population size: IUCN assessed as least concern. Stocks fluctuate due to environmental variability, but no evidence of stock decline.	No management proposed based on current stock status
Elasmobranchs				
Blue Skate / Common Skate	*Dipturus flossada*	Dulvy et al, 2006.	Population size: IUCN assessed as critically endangered.	Landings recorded within catch statistics, management as per described in 2.1.2 and 2.2.2.
Shagreen ray	*Leucoraja fullonica*	McCully et al, 2015	Population size: IUCN assessed as vulnerable. Population declines of 30-50% over three generations for the Northeast Atlantic subpopulation	Landings recorded within catch statistics, management as per described in 2.1.2 and 2.2.2.
Starry ray	*Amblyraja radiata*	MFRI advice, 2018	Juvenile index and biomass index	A TAC is not advised by MFRI based on stock status and abundance of species around Iceland.
Greenland shark	*Somniosus microcephalus*	Kyne, 2006	Populations size and lif history: IUCN assessed as near threatened.	When caught, fishers record occurrence within e-Log system and when landed, recorded within landing / catch statistics.
Leafscale gulper shark	*Centrophorus squamosus*	White et al, 2003	Population size: IUCN assessed as vulnerable. Abundance likely less than 10% of baseline	Landings recorded within catch statistics, management as per described in 2.1.2 and 2.2.2.
Porbeagle	*Lamna nasus*	Stevens et al, 2006	Population size: IUCN assessed as vulnerable.	Landings recorded within catch statistics, management as per described in 2.1.2 and 2.2.2.
Spiny dogfish / Picked dogfish	*Squalus acanthias*	Fordham et al, 2016.	Population size: IUCN assessed as vulnerable, decline of >30% in global population in last three generations of species	Landings recorded within catch statistics, management as per described in 2.1.2 and 2.2.2.

4.4 Evaluation Processes and Techniques

4.4.1 Site Visits

Site visits and stakeholder meetings were conducted as announced in Reykjavík, Iceland, during the period 3rd[nd] to 5[th] of April 2018, see below.

4.4.2 Consultations

Stakeholders were invited to submit comments and to consult the assessment team from the onset of the assessment process. Public notification of the assessment, its scope, methodology and assessment team, was issued with an invitation to comment and consult the team, and the same was sent out by e-mail to a list of stakeholders. Meetings were arranged with representatives of the client and key stakeholders, as summarized in Table 4-3 and Table 4-4.

On the basis of consultation with key stakeholders and their commitments, the client submitted a Client Action Plan which the assessment team has approved. A Preliminary Draft Report, including eight conditions and their milestones, was completed and presented to the Client in July of 2017.

Table 4-3: Itinerary of site visit and stakeholder consultation in the Icelandic lemon sole fishery assessment.

Date	***Name of organisation***	***Subjects of Consultation***
3.4.2018	Iceland Sustainable Fisheries ehf. (the Client)	The client fishery
3.4.2018	Fuglavernd (BirdLife Iceland)	Environmental NGO´s role in fisheries policy making and consultation; views on sustainability and environmental impact of fishery
	Landvernd (Icelandic Environmental Association)	
3.4.2018	Náttúruverndarsamtök Íslands	
4.4.2018	Atvinnuvega- og nýsköpunarráðuneytið (Ministry of Industries & Innovation)	Overall fisheries management and policies
4.4.2018	Hafrannsóknastofnun (Marine & Freshwater Research Institute)	Fisheries research and advice
4.4.2018	Fiskistofa (Directorate of Fisheries)	Fisheries statistics, enforcement, monitoring and controls
5.4.2018	Örfirisey RE-4 (Bottom trawler, operated by HB Grandi hf., a member of the ISF client group)	Fishers´ view on the fishery and its management; fishing gears and logging of fishing on board
5.4.2018	Iceland Sustainable Fisheries ehf.	Closing meeting with the Client

Table 4-4: Participants in assessment team meetings with the Client and stakeholders on the ISF Iceland lemon sole fishery

Name	***Affiliation / Role***
Gunnar Á. Gunnarsson	Vottunarstofan Tún; observer
Geir Hønneland	Vottunarstofan Tún; assessor
Fiona Nimmo	Vottunarstofan Tún; assessor
Giuseppe Scarcella	Vottunarstofan Tún; assessor, Team leader
Sergio Cansado	Accreditation Services International; lead assessor, ASI witness assessment
Kristinn Hjálmarsson	Iceland Sustainable Fisheries ehf. (the Client); Project Manager
Ævar Smári Jóhannsson	HB Grandi hf., Örfirisey RE-4; captain

Name	*Affiliation / Role*
Kristján Víðir Kristjánsson	HB Grandi hf., Örfirisey RE-4; helmsman/mate
Hólmfríður Arnardóttir	Fuglavernd (BirdLife Iceland); Managing Director
Árni Finnsson	Náttúruverndarsamtök Íslands; Chairman
Salóme Hallfreðsdóttir	Landvernd (Icelandic Environmental Association); Managing Director
Brynhildur Benediktsdóttir	Atvinnuvega- og nýsköpunarráðuneytið (Ministry of Industries & Innovation; Expert on natural resources
Jónbjörn Pálsson	Hafrannsóknastofnun (Marine & Freshwater Research Institute - MFRI); marine biologist
Steinunn H. Ólafsdóttir	MFRI; marine biologist
Guðmundur Þórðarson	MFRI; marine biologist
Guðjón Már Sigurðsson	MFRI; marine biologist
Þorsteinn Hilmarsson	Fiskistofa (Directorate of Fisheries); Director of information
Sævar Guðmundsson	Fiskistofa (Directorate of Fisheries); Head, Department

4.4.3 Evaluation Techniques

All the required public announcements were published on the website of the MSC and mailed electronically to the client and a list of stakeholders. All stakeholders identified have internet access and access to an email account. This was identified as the most appropriate contact.

A working knowledge of the lemon sole fishery was obtained by literature review and by interviews with key actors and stakeholders in the fishery. Information on this fishery is readily available from the management (DF) and scientific authorities (MFRI), including complete trip based landings 2011-2016 inclusive.

Each team member was responsible for a single principle to develop scoring justifications. A group consensus was developed for each scoring issue and this determined the final scores for each performance indicator. The standard MSC decision rule was applied for the final recommendation (i.e. aggregate category-level scores must all exceed 80 and each individual PI must score 60 or above).

A total of 55 species scoring elements, evaluated in PI 2.1 – 2.3, were identified. These were clearly separated into Primary, Secondary and ETP. Of the 55 species/stocks identified as potentially having an interaction with the fishery, 30 have been identified as primary species (Table 3-7). That is, they are subject to some level of management with the general objective of maintaining these stocks as close to MSY level as is feasible. A further 21 species have been identified as secondary species (Tables 3-9 – 3-10), including 3 out-of-scope species. Four species have been identified as ETP mainly based on their presence on international lists of vulnerable and endangered species (CITES Appendix 1, IUCN Redlist Status for out-of-scope species, AEWA table1 column A) that overlap with fishing operations (Table 3-13). Information was available on ETP from various scientific sources to assess their risks from fishing. All species not allocated to primary or ETP are considered secondary species.

All in-scope species were allocated between main and minor species based on the gear-specific landings data (Tables 3-7, 3-9 – 3-10). This included consideration of their resilience in setting landings references between 2% for less resilient and 5% for more resilient species. Where information was lacking, lower resilience was assumed. The results were not sensitive to this determination. For all primary species, stock assessment information was used to determine their status. For out-of-scope species (which are automatically designated 'main', if the are not ETP species), information was available to determine risks. All secondary in-scope species were minor components of the landings.

Six commonly encountered / minor habitats and 6 VMEs were scored as elements under PI 2.4. The Icelandic marine ecosystem was considered as a whole under PI 2.5.

The scoring elements contributed to the relevant performance indicator score using the standard methodology as described in FCR 7.10.7.5 Table 4-5.

Table 4-5: Scoring elements: see Table 6 – Table 12 for gear specific main/minor allocations of primary and secondary species.

Component	*Scoring elements*	*Main or minor*	*Data-deficient or not*
P1	Lemon sole (*Microstomus kitt*) in Icelandic EEZ	Target species	Not
P2: Primary Species	30 species (see Table 3-7)	Main	Not
P2: Primary Species		Minor	Not
P2: Secondary Species	21 species (see Tables **Error! Reference source not found.**9 and 3-10))	Main	Not
P2: Secondary Species		Minor	Not
P2: ETP Species	20 ETP species in Icelandic waters (see Table 3-13) of which 1 is considered an element within the UoAs assessed	N/A	Not
P2: Habitats	Coarse sediments; fine mud; mixed sediment; rock / hard substrata; sand; sandy mud / muddy sand; maerl beds; Modiolus reefs; Lophelia reefs; coral gardens; deep-water sponge aggregations; hydrothermal vent habitats.	N/A	Not
P2: Ecosystems	Icelandic Marine Ecosystem	N/A	Not
Principle 3	Icelandic Management Authority	N/A	Not

The assessment team interviewed representatives of the client, Iceland Sustainable Fisheries ehf. and a visit was arranged to a bottom trawler. Separate meetings were held with three leading Icelandic environmental NGOs. The assessment team conducted separate meetings with representatives of the Ministry of Industries and Innovation (MII), of the Marine Research Institute (MRI) and the Directorate of Fisheries (DF) to discuss matters related to marine biological research data, fisheries advice, fisheries management and government policy, as well as the enforcement and monitoring of official regulations.

5 Traceability

5.1 Eligibility Date

The eligibility date (ED) for this fishery will be the date of publication of the first Public Comment Draft Report (see *FCRv2.0 7.6.1.2*). The eligibility date and its implications for chain of custody were discussed with the client prior to the launching of the assessment and were further underlined in subsequent memos referring to the MSC chain of custody standard. As outlined below there is already in force a robust system of traceability and segregation that gives confidence in the ED set. The catch is recorded at sea and again by official weighmasters at landing points by vessel, gear and species.

5.2 Traceability within the Fishery

All commercial operations are subject to a permit from the Directorate of Fisheries (DF), and all vessels are required to carry a vessel monitoring system (VMS), which is monitored 24hrs a day by the Coast Guard. An AIS system (Autonomous Identification System) applies to vessels while operating within 50 miles and an Inmarsat/Standard-C system for vessels operating further afield.

The DF collects, retains and publishes data on fishing and catches landed by the Icelandic fleet and by other vessels catching within the Icelandic EEZ. The DF monitors compliance with rules on weighing and recording of catches. The DF also collects information about all sales and purchases of unprocessed fish that is traceable to landings, i.e. to vessel, gear and area, which enables DF to monitor potential substitution.

Fishing vessels are required to fill out logbooks to record details of fishing practices, including location, dates, gear, species and catch quantity. Vessels above 6 GT in size are required to do so electronically while smaller vessels may do so manually. Logbooks must be submitted directly to the Directorate of Fisheries. Most fishing is conducted by means of single gear per trip. The use of multiple (more than one) gears during the same fishing trip is rare, although this may occur in some cases on smaller vessels simultaneously using handline and longline. However, captains are required to report their catch by type of gear, as well as fishing area. Catch, whether gutted on board or not, is separated by species in large tubs. Tubs carry identification numbers, and vessels conducting multiple-days trips add a removable tag to each tub on board to further identify day of catch, both of which are carried through landing, auction and first trading, unless processing is conducted at auction and in that case chain of custody is required. These measures serve to prevent substitution and to ensure segregation of fish of certified units (gears and areas) from fish of non-certified units, up to the point of landing.

Landings of each fishing vessel are monitored by persons officially licenced and employed by local port authorities. These certified weighers are responsible for weighing landed catch, using certified scales, and recording the catch by vessel, species, fishing gear used, and quantities landed. Inspectors from the DF regularly monitor the landing of catches to ensure that catch is weighed and recorded according to precise applicable rules. This provides a check on the accuracy of vessel logbooks for all landings and a support of traceability within the fishery. All fish caught within the Icelandic EEZ must be registered and weighed in Iceland, although DF may, with the Ministry´s permission, authorise derogation from that rule.

Fish catch remains segregated at the point of landing by vessel, species and gear. Identified tubs of landed fish are passed on either directly to first buyer (trader or processor), or to an auction that operates as an electronic facilitator of trade or as a physical facility where tubs received are passed on to first buyer. Where an auction assembles small lots from more than one small vessels into a single lot, the delivery document specifies the names of the vessels and the gear applied. A few auction houses may perform primary processing (gutting), involving change of tub numbers, which will require the facilities to be chain of custody certified (or registered as processing sub-contractors for CoC certified entities) to assure traceability of fish supplied, back to the unit of certification. At the time of the release of this report, four auction operations are CoC certified in Iceland.

Fishing companies, especially ones operating large vessels with on-board processing facilities, may use sub-contracted cold storage facilities for storing landed catch prior to first sale or first processing after landing. This may be the case particularly with short-term storing of landed fish-on-ice, or longer-term storing of products frozen, packed and labelled on-board the vessel, typically loaded on pallets which in turn are sometimes loaded into containers. Either way, these are identified and traceable to vessel, catch dates, gear and fishing area.

The unit of certification allows for catch from the entire Icelandic EEZ to enter chain of custody. All registered fishing vessels operating bottom trawl, *nephrops* trawl and Danish seine within the Icelandic EEZ are eligible. Fish caught directly or purchased by members of the client group from vessels, auctions or processors, is traceable to catch dates, catch areas and vessels.

While the assessment team has confidence in the internal traceability of the ISF Iceland lemon sole fishery (Table 5-1), a recommendation will be raised, requesting that the client issues a reminder to all of the client members, including auctions, to observe the following:

- to ensure full segregation of catch of each species by gear in the event more than one gear is applied during the same fishing trip;
- to ensure full segregation of catch of each species by management region, i.e. fish caught inside the Icelandic EEZ is kept separate, in the event a vessel catches the same species on the same trip inside and outside the Icelandic EEZ – and –
- to observe and implement appropriate measures of packing and labelling certified products prior to moving them to sub-contracting cooler or freezer storages upon landing, to ensure client members´ responsibility for product integrity prior to sale or further handling.

Table 5-1: Traceability Factors within the ISF Iceland lemon sole fishery.

Traceability Factor	***Description of risk factor if present. Where applicable, a description of relevant mitigation measures or traceability systems (this can include the role of existing regulatory or fishery management controls)***
Potential for non-certified gear/s to be used within the fishery	Apart from the three assessed gears, lemon sole in the Icelandic EEZ is caught in shrimp trawls, gillnets and handline. Average annual reported catches from these gears combined were 0,19% of the total lemon sole catch in 2011-2017. Fish is segregated on board, landed and recorded by reference to vessel, date and gear. The use of certified and non-certified gears during the same fishing trip is considered quite rare and the risk of mixing catch of same species from the two is minimal. Fishing vessels – Icelandic and foreign operating within the Icelandic EEZ – are required to keep logbooks for the recording of fishing by species, gear and area. Furthermore, all landings in Iceland are recorded and monitored by registered weighmasters. Landings of lemon sole from non-certified gear used within the Icelandic EEZ are segregated from lemon sole caught in certified gear, both physically and in records prior to entry into chain of custody.
Potential for vessels from the UoC to fish outside the UoC or in different geographical areas (on the same trips or different trips)	Vessels are unlikely to catch lemon sole within and outside the Icelandic EEZ on the same trip. Although not common this is particularly possible in the case of larger trawlers on their return trips from fishing in foreign or international territories (like the Greenland EEZ). Risk to traceability is mitigated by mandatory segregation on board of catches in foreign area from catches in the Icelandic EEZ, real time electronic logging – and thus monitoring by DF – of catches and labelling of unprocessed and processed fish with reference to fishing dates and/or areas.
Potential for vessels outside of the UoC or	Lemon sole are caught by a large number of vessels, most of them Icelandic ones that are part of the UoC.

client group fishing the same stock	Icelandic vessels operating gear that is not a part of the UoC, catch a small amount of lemon sole, or 0,19%, of the average annual total catches in 2011-2017. Furthermore, foreign vessels – which are not eligible and are outside the proposed UoC – may catch a small amount of lemon sole. Still, those vessels are subject to the same requirements of the Directorate of Fisheries for segregating, logging and reporting of catch by species, whether landed in Iceland or abroad, with information on the name of the vessel available to first purchasers.
Risks of mixing between certified and non-certified catch during storage, transport, or handling activities (including transport at sea and on land, points of landing, and sales at auction)	Fishers are required to separate catch by species. All fish landed in Iceland by the fishing fleet must be reported in Iceland to Port Authorities who are responsible for weighing catch on certified scales either by licensed operators or processing plants approved for this purpose. Foreign vessels landing fish from the Icelandic EEZ in Iceland are subject to the same requirements. In the event that eligible vessels are landing lemon sole in foreign ports, there is a possibility that certified and non-certified fish could be simultaneously handled, e.g. in cold storage facilities, prior to entry into chain of custody. Although not common, this is a possibility, especially of fish gutted on ice, delivered in boxes or tubs. Provided these carry identification traceable to the delivery and vessel, traceability back to unit of certification is ensured, since all vessels are obliged to report to Fisheries Directorate landings in foreign ports by type of species, fishing gear, area and quantities. Furthermore, the DF issues catch certificates required for entry into a third country. The possibility may arise that lemon sole from vessels within the UoC and lemon sole from foreign vessels outside the UoC may simultaneously be handled at auctions. The majority of foreign vessels fishing under bilateral agreement in Iceland do not land their catch in Iceland, but are required to report all details of catches by species, quantity, area, gear type and vessel to the Icelandic Directorate of Fisheries. However, if such vessels were to land fish anywhere in Iceland, information are recorded by official weighmasters upon landing, in the same manner as for all Icelandic vessels and can thus be traced back to species, quantity, area, gear and vessel. Icelandic regulation require fish from foreign vessels to be kept and processed separate from all other fish throughout the chain of custody. At first point of sale, i.e. entry into chain of custody, the tracing of the fish back to UoC will require verification by the buyer and its CoC CAB.
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	Chain of Custody is required for all post-landing processing activities. Risk to the integrity of certified fish processed on-board, which would be confined almost solely to large trawlers, may potentially emanate from fishing in areas not identified as part of the UoA during the same fishing trip. This risk is minimised and mitigated by the mandatory logging, as well as physical identification, of fish catch by management regions. Fishing by vessels with on-board processing facilities is monitored by weighing landed products in a similar way and converting to catch weight by means yield indices, estimated by sampling catch and processed products on board. Basic handling of the catch, such as gutting and possibly heading, is commonly conducted by most types of vessels at sea, during which a risk of mixing certified and non-certified catch is considered minimal or none.
Risks of mixing between certified and non-certified catch during transhipment	The DF monitors, via the vessel monitoring systems (VMS), that trans-shipment of fish is not conducted. Some Icelandic fishery practices export fish directly from vessels, without involvement of domestic processing operations, and typically after being transferred to containers. However, recent law stipulates that any unprocessed fish must be landed and weighed in Icelandic ports prior to export[3]. Un- or semi-processed catch may thus be exported, after landing and weighing,

[3] http://www.reglugerd.is/reglugerdir/allar/nr/224-2006.

	for storing in cold storages and/or processing in facilities in a third country, some of which may be subsidiaries of ISF´s shareholders. Given the tight monitoring system operated by DF, partly via the VMS, the fishing by vessels outside the unit of certification and, thereby, the opportunities to substitute certified fish with non-certified fish, are unlikely.
Any other risks of substitution between fish from the UoC (certified catch) and fish from outside this unit (non-certified catch) before subsequent Chain of Custody is required	None identified.

5.3 Eligibility to Enter Further Chains of Custody

Potential certification will include fish caught by all registered Icelandic vessels with valid permit to operate within the Icelandic EEZ. It will also include fish handled by officially licenced fish auctions, provided these auctions do not take ownership of the catch and/or are not involved in the processing of the catch either as owners of the fish or sub-contractors. A list of vessels with valid licences for fishing within the Icelandic EEZ is available from the Fisheries Directorate upon request (http://www.fiskistofa.is).

A list of Icelandic vessels and their quotas can be found on the website of the Directorate of Fisheries, see http://www.fiskistofa.is/veidar/aflaheimildir/uthlutadaflamark/ (*Úthlutun til skipa 2016/2017*).

Fish from eligible fishing vessels, whole and/or semi-processed, landed at any officially approved landing site (harbour) and/or sold via (first sale) fish auction and/or kept in cold store facilities in Iceland or in a Third Country, may therefore enter into further certified chain of custody and be eligible to carry the MSC eco-label, provided these are sold through a member of the client group, i.e. shareholder of the Iceland Sustainable Fisheries ehf. and/or its registered certificate sharing entities.

Chain of custody will commence as of the first point of sale, change of ownership and/or processing after landing. Auctions that may or may not take possession of the fish and merely serve as facilitators of trade do not need chain of custody certification. Auctions that are not members of the client group and that either take ownership of the fish and/or engage in processing the fish after landing, e.g. by gutting or otherwise, must have chain of custody certification.

Operators who do not share the certificate but who take ownership of the fish before it is sold to certificate sharers are required to hold MSC Chain of Custody certification. Subcontractors, who do not take ownership of the catch but are involved in the handling of the fish after landing, are required either to be holders of MSC Chain of Custody certification or to be listed as subcontractors on the scope of another MSC Chain of Custody certificate holder.

The Icelandic Consumer Agency (Neytendastofa) issues authorisations to conduct official weighing of fish landed in Icelandic ports. The current list of officially authorised weighmasters is available on https://rafraen.neytendastofa.is/pages/loggiltirvigtarmenn/.

A map of the official points of landing for fish can be found here:

http://gafl.fiskistofa.is/index.php?option=com_content&view=article&id=53:dreifikort&catid=38:kynningarefni&Itemid=62.

6 Evaluation Results

6.1 Principle Level Scores

Table 6-1: Final Principle Scores

Principle		***Score***
Principle 1 – Target Species		82.5
Principle 2 – Ecosystem	UoA1: Bottom Trawl (TB)	85.0
	UoA2: Nephrops Trawl (TN)	85.3
	UoA3: Danish Seine (SD)	87.3
Principle 3 – Management System		89.4

6.2 Summary of PI Level Scores

Table 6-2 PI level scores by gear
(TB: Bottom trawl; TN: Nephrops trawl; SD: Danish seine)

Principle	Component	Wt	Performance Indicator (PI)		BT	NT	DS
One	Outcome	0.333	1.1.1	Stock status	80	80	80
			1.1.2	Stock rebuilding	-	-	-
	Management	0.667	1.2.1	Harvest strategy	80	80	80
			1.2.2	Harvest control rules & tools	75	75	75
			1.2.3	Information & monitoring	100	100	100
			1.2.4	Assessment of stock status	80	80	80
Two	Primary species	0.2	2.1.1	Outcome	95	95	95
			2.1.2	Management strategy	90	90	90
			2.1.3	Information/Monitoring	100	100	100
	Secondary species	0.2	2.2.1	Outcome	80	80	80
			2.2.2	Management strategy	85	85	85
			2.2.3	Information/Monitoring	85	85	85
	ETP species	0.2	2.3.1	Outcome	80	80	90
			2.3.2	Management strategy	80	80	80
			2.3.3	Information strategy	80	80	80
	Habitats	0.2	2.4.1	Outcome	75	80	85
			2.4.2	Management strategy	70	70	80
			2.4.3	Information	85	85	85
	Ecosystem	0.2	2.5.1	Outcome	100	100	100
			2.5.2	Management	85	85	85
			2.5.3	Information	85	85	90
Three	Governance and policy	0.5	3.1.1	Legal &/or customary framework	100	100	100
			3.1.2	Consultation, roles & responsibilities	85	85	85
			3.1.3	Long term objectives	100	100	100
	Fishery specific management system	0.5	3.2.1	Fishery specific objectives	90	90	90
			3.2.2	Decision making processes	85	85	85
			3.2.3	Compliance & enforcement	80	80	80
			3.2.4	Monitoring & management performance evaluation	80	80	80

Overall weighted Principle-level scores	Score TB	Score NT	Score DS
Principle 1 - Target species	**82.5**	**82.5**	**82.5**
Principle 2 - Ecosystem	**85.0**	**85.3**	**87.3**
Principle 3 - Management	**89.4**	**89.4**	**89.4**

6.3 Summary of Conditions

Table 6-3: Summary of Conditions

No.	*Condition*	*Performance Indicator Scoring Issue*	*Related to previously raised condition? (Y/N/NA)*
1	A well-defined harvest control rule should be put in place that is consistent with the harvest strategy and defines how the exploitation rate will be reduced as the stock approaches the limit reference point. Evidence should be provided that the HCR is precautionary within 4 years.	**PI 1.2.2 a)**	**N**
2	By the fourth surveillance audit necessary conservation and management measures for all vulnerable marine habitats shall be in place and implemented, such that the trawl fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. This condition is harmonised with that for ISF Iceland anglerfish, ISF Iceland haddock, ISF Iceland golden redfish, blue ling and tusk and the ISF Iceland saithe, ling, Atlantic wolfish and plaice fisheries.	**PI 2.4.1** b) (Bottom trawl)	**N**
3	By the fourth surveillance audit necessary conservation and management measures for deep-sea sponge aggregation and coral gardens shall be in place and implemented, such that there is a partial strategy in place and implemented for these habitat types specifically, ensuring that the bottom and *Nephrops* trawl fisheries do not cause serious or irreversible harm to habitat structure and function in Icelandic waters. This strategy will include, where necessary, appropriate formalised move-on measures to avoid interactions with ALL forms of VMEs. With regard to the bottom trawl UoA, this condition is harmonised with that for ISF Iceland anglerfish, ISF Iceland haddock, ISF Iceland golden redfish, blue ling and tusk, and the ISF Iceland saithe, ling, Atlantic wolfish and plaice fisheries. With regards to Nephrops UoA, this condition is harmonised with that for ISF Iceland anglerfish, ISF Iceland cod and ISF Greenland halibut fisheries.	**PI 2.4.2** a, b) (Bottom trawl and *Nephrops* trawlers)	**N**

6.4 Recommendations

Table 6-4: Recommendations

Recommendation 1 **UoA: Bottom trawl, Nephrops trawl, Danish seine.**	
Performance Indicator	**PI 2.2.3 Secondary species information** 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
Purpose	Interactions with seabird and marine mammals should be recorded in the electronic logbooks of client vessels. However, logbook returns since their introduction in 2009 have indicated very few such entries.

Recommendation	The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals. This recommendation applies to all gears. This recommendation is harmonised with that for ISF Iceland anglerfish.

Recommendation 2 **UoA: Bottom trawl, Nephrops trawl, Danish seine.**	
Performance Indicator	**PI 2.3.3 ETP species information** 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
Purpose	Interactions with seabird and marine mammals should be recorded in the electronic logbooks of client vessels. However, logbook returns since their introduction in 2009 have indicated very few such entries.
Recommendation	The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals. This recommendation applies to all gears. This recommendation is harmonised with that for secondary out-of-scope species.

Recommendation 3 **UoA: All**	
Performance Indicator	**Traceability**
Purpose	Management of risks to segregation and traceability within the fishery
Recommendation	The team requests that the client issues a reminder to all of the client members, as well as auctions, to observe the following: - to ensure full segregation of catch of each species by gear in the event more than one gear is applied during the same fishing trip; - to ensure full segregation of catch of each species by management region, i.e. fish caught inside the Icelandic EEZ is kept separate, in the event a vessel catches the same species on the same trip inside and outside the Icelandic EEZ – and – - to observe and implement appropriate measures of packing and labelling certified products prior to moving them to sub-contracting cooler or freezer storages upon landing, to ensure client members´ responsibility for product integrity prior to sale or further handling.

6.5 *Draft* Determination, Formal Conclusion and Agreement

The assessment team has passed a draft determination to recommend that the following three Units of Assessment of the ISF Iceland lemon sole fishery should be certified for the scope specified in section 3.1 of this report as well-managed and sustainable fisheries against the MSC fishery standard v2.0: Bottom trawl, *Nephrops* trawl and Danish seine.

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- Blue ling (*Molva dypterygia)* in Subarea 14 and Division 5.a (East Greenland and Iceland grounds)
- Beaked redfish (*Sebastes mentella) in* Subarea 14 and Division 5.a, Icelandic slope stock (East of Greenland, Iceland grounds)

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- 13 June 2017 ÞORSKUR – COD *Gadus morhua*
- 13 June 2017 SKÖTUSELUR – ANGLERFISH *Lophius piscatorius*
- 29 September 2017 KOLMUNNI – BLUE WHITING *Micromesistius poutassou*
- 13 June 2017 BLÁLANGA – BLUE LING *Molva dipterygia*
- 13 June 2017. SANDKOLI – DAB *Limanda limanda*
- 13 June 2017. DJÚPKARFI – DEMERSAL BEAKED REDFISH *Sebastes mentella*
- 13 June 2017. GULLKARFI – GOLDEN REDFISH *Sebastes norvegicus*
- 13 June 2017. GULLLAX – GREATER SILVER SMELT *Argentina silus*
- 13 June 2017. GRÁLÚÐA – GREENLAND HALIBUT *Reinhardtius hippoglossoides*
- 13 June 2017. ÝSA – HADDOCK *Melanogrammus aeglefinus*
- 13 June 2017. SÍLD – HERRING *Clupea harengus*
- 13 June 2017. LANGA - LING *Molva molva*
- 13 June 2017. SKRÁPFLÚRA – LONG ROUGH DAB *Hippoglossoides platessoides*
- 13 June 2017 HROGNKELSI – LUMPFISH *Cyclopterus lumpus*
- 29 September 2017 MAKRÍLL – MACKEREL *Scomber scombrus*
- 31 July 2017 ÚTHAFSRÆKJA – NORTHERN SHRIMP OFFSHORE *Pandalus borealis*
- 13 June 2017 HUMAR – NORWAY LOBSTER *Nephrops norvegicus*
- , 13 June 2017 LITLI KARFI – NORWAY REDFISH *Sebastes viviparus*
- 13 June 2017 SKARKOLI – PLAICE *Pleuronectes platessa*
- , 13 June 2017 UFSI – SAITHE *Pollachius virens*
- 13 June 2017 HLÝRI – SPOTTED WOLFFISH *Anarhichas minor*
- 13 June 2017 KEILA – TUSK *Brosme brosme*
- 13 June 2017 LANGLÚRA – WITCH Glyptocephalus cynoglossus

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Act on Fisheries Management No. 38/1999, amended as Act No. 116/2006.

Act on Fishing and Processing by Foreign Vessels in Iceland's Exclusive Economic Zone No. 28/1998.

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Act on the Auditor General and the Auditing of Government Accounts No. 46/2016.

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Appendices

Appendix 1: Scoring and Rationales

Appendix 1.1: Performance Indicator Scores and Rationale

PI 1.1.1 Evaluation Table for – 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			
	Guidepost	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?	Y	Y	N
	Justification	The Icelandic spring groundfish survey which has been conducted annually in March since 1985, covers the most important distribution area of lemon sole. In addition, the Icelandic autumn groundfish survey was started in 1996. However, a full autumn survey was not conducted in 2011 due to a labour dispute and therefore the results for 2011 are not presented. The spring survey is considered to measure changes in abundance/biomass better than the autumn survey. It may not, however, adequately cover the main recruitment grounds for lemon sole as the main nursery areas are thought to be in shallow water in habitats unsuitable for demersal trawling. However, the information available can be used to understand the dynamics of the stock also in terms of recruitment, taking into account that some recruitment grounds are anyway examined by the spring survey (MFRI pers. comm.). The harvestable biomass index observed in the spring survey has been relatively low in the period 1985-2002, followed by a strong increase in 2003 and 2004. From 2005 to 2010 the biomass remained at high levels fluctuating around 5 kg/km^2. Since then the biomass has decreased but it remained above the levels observed in the first part of the series. The recruitment index showed a similar pattern, with the main difference that in 2001 the maximum value of the series has been observed (MFRI, 2017). Taking into account that the harvestable biomass observed in 2017 is still higher than the biomass observed in the period 1985-2002 and that the highest recruitment observed in 2011 has originated from the biomass of larger individuals (> 39 cm) observed in 2009, which was lower than 2017, it can be argued that the stock is highly likely to be above the point where recruitment would be impaired (MFRI, 2017). Therefore SG80 is met. Considering the decreasing patterns of harvestable biomass index and recruitment observed in recent years, as well as the adequacy of the spring survey in sampling recruits, it is not possible to argue that there is an high degree of certainty that the stock is above PRI. On this basis, SG100 is not met.		
b	Stock status in relation to achievement of MSY			
	Guidepost		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?		Y	N

	Justification	The advice for lemon sole follows the ICES framework for stocks where reliable stock biomass indices are available, but analytical age-length based assessments are not possible (Category 3 stocks; ICES, 2012). Spring biomass index of lemon sole 30 cm and larger, along with catch, is used to calculate Fproxy (catch/survey biomass). The target Fproxy was defined as 80% of the mean Fproxy from the reference period of 2010–2015 (MFRI, 2017). Taking into consideration that the value of Fproxy in the period where high values of biomass were observed (2010-2015) was around 0.5 it is possible to argue that the Fproxy was around a level consistent with F_{MSY} since 2002 and is above Fproxy target in the last two years. According to GSA2.2.3 (MSC CRV2.0), teams may use surrogate or proxy indicators and reference points in scoring both stock biomass and exploitation rate. Proxy indicators and reference points or measuring stock status may also be used where the exact relationship with the PRI, B_{MSY} and F_{MSY} levels are not known. In the present case the team decided to use the trends of biomass of large individuals (>39 cm) and recruitment observed from the spring survey, taking into account that the spring survey provides a longer series than the autumn survey. According to GSA2.2.3.1 empirical values of CPUE (not based on an explicit stock assessment) can be used as reference points for monitoring biomass and teams have to provide rationales which show that the values adopted are consistent with MSY or a similar highly productive level. Checks may be needed to ensure, in this case, that spatial changes in fishing, or changes in the catchability of gears do not reduce the reliability of the proxy indicators. According to the data presented, the avarage level of biomass of large individuals (>39 cm) observed between 2004 and 2015 (around 1 kg/km^2) can be considered a good proxy of highly productive level, taking into account that such biomass produced the highest recruitment observed in the whole series. Morever the data presented show clearly that the spatial changes in fishing, or changes in the catchability of gears are not occurring and the length and age distributions of the stock are stable. Taking into account that the CPUE value of spring survey of large individuals observed in 2017 is the highest of the series, and no decline has been observed in the other proxies of biomass (total biomass and harvestable biomass) for the whole series (more than one generation time), is possible to conclude that stock is at or fluctuating around a level consistent with MSY. Therefore, SG 80 is met. However, taking into account that no other proxy indicates that the stock is at a highly productive level it is not possible to conclude 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 (2012). ICES Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM 68. 42 pp. MFRI ,2017. Detailed assessment report of the status of LEMON SOLE – ÞYKKVALÚRA (*Microstomus kitt*) in Icelandic waters. https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf

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)	Mean harvestable biomass observed in the period 2010-2015 from the spring survey	3.88 kg/km^2	1.12
Reference point used in scoring stock relative to MSY (SIb)	Mean biomass of large individials observed in the period 2004-2015 from the spring survey	1 kg/km^2	1.5

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

PI 1.1.2 Evaluation Table for 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**			
	Guidepost	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?	Not relevant		Not relevant
	Justification	The stock is not depleted		
b	Rebuilding evaluation			
	Guidepost	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?	Not relevant	Not relevant	Not relevant
		The stock is not depleted		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				**N/A**
CONDITION NUMBER (if relevant):				-

PI 1.2.1 Evaluation Table for 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			
	Guidepost	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?	Y	Y	N
	Justification	The MSC defines a harvest strategy as the combination of the following elements: - Monitoring - stock assessment - harvest control rule - management actions There is an appropriate monitoring, data collection and stock assessment process in place via MFRI – full details are given in the rationales for PI 1.2.3 and 1.2.4 below. In terms of the harvest control rule, the MFRI has provided advice based on the long-term objective of keeping Fproxy at or below the long-term average (target reference point; MFRI, 2017). The suggested target reference point Fproxy=0.38 is expected to keep the stock at a sustainable level. While there is no formally adopted management plan, the Ministry has formally committed in writing to follow the advice of MFRI, which is given on this basis (http://www.fisheries.is/management/government-policy/responsible-fisheries/). This therefore constitutes a formal harvest control rule (see further details rationale for PI 1.2.2 below). On the basis of this harvest control rule, MFRI proposes a TAC based on the spring survey. The TAC is therefore based on the latest information of the stock. Thus, the proposed harvest strategy by MFRI is responsive to the state of the stock. Overall, the elements of the harvest strategy include effective data collection, scientific advice and appropriate management response. As the management system includes evaluation of performance (annual estimates of fishing mortality compared to the target levels) and it is responsive to this, SG80 is met. There is no evidence that the harvest strategy is designed to achieve objectives for this stock. The strategy for the multispecies fishery is based on the sum of single species management, and the strategy is the result of various responses to concerns within the fishery. In particular the possibility to transfer quota to/from lemon sole in the Icelandic ITQ system has produced an overshoot of quota in the last two fishing seasons. Without further evidence of an overarching design of the current monitoring and set of controls, the SG100 cannot be met.		
b	Harvest strategy evaluation			
	Guidepost	The harvest strategy is likely to work based on prior experience or plausible argument.	The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.	The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels.

	Met?	Y	Y	N
	Justification	The stock status is regularly monitored through annual surveys, and the estimates of harvest rate (Fproxy) and biomass indexes from surveys indicate that the harvest strategy has been achieving its objectives. The current strategy has been operating since 2010, including the current harvest control rule, effective monitoring system and regular evaluation giving feedback to the decision-makers. There is clear evidence that it is working, with increasing trends of biomass indexes, high recruitment, stable landings and negligible discarding. Demonstrable success in implementation and outcome over a significant period of time constitutes full evaluation. There is clear evidence that the harvest strategy is achieving its objectives in the last period of time and it is maintaining the stock at high levels. Currently, the harvest strategy is not fully evaluated by ICES or any other relevant scientific institution. However, evidence from analogous fisheries (cod fishery in Iceland; ICES, 2015) exist confirming that the different components of the harvest strategy, including the HCRs, are achieving their objectives. Therefore, SG60 and SG80 are met. However, taking into account that Fproxy was above the Fproxy target in the years 2015 and 2016 it is not possible to argue that the HS is clearly able to maintain stocks at target levels of exploitation. Therefore SG 100 is not met.		
c	Harvest strategy monitoring			
	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	Considerable data are collected on the fishery, including data on catches, vessels and abundance indexes. These are sufficient to monitor the stock, vessel operations, and catch by area and time. These provide a strong basis to evaluate all parts of the harvest strategy. This meets SG60.		
d	Harvest strategy review			
	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			N
	Justification	MFRI annually reviews all management advice. However, there has been no formal review of the overall strategy with respect to lemon sole. Therefore, SG100 is not met.		
e	Shark finning			
	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	Lemon sole is not a shark.		
f	Review of alternative measures			
	Guidepost	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	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.	are implemented, as appropriate.
	Met?	Y	Y	N
	Justification	Iceland requires that all target stock caught within its waters are landed. This applies a strong discouragement for unwanted catch which is avoidable. In addition, the application of a system of temporary closed areas to reduce the catch of small fish is foreseen by Iceland. These are not necessarily "unwanted" in the sense usually implied by discarding, but the management system seeks to reduce catch of fish below the optimum size (e.g. juveniles). This control has predominantly applied to cod, but could be applied to other species as appropriate, as the closure of certain areas shows (see Figure 3-21 and Figure 3-22). These measures imply ongoing review of ways to reduce unwanted catch (as real time closure and move on rules), and that measures are implemented when considered appropriate and desirable. According to the available statistics discard of lemon sole is negligible. In the statement on responsible fisheries in Iceland (see point 10. on discards and by-catch in: http://www.fisheries.is/management/government-policy/responsible-fisheries) it is clearly stated that the Directorate of Fisheries and the Marine Research Institute conduct research and estimate discarded catches and the results indicate insignificant discards by the Icelandic fishing fleet. The research can be considered 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, considering the negligible discards of lemon sole. Therefore, SG 80 is met. However is not clearly stated if this review is conducted every two years or more frequently. Therefore SG 100 is not met.		
References		http://www.fisheries.is/management/government-policy/responsible-fisheries/. ICES 2015. Report of the Benchmark Workshop on Icelandic Stocks (WKICE), 26–30 January 2015, Copenhagen, Denmark. ICES CM 2015/ACOM:31. 325 pp. MFRI ,2017. Detailed assessment report of the status of LEMON SOLE – ÞYKKVALÚRA (*Microstomus kitt*) in Icelandic waters. https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

PI 1.2.2 Evaluation Table for 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			
	Guidepost	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?	Y	N	N
	Justification	The ICES framework for category 3 stocks (ICES, 2012) is being used for advice. A management plan has not been formally developed for this stock and there are no formal management reference points. Advice is based on the ICES default HCR, which uses the survey to adjust the TAC relative to survey trends, which ICES considers consistent with the precautionary approach. The catch advice provided by MFRI allows managers to set a reasonable target catch level based on a precautionary approach and has determined a stock level of high productivity taking into account that 2017 biomass index of large individuals (> 39 cm; MFRI, 2017) is the highest observed in the entire time series. HCRs can be considered 'generally understood', as required to achieve the SG60 score, because as showen in Table 3-3 the recommended TAC by MFRI has been followed by the Ministry of Industry and Innovation (MII) as National TAC since the 2010/11 fishing season and, according to the status of the stock, there has been no evidence of status close to PRI since the begin of the series. Therefore, SG 60 is met. However, to what extent exploitation might be reduced as and when biomass index shows low values and productitvity of the stock is decreasing is not formally defined. Implicitly Ministry of Industry and Innovation (MII) stated that appropriate actions are foreseen whereby MFRI advises further reductions in TAC below Fproxy target, but what would be done is not well defined. Therefore, SG 80 is not met.		
b	HCRs robustness to uncertainty			
	Guidepost		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?		Y	N
	Justification	The harvest control rule is implicitly taking into account some uncertainties based upon the empirical data and variability available from the survey time series. TACs are adjusted within a year based on the survey. The main uncertainties considered in the framework of the HRCs are the stock fluctuations observed in the biomass index coming from the scientific survey. The HCRs are robust to the main uncertainities because the reference point chosen as Fproxy of 0.38, presumably, is going to maintain the stock at levels of high biomass. SG80 is met. However, uncertainties in the influence of juvenile declines remain an issue and are not fully considered in the present HCRs. Therefore, SG100 is not met.		
	HCRs evaluation			

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
c	Guidepost	There is some evidence that tools used or available to implement HCRs are appropriate and effective in controlling exploitation.	Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the HCRs.	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.
	Met?	Y	Y	N
	Justification	Tools used to implement the harvest control rule include TAC based on the annual surveys and monitoring of catch, as well as the technical measures and licencing system described in section 3.3.2 Available evidence (Table 3-3) indicates that the exploitation levels of the last six fishing seasons are in line with the national TAC issued by the Iceland government (MII), even if in 2014/15 and 2015/16 the TAC was overshot respectively by 10% and 32%. The likely reason of such overshooting is quota transfers between species. Within the context of multispecies fisheries, opportunities to reduce the catch of a single species relative to other species are more limited, which may limit effectiveness of TACs in controlling exploitation. However taking into account that such situations occurred only twice in the last 6 fishing seasons, and the stock biomass is increasing, according to the spring survey data in the last two years, SG80 is met. Since in 2015 and 2016 as well as in the past the observed catches and national TAC were above the TAC recommended by MFRI, there is no clear evidence showing the tools are effective in achieving the exploitation levels required under the HCR. Thus, SG 100 is not met.		
References		ICES (2012). ICES Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM 68. 42 pp. MFRI ,2017. Detailed assessment report of the status of LEMON SOLE – ÞYKKVALÚRA (*Microstomus kitt*) in Icelandic waters. https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf		
OVERALL PERFORMANCE INDICATOR SCORE:				**75**
CONDITION NUMBER (if relevant):				**1**

PI 1.2.3 Evaluation Table for 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			
	Guidepost	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, 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?	Y	Y	Y
	Justification	Information is comprehensive across fleet, stock distribution and catches for all Iceland fisheries. All vessels are registered and licensed. Vessels are required to retain VMS and AIS equipment on board and use log-books for reporting fishing operations. AIS is mandatory for all vessels and is primarily for safety purposes. The VMS is for fisheries control, in which certain vessels must participate according to their fishery and fishing area. Fisheries control authorities have full access to all data in both systems. Discarding is not allowed within Iceland. Environmental information is also collected by MFRI (oceanographic data, topography, temperature, salinity, waves, tides, etc.) which is relevant to the population dynamics of all Iceland stocks (MFRI, 2017). The research activities carried out by MFRI support long-term management needs with a clear research agenda. The scientific surveys, estimating changes in abundance of groundfish, collection of samples on many aspects of the ecosystem, marine environment contaminants, habitat mapping, including depth, are currently being undertaken and improved by MFRI. Physical and biological oceanographic information (temperature, salinity, chlorophil) is collected routinely and is available for research. The distribution of habitats and others species may be particularly useful for developing the harvest strategy further. The main research priorities of MFRI are exploration of marine and freshwater ecosystems, sustainable exploitation of main stocks, ecosystem approach to fisheries management, research on fishing technology and seafloor and habitat mapping. MFRI is highly regarded in the scientific community and is therefore a valuable research partner, active at an international level with a strong infrastructure and high quality equipment. MFRI is an appealing work place with progressive human resources policy to strengthen the institute's competiveness.Therefore, the SG100 is met.		

b	Monitoring			
	Guidepost	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?	Y	Y	Y
	Justification	The authorities of the countries involved in the fishery regularly monitor the UoA removals. The stock abundance of lemon sole is regularly monitored by scientific institution in Iceland with spring and fall surveys every year. The biomass index resulting from the survey and the catches are used in the assessment to estimate the yearly level of fishing mortality relative to reference points employed in the estimation of the TAC. Therefore, SG 60 and 80 are met. SG100 requires that all information for the HCR are monitored with high frequency and a high degree of certainty, this has been confirmed by the Directorate of Fisheries and is clearly stated in the statement on responsible fisheries in Iceland (see specifically point 5 in: http://www.fisheries.is/management/government-policy/responsible-fisheries). Moreover, SG 100 requires that there is a 'good understanding of the uncertainties in the information and the robustness of assessment and management to this uncertainty'. A key uncertainty is the accuracy in the evaluation of the recruitment using the spring survey, considering that it does not adequately cover the main recruitment grounds for lemon sole as the main nursery areas are thought to be in shallow water in habitats unsuitable for demersal trawling. In addition to these two major surveys, a designated flatfish survey with beam trawl was started in 2016 and has been expanded in 2017 to cover most of the recruitment grounds of lemon sole and other flatfish species. The plan is to incorporate this survey in the stock assessment for lemon sole in the future (ICES, 2016) in order to improve the understanding of the dynamic of lemon sole as well as other stocks. During the site visit, MFRI stated that the number of stations sampled during the beam trawl survey are going to be increased in the next years and that the beam trawl survey is providing good information on the recruitment and status of lemon sole. Therefore, taking into consideration that MFRI understands the uncertainties in the data provided by the spring and fall surveys and is improving the stock dynamic understanding implementing a new survey, SG100 is met.		
c	Comprehensiveness of information			
	Guidepost		There is good information on all other fishery removals from the stock.	
	Met?		Y	
	Justification	All the other fisheries removals are well monitored with the data collection regulation foreseen in Iceland. This meets SG80.		
References		http://www.fisheries.is/management/government-policy/responsible-fisheries ICES (2016) Report of the Working Group on Beam Trawl Surveys (WGBEAM), 12-15 April 2016, La Rochelle, France. ICES CM 2016/SSGIEOM:20. 148 pp. MFRI ,2017. Detailed assessment report of the status of LEMON SOLE – ÞYKKVALÚRA (*Microstomus kitt*) in Icelandic waters. https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf		

OVERALL PERFORMANCE INDICATOR SCORE:	**100**
CONDITION NUMBER (if relevant):	**NA**

PI 1.2.4 Evaluation Table for 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			
	Guidepost		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?		Y	N
	Justification	Stock is mainly assessed through spring survey (see PI 1.1.1), which provides a biomass index for adults and juveniles. The biomass index (current and previous year) is used as a basis for setting a TAC, such that Fproxy (catch/biomass index) is not greater than 0.3 (MFRI, 2017). As evidenced in ICES WKLIFE 3 (ICES, 2013), this is an appropriate approach for stocks with this type of data. At such ICES workshops, simulated populations were generated and HCRs were tested for estimating current exploitation based, on available limited information (for instance, catch and survey data). The results of the workshop allowed to build a strong framework for Data-Limited Stocks and identified preferred options for determining proxies for F_{MSY} for stocks without quantitative forecasts, using life-history traits, exploitation characteristics and fishery independent information. The assessment carried out takes into account such outcomes and is therefore appropriate for the stock and the HCR. SG 80 is met. The assessment of the stocks takes into account only the trend in biomass from fishery independent data sets. It does not consider the major features relevant to the biology of the species and the nature of the UoA, so SG100 is not met.		
b	Assessment approach			
	Guidepost	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?	Y	Y	
	Justification	The status can be evaluated relative to the proposed reference points that according to ICES WKLIFE 3 (ICES, 2013) are appropriate for the stock. SG 80 is met.		
c	Uncertainty in the assessment			
	Guidepost	The assessment identifies major sources of uncertainty.	The assessment takes uncertainty into account.	The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.
	Met?	Y	Y	N
	Justification	The spring survey forms the basis for the assessment of stock status. The spring survey covers the full depth range of the fisheries, and the uncertainties of the survey index are considered to be low (see Figure 5-6, Biomass index). SG80 is met.		

PI 1.2.4		**There is an adequate assessment of the stock status**		
		The assessment does not use a probabilistic framework to evaluate stock status, therefore SG100 is not met.		
d	Evaluation of assessment			
	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			N
	Justification	MFRI reported that other assessment approaches will be explored in the future, such as length or age based GADGET model (MFRI, pers. comm.), and also that beam trawl survey data (ICES, 2016) will be employed in the assessment in the future as a tuning index. However, for the time being the team saw no evidence that other assessment methodologies are tested or that alternative approaches have been explored. SG 100 is not met.		
e	Peer review of assessment			
	Guidepost		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	Met?		Y	N
	Justification	There is regular internal review of all stock assessments conducted by MFRI. SG80 is met. The assessments are not reviewed externally e.g. by ICES. SG 100 is not met		
References		ICES. 2013. Report of the Workshop on the Development of Quantitative Assessment Methodologies based on LIFE-history traits, exploitation characteristics, and other key parameters for Data-limited Stocks (WKLIFE III), 28 October–1 November 2013, Copenhagen, Denmark. ICES CM 2013/ACOM:35. 98 pp. ICES. 2016. Report of the Working Group on Beam Trawl Surveys (WGBEAM), 12-15 April 2016, La Rochelle, France. ICES CM 2016/SSGIEOM:20. 148 pp. MFRI ,2017. Detailed assessment report of the status of LEMON SOLE – ÞYKKVALÚRA (*Microstomus kitt*) in Icelandic waters. https://www.hafogvatn.is/static/extras/images/lemon_sole24203.pdf		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

NOTE:
Scoring tables 2.1.1-3 and 2.2.1-3 are arranged to minimise repetition and maximise clarity. As a result the formats are different. Scoring tables 2.1.1-3 are arranged by gear based on their landings profiles. However, where the same rationale and scores apply across gears (2.1.2-2.1.3), the tables have been combined into a single "All Gear" category. 2.2.1-3 are arranged primarily to explain scoring of the out-of-scope species, which broadly determine the scores for gears which interact with them.

PI 2.1.1 Evaluation Table Primary species outcome

PI 2.1.1		**The UoA aims to maintain primary species above the 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			
	Guidepost	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.
	Bottom trawl			
	Met?	Y	Y	2 Y : 2 N
	Justification	There are 4 main stocks: Atlantic cod, golden redfish, haddock and saithe (see Table 3-9). **Saithe** and **cod** are currently in a good state and are at or above the MSY level (see table 3-10) with a high degree of certainty. Specifically, based on the stock assessments for these stocks, there is a greater than 80% probability that the stock is at or above MSY (i.e. SSB is at least 2 times the MSY $B_{trigger}$ reference point). This meets the SG100 for these 2 elements. The SSB for **golden redfish** has steadily increased for the past 20 years, has been above $B_{trigger}$ since 2000, and fishing mortality since 2010 has been estimated to be around FMSY. It is highly likely that SSB is above PRI, given the status of SSB with respect to $B_{trigger}$ and B_{lim}. SG60 and SG80 are met. SSB in 2017 was just below 350 thousand tonnes, $B_{trigger}$ is approximately 220 thousand tonnes and therefore 2 times $B_{trigger}$ = 440 thousand tonnes. Taking the MSY biological reference point to be 2 x $B_{trigger}$, golden redfish SSB is therefore not at or fluctuating around MSY and SG100 is not met. **Haddock** SSB has decreased from record highs in 2004, but remains above management $B_{trigger}$. Harvest rate in 2015–2016 is estimated close to its lowest level in the assessment period and is currently close to HR_{MGT}. Recruitment in 2010–2015 was low but is estimated high for 2016 and 2017 close to geometric mean (MFRI, 2017). SSB has been at or above Btrigger for the entire time series and therefore it is highly likely that biomass is above PRI. SG60 and SG80 are met. SSB is currently approximately 75,000 tonnes. Assuming B_{MSY} equates to 2 x $B_{trigger}$ (=90,000), this biomass is below the level considered consistent with MSY and therefore SG 100 is not met.		

	Nephrops trawl			
	Met?	Y	Y	3 Y: 3 N
	Justification	There are 6 main stocks: Atlantic cod, golden redfish, ling, saithe, witch and nephrops (Table 3-9). The elements **cod, ling** and **saithe** are currently at or above MSY level (Table 3-10) with a high degree of certainty. Specifically, based on the stock assessments for these stocks, there is a greater than 80% probability that the stock is at or above MSY (i.e. SSB is at least 2 times the MSY $B_{trigger}$ reference point). This meets the SG100 for these 3 elements. In relation to the elements **golden redfish**, **witch** and **nephrops** all are highly likely to be above PRI, and therefore SG60 and SG80 are met, but none are considered to be at or above MSY, and SG100 is not met (see Table 3-10). The SSB for golden redfish has steadily increased for the past 20 years, has been above $B_{trigger}$ since 2000, and fishing mortality since 2010 has been estimated to be around FMSY. It is highly likely that SSB is above PRI, given the status of SSB with respect to $B_{trigger}$ and B_{lim}. SG60 and SG80 are met. SSB in 2017 was just below 350 thousand tonnes, $B_{trigger}$ is approximately 220 thousand tonnes and therefore 2 times $B_{trigger}$ = 440 thousand tonnes. Taking the MSY biological reference point to be 2 x $B_{trigger}$, golden redfish SSB is therefore not at or fluctuating around MSY and SG100 is not met. Fishing mortality for nephrops has decreased significantly relevant to levels in the 1980-1990s, and has been below F_{MSY} since 1997. Biomass levels peaked in 2008, but have dropped since then. Recruitment has decreased since 2005, with sharp declines since 2009 and has never been lower. Based on the 2017 stock assessment, harvestable biomass has decreased sharply and is at its lowest level. MFRI advise catch levels based on the MSY approach and a TAC continues to be set appropriately for nephrops. SG60 and SG80 are met, however due to biomass decline since 2008, it is unlikely the stock is at MSY, so SG100 is not met. Witch biomass index has been high since 2004. The recruitment index has, however, declined since 2009, and reached an all- time low in 2016. However, as yet the stock biomass does not appear to be affected by the decline in recruitment. F_{proxy} has remained relatively low over the last five years and has been at or below target F_{proxy} since 2012. Since 2010, the catch of witch has remained fairly stable. Given the stock stability throughout recruitment decline it is highly likely that the stock is above PRI and SG60 and SG80 are met. However the stock is unlikely to be at or above MSY and so SG100 is not met.		
	Danish seine			
	Met?	Y	Y	1 Y : 4 N
	Justification	There are 5 main stocks: Atlantic cod, Atlantic wolfish, golden redfish, haddock and plaice (see Table 3-9). **Atlantic cod** are currently in a good state and are at or above the MSY level (see Table 3-10) with a high degree of certainty. Specifically, based on the stock assessments for these stocks, there is a greater than 80% probability that the stock is at or above MSY (i.e. SSB is at least 2 times the MSY $B_{trigger}$ reference point). This meets the SG100 for this element. In relation to the elements **Atlantic wolffish, golden redfish, hadock** and **plaice** all are highly likely to be above PRI, and therefore SG60 and SG80 are met, but none are considered to be at or above MSY, and SG100 is not met (see Table 3-10). **Atlantic wolffish** abundance is tracked in the spring groundfish survey. The survey also provides a recruitment index as it catches wolffish before they recruit to the fishery. The survey suggests that the fishable stock biomass decreased by more than half in 1985–1995 but has generally increased since then, and in 2015 the index is above average. Recruitment was high from 1991–1998, but has decreased since to the lowest level in 2016. Increases in		

		fishable stock indices from 1995–2008 correspond to the high recruitment indices in earlier years. Fishing mortality has decreased since the late 1990s when levels greatly exceeded FMSY, fell below FMSY from 2013-2015, and is current at FMSY. Based on the above average harvestable biomass, together with fishing mortality at FMSY, the stock is highly likely to be above its PRI. However, it is unknown if the stock is fluctuating around the biological MSY level. The SSB for **golden redfish** has steadily increased for the past 20 years, has been above $B_{trigger}$ since 2000, and fishing mortality since 2010 has been estimated to be around FMSY. It is highly likely that SSB is above PRI, given the status of SSB with respect to $B_{trigger}$ and B_{lim}. SG60 and SG80 are met. SSB in 2017 was just below 350 thousand tonnes, $B_{trigger}$ is approximately 220 thousand tonnes and therefore 2 times $B_{trigger}$ = 440 thousand tonnes. Taking the MSY biological reference point to be 2 x $B_{trigger}$, golden redfish SSB is therefore not at or fluctuating around MSY and SG100 is not met. **Haddock** SSB has decreased from record highs in 2004, but remains above management $B_{trigger}$. Harvest rate in 2015–2016 is estimated close to its lowest level in the assessment period and is currently close to HR_{MGT}. Recruitment in 2010–2015 was low but is estimated high for 2016 and 2017 close to geometric mean (MFRI, 2017). SSB has been at or above Btrigger for the entire time series and therefore it is highly likely that biomass is above PRI. SG60 and SG80 are met. SSB is currently approximately 75,000 tonnes. Assuming B_{MSY} equates to 2 x $B_{trigger}$ (=90,000), this biomass is below the level considered consistent with MSY and therefore SG 100 is not met. In relation to **plaice**, since 2016, a new analytical age-based model has been used by MFRI. This new model has indicated that fishing mortality was overestimated in the model used in 2013–2015, and harvestable biomass was underestimated. The harvestable biomass was at a record low in 2000, but has increased steadily since then and is currently at its highest level. MFRI (2017) consider that the stock size is likely to remain stable over the next years, but considerable uncertainty is present in the assessment due to a lack of recruitment data. Available data indicates that recruitment has been stable since 1994 and catches have been stable since 2000. Fishing mortality has decreased since 1997 and has been fluctuating around F_{MSY} since 2011. The TAC is set at F_{MSY} and a seasonal closed area is used to help protect the spawning stock. Given the stock assessment results, and current increasing trend in harvestable biomass, it is highly likely that the stock is above PRI. The stock status with respect to MSY is unknown and therefore SG100 is not met.

b	Minor primary species stock status			
	Guidepost			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

	Bottom trawl			
	Met?			19 Y 2N
	Justification	There are 21 minor primary species stocks that are impacted by the fishery (i.e. these species have been recorded in the landings) (see Table 3-7a for bottom trawl catch profile and Table 3-9 for a list of minor primary species). Of these elements, **blue whiting** and **tusk** have a stock status that is around the MSY level. The other relevant elements, **anglerfish**, **Atlantic wolffish**, **Atlantic bluefin tuna**, **blue ling**, **deepwater redfish**, **greater silver smelt**, **Greenland halibut**, **herring, ling**, **lumpfish**, **mackerel**, **nephrops**, **northern shrimp** (2 stocks),		

		Norway redfish, plaice and **witch** have been determined as highly likely to be above their PRI or recovering to the MSY level (see Table 3-10). SG100 is met for these elements. For **dab, long rough dab** and **spotted wolffish**, the stock status is less certain. For these stocks, it cannot be determined that the stock is highly likely above their PRI and therefore it can not be determined if thery are highly likely to be above the PRI. Bottom trawl landings for these three species are relatively small: **spotted wolffish** (0.24% of catch by weight), **common dab** (0.01%) and **long rough dab** (<0.01%). For **long rough dab**, the stock is at its lowest levels in the time series and it is unclear whether the stock is above PRI. However, the MFRI has recommended no TAC, no direct fishing of long rough dab and that main spawning areas will be closed during spawning to promote rebuilding. **Long rough dab** is therefore only caught as bycatch, in very low levels. The high juvenile index for long rough dab in recent years, is evidence of rebuilding. Evidence of effective management strategies together with low catches of long rough dab form evidence that the UoA does not hinder recovery and rebuilding and therefore the second part of SG100 is met. For **spotted wolffish**, it is not clear that the stock is above PRI, trends in biomass continue to reduce. For **common dab**, given the low indices and high fishing mortality, it is not clear that the stock is highly likely to be above the PRI. Despite TACs in place that limit catches to advised levels, there is not evidence that F is below Fmsy, or that combined catch by all MSC UoAs relative to the total catch does not hinder recovery. As such SG100 is not met for **spotted wolfish** and **common dab**.

	Nephrops trawl			
	Met?			12 Y 2 N
	Justification	There are 14 minor primary species stocks that are impacted by the fishery (Table 3-7c for nephrops trawl catch profile and Table 3-9 for a list of minor primary species). Of these elements **tusk** has a stock status that is around the MSY level. The other relevant elements, **anglerfish, Atlantic wolffish, blue ling, greater silver smelt, Greenland halibut, haddock, lumpfish female, mackerel, Norway redfish** and **plaice** have been determined as highly likely to be above their PRI or recovering to the MSY level (see Table 3-10). SG100 is met for these elements. For **dab, long rough dab** and **spotted wolffish**, the stock status is less certain. For these stocks, it cannot be determined that the stock is highly likely above their PRI and therefore the first part of SG100 is not met. Nephrops trawl landings for these three species are extremely small: **spotted wolfish** (0.01% of catch by weight), **common dab** (<0.01%) and **long rough dab** (<0.01%). For **long rough dab**, the stock is at its lowest levels in the time series and it is unclear whether the stock is above PRI. However, the MFRI has recommended no TAC, no direct fishing of long rough dab and that main spawning areas will be closed during spawning to promote rebuilding. **Long rough dab** is therefore only caught as bycatch, in very low levels. The high juvenile index for long rough dab in recent years, is evidence of rebuilding. Evidence of effective management strategies together with low catches of long rough dab form evidence that the UoA does not hinder recovery and rebuilding and therefore the second part of SG100 is met. For **spotted wolffish**, it is not clear that the stock is above PRI, trends in biomass continue to reduce. For **common dab**, given the low indices and high fishing mortality, it is not clear that the stock is highly likely to be above the PRI. Despite TACs in place that limit catches to advised levels, there is not evidence that F is below Fmsy, or that combined catch by all MSC UoAs relative to the total catch does not hinder recovery. As such SG100 is not met for **spotted wolfish** and **common dab**.		

	Danish seine			
	Met?			13 Y
	Justification	There are 13 minor primary species stocks that are impacted by the fishery (Table 3-7b for Danish seine catch profile and Table 3-9 for a list of minor primary species). Of these elements **saithe** and **tusk** have a stock status that is around the MSY level. The other relevant elements, **anglerfish, blue ling, Greenland halibut, ling, lumpfish female, mackerel, tusk** and **witch** have been determined as highly likely to be above their PRI or recovering to the MSY level (see Table 3-10). SG100 is met for these elements. For dab, long rough dab and spotted wolfish, the stock status is less certain. For these stocks, it cannot be determined that the stock is highly likely above their PRI. Nephrops trawl landings for these three species are extremely small: **spotted wolffish** (0.01% of catch by weight), **common dab** (<0.01%) and **long rough dab** (<0.01%). Demonstrably effective management strategies (TACs, discard ban, no direct fishing of long rough dab, spawning area protection) together with low catches of these species provides evidence that the UoA does not hinder recovery and rebuilding of dab, long rough dab and spotted wolfish, SG100 is met		

References	MFRI stock advice for 24 species, see MFRI, 2017a; ICCAT, 2015; ICES stock advice for 2 species, see ICES, 2017a:

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl Main species: 2 reach 100, 2 reach 80 Minor species: 19 reach 100, 2 reach 80	**95**
	Nephrops trawl Main species: 3 reach 100, 3 reach 80 Minor species: 12 reach 100**,** 2 reach 80	**95**
	Danish seine Main species: 1 reaches 100, 4 reach 80 Minor species: 14 reach 100	**95**
CONDITION NUMBER (if relevant):		

PI 2.1.2 Evaluation Table for Primary species management strategy

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			
	Guidepost	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 above the point where recruitment would be impaired.	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 point where recruitment would be impaired.	There is a strategy in place for the UoA for managing main and minor primary species.
	Met?	TB: 4 Y	TB: 4 Y	TB: 25 Y
		TN: 6 Y	TN: 6 Y	TN: 20 Y
		SD: 5 Y	SD: 5 Y	SD: 19 Y
	Justification	**All gears** All main primary species are managed through a standard harvest strategy applicable to commercial important stocks. This consists of the process described in Principle 1. Standard monitoring procedures provide data for stock assessment. The majority of stock assessments are undertaken by MFRI, with Bluefin tuna undertaken by ICCAT, which provide the scientific advice, specifically the TAC. MFRI methodologies align with stock assessments undertaken by ICES. The MFRI scientific advice has been followed for these stocks, limiting exploitation to sustainable levels. Additional controls are applied, such as seasonal closures of spawning areas. Generic controls, notably mesh size, have been chosen to protect the most important commercial species, particularly cod, but should also reduce mortality on juveniles of other species. The system takes into account the multispecies nature of these fisheries, so different parts of the harvest strategy work together to maintain all main species stocks above their PRI. This meets SG80. All of the assessed UoAs also catch minor primary species, which are also managed through the Iceland fisheries management system described above, including advice from MFRI, which follows very similar procedures and objectives as main primary species, and are analogous to the ICES system. The data are collected in the same way using the same system, the same type of stock assessments are conducted. There is no minimum landing size, due to a discard ban and therefore all fish are deducted from quota, regardless of their size. At point of landing an authorized weigher weighs and logs all landings into an electronic system. Overall capacity of the fleet was reduced due to the introduction of the Individual Transferrable Quota (ITQ) system. Fisheries are highly targeted and responsive to market demands. Vessels know the grounds that they want to work and will often line up to trawl specific lines. The DF are responsible for enforcement and compliance at the landing points and on land, while the Coast Guard take responsibilities at sea. The DF also have observers on board vessels to check catches etc. Landings are limited by TACs and if approaching 90% then the DF will inform the MII who will issue measure to stop fishing to ensure TACs are not exceeded. See regulation 607/2017-2018 (DF, pers. comm.).		

		The TAC is adjusted, and closed areas are implemented where appropriate. This constitutes a full management strategy for all minor primary species to maintain stocks at MSY (or equivalent reference with the same intent). Because all primary stocks have a harvest strategy with TACs set based on scientific monitoring, SG100 is met for all gears.		
b	Management strategy evaluation			
	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the 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?	TB: 25 Y	TB: 25 Y	TB: 4 Y 21 N
		TN: 20 Y	TN: 20 Y	TN: 6 Y 14 N
		SD: 19 Y	SD: 19 Y	SD: 5 Y 14 N
	Justification	**All gears** All primary species are monitored and all undergo an annual assessment of stock status. This tests whether the harvest strategy is working in each case. The assessments and scientific advice are published annually by MFRI and ICES, and regularly by ICCAT. This constitutes testing of the strategy. For main primary species stocks that are subject to full stock assessment, testing supports high confidence that the harvest strategy will work. For several minor species stocks (common dab, long rough dab, witch, Norway redfish) there is confidence that the stocks can be rebuilt to MSY or equivalent level, but there has been no testing that this will be achieved. The confidence that current limits on fishing mortality have been reduced to sustainable levels is based on reported catches and trends in abundance and their life history characteristics. This meets SG80. However, because the harvest strategy has not been tested for all minor primary species stocks, SG100 is not met.		
c	Management strategy implementation			
	Guidepost		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?		TB: 25 Y	TB: 4 Y 21 N
			TN: 20 Y	TN: 6 Y 14 N
			SD: 19 Y	SD: 5 Y 14 N
	Justification	**All gears** The evidence for successful implementation consists of landings, which can be compared to TAC, and assessments of abundance. Estimates of discarding are made for haddock and cod. Discards are estimated to be very low (essentially negligible for stock assessment purposes), although discards are not estimated for all stocks. Given the regulation prohibiting discarding, it is likely discards are equally low across all primary stocks. This meets SG80. Stock assessments and the abundance indices are being used to assess whether target fishing mortality is limited to sustainable levels for primary species stocks, and whether objectives maintaining or rebuilding biomass is being achieved. There is sufficient information to evaluate this for all main stocks.		

		However, for minor species, namely common dab and spotted wolfish, there is little to demonstrate that the stocks are being rebuilt and can be managed at around MSY. As such SG100 is not meet.		
d	Shark finning			
	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	This scoring issue is not scored because no primary species are sharks.		
e	Review of alternative measures			
	Guidepost	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?	TB: 4 Y	TB: 4 Y	TB: 25 N
		TN: 6 Y	TN: 6 Y	TN: 20 N
		SD: 5 Y	SD: 5 Y	SD: 19 N
	Justification	**All gears** There is clear evidence that alternative measures have been adopted to minimize discarding of all species. There is a prohibition on discarding commercial species, although reasonable exceptions are allowed. There is flexibility in TAC, so a limited 5% overshoot can be carried over between years without penalty, and quota can be exchanged among companies and vessels. Technical measures include increasing mesh size in trawls from 120 mm to 155 mm in 1977 (except redfish directed fisheries), and real time area closures to reduce catches of undersized fish. In addition, individual boats may be allowed the limited transfer of allowable catch quota of one species to another. The effect of these measures on the quota system is reviewed. Moreover, the fishing industry has a policy to make best possible use of all products, including bio-medical products, and new markets for new products such as developing markets for dried starry ray, dried cod heads, encouraging restaurants to use more unusual species (Clucas, 2014), and luxury items such as handbags, wallets and clothing made from fish skins (Cataneo, 2018). This converts otherwise unwanted to wanted catch, which is perhaps the most effective way of dealing with this issue. The use of sorting grids, which were mandatory within Icelandic trawls since 1997, was reviewed in 2013. This led to the decision for sorting grids to be mandatory only for specific gear/target species in certain areas, specifically for trawls targeting shrimp (*Pandalus borealis*) and pelagic species. It is noted that "the application of sorting grids can have severe effects on water flow in the trawl, the selectiveness can be highly variable depending on catch rate and information given by catch sensors can be unreliable when the path of the catch is interrupted with a sorting grid" (Viðarsson et al., 2014). In addition, anecdotal evidence from the skipper of a bottom trawl vessel cited sorting grids to be prohibitive to work with on-deck (from a labour perspective) and would damage the target fish. Sorting grids subsequently are not mandatory within the Icelandic trawl nets included within this assessment."		

		The research and reviews described above can be considered a regular review of the effectiveness and practicality of alterntive measures to minimize unwanted catch and SG60 and SG80 are met. However is not clearly stated if this review is conducted every two years or more frequently. Therefore SG 100 is not met. This is harmonized with the Principle 1 assessment for unwanted catch of target stock of lemon sole.
References		Clucas 2014; MRI 2016. Cataneo, 2018. An Icelandic tannery makes fish skins fashionable. https://www.atlasobscura.com/articles/fish-leather-products-iceland Viðarsson et al., 2014 ICCAT stock advice: 2014 Atlantic Bluefin Tuna stock assessment. ICES stock advice: ICES 2015. 9.3.17 Herring (*Clupea harengus*); 9.3.25 Mackerel (*Scomber scombrus*); Stock Annex for Icelandic cod; 9.3.8 Blue whiting (*Micromesistius poutassou*). ICES 2016. 2.3.2 Cod (*Gadus morhua*); 2.3.6 Greenland halibut (Reinhardtius hippoglossoides); 2.3.7 Haddock (*Melanogrammus aeglefinus*); 2.3.8 Herring (*Clupea harengus*); 2.3.11 Beaked redfish (*Sebastes mentella*); 2.3.13 Beaked redfish (*Sebastes mentella*); 2.3.14 Golden redfish (*Sebastes norvegicus*); 2.3.15 Saithe (*Pollachius virens*); 9.3.3 Blue ling (*Molva dypterygia*); 9.3.23 Greater silver smelt (*Argentina silus*); 9.3.35 Ling (*Molva molva*); 9.3.47 Tusk (*Brosme brosme*).
OVERALL PERFORMANCE INDICATOR SCORE: All Gears		
	Bottom trawl Main species: 4 reach 95 Minor species: 21 reach 85	**90**
	Nephrops trawl Main species: 6 reach 95 Minor species: 14 reach 85	**90**
	Danish seine Main species: 5 reach 95 Minor species: 14 reach 85	**90**
CONDITION NUMBER (if relevant):		

PI 2.1.3 Evaluation Table for Primary species information

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			
	Guidepost	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?	TB: 4 Y	TB: 4 Y	TB: 4 Y
		TN: 6 Y	TN: 6 Y	TN: 6 Y
		SD: 5 Y	SD: 5 Y	SD: 5 Y
	Justification	**All gears** Full quantitative information, in the form of landings data, is available to measure the impact of each gear on each stock of main primary species identified. In addition, there are fisheries independent scientific demersal surveys (see ICES, 2010), and catch composition sampling (length, age) for both surveys and commercial catches is carried out, covering all main species. These data are suitable to quantitatively assess the impact of the UoAs being assessed on main primary species with a high degree of certainty. SG100 is met.		
b	Information adequacy for assessment of impact on minor primary species			
	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			TB: 21 Y
				TN: 14 Y
				SD: 14 Y
	Justification	**All gears** All minor species, like the main species, have accurate landings recorded for all gears. These species are also assessed with respect to status. In all cases reference points are available and used to assess status, at least in the form of trends. These assessments are used to advise on adjustments in TAC for each species. This meets SG100 for all gears.		

c	Information adequacy for management strategy			
	Guidepost	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.
		TB: 4 Y	TB: 4 Y	TB: 21 Y
		TN: 6 Y	TN: 6 Y	TN: 14 Y
	Met?	SD: 5 Y	SD: 5 Y	SD: 14 Y
	Justification	**All gears** Information available for main Primary species in all gears is sufficient to support stock assessments, estimate biomass and adjust the TAC accordingly. SG80 is met. A standard harvest strategy is implemented for each primary species. Because the stock status of all main and minor primary species is evaluated each year, the strategy for each species is under constant re-evaluation, determining whether objectives are being achieved in each case. Because all primary species have information sufficient to evaluate the harvest strategy, SG100 is met for all gears.		
References	ICES 2010; MRI 2016. <u>ICCAT stock advice:</u> 2014 Atlantic Bluefin Tuna stock assessment. <u>ICES stock advice:</u> ICES 2015. 9.3.17 Herring (*Clupea harengus*); 9.3.25 Mackerel (*Scomber scombrus*); Stock Annex for Icelandic cod; 9.3.8 Blue whiting (*Micromesistius poutassou*). ICES 2016. 2.3.2 Cod (*Gadus morhua*); 2.3.6 Greenland halibut (Reinhardtius hippoglossoides); 2.3.7 Haddock (*Melanogrammus aeglefinus*); 2.3.8 Herring (*Clupea harengus*); 2.3.11 Beaked redfish (*Sebastes mentella*); 2.3.13 Beaked redfish (*Sebastes mentella*); 2.3.14 Golden redfish (*Sebastes norvegicus*); 2.3.15 Saithe (*Pollachius virens*); 9.3.3 Blue ling (*Molva dypterygia*); 9.3.23 Greater silver smelt (*Argentina silus*); 9.3.35 Ling (*Molva molva*); 9.3.47 Tusk (*Brosme brosme*).			

OVERALL PERFORMANCE INDICATOR SCORE (All Gears):	
Bottom trawl Main species: 4 reach 100 Minor species: 21 reach 100	**100**
Nephrops trawl Main species: 6 reach 100 Minor species: 14 reach 100	**100**
Danish seine Main species: 5 reach 100 Minor species: 14 reach 100	**100**
CONDITION NUMBER (if relevant):	

PI 2.2.1 Evaluation Table for Secondary species outcome

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 within 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 also 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 within biologically based limits.	
	Met?	TB	3 Y	TB	3 Y	TB	3 N
		TN	3 Y	TN	3 Y	TN	3 N
		SD	N/A	SD	N/A	SD	N/A
		Data on catches of secondary finfish and shark species was available for all gears, and data on out of scope secondary seabird and marine mammal species from on-board observations was available for all UoAs. In total, approximately 143 vessels catch lemon sole as bycatch in other demersal targeted fisheries (ISF, pers. comm.). There are approximately 15 bottom trawl vessels (ISF, pers. comm.), 45 Danish seine vessels (DF, pers. comm.) and the remainder nephrops trawl that land lemon sole. Lemon sole landings are limited to the Icelandic EEZ. **Danish seine** Danish seine is operated very close to the bottom and the opening of the nets is closed before it is hauled to the surface; this makes interaction with marine mammals and seabirds very rare (DF, pers. comm). There are no significant interactions recorded between Danish seine with out-of-scope species, and any such interactions are therefore considered negligible. All other secondary species are minor (see SI2.2.1b). Because there are no main secondary species for Danish seine, scoring issue (a) is not used. Each element (minor species) is assessed against scoring issue (b). **Bottom trawl and nephrops trawl** There are no secondary species of finfish or shark which are main species for bottom trawl and nephrops trawl. The following out-of-scope species are main secondary species which may have					

interactions with the UoAs considered in this assessment: northern gannet, harbour seal and grey seal.

Northern gannet

The northern gannet is found on both sides of the Atlantic Ocean; breeding sites include northern France, the United Kingdom, Ireland, Iceland, Norway and the eastern tip Quebec (Canada) (del Hoyo et al. 1992). The Icelandic population was estimated to number 31,500 breeding pairs (63,000 in total) in 2005-2008 (Arnthór Garðarsson. 2008a, cited in Birdlife International, 2015). This strictly marine species wanders mostly over continental shelves, feeding on shoaling pelagic fish which are mostly caught by plunge-diving from great heights. It also follows trawlers and will form large congregations where food is plentiful. Breeding is highly seasonal starting between March and April, usually in large colonies on cliffs and offshore islands, but also sometimes on the mainland. Both short and long term population trends for this species have been estimated to be increasing in Iceland, and the species was recently given an IUCN status of 'Least Concern' in Europe (see status on http://www.iucnredlist.org/).

The population trend appears to be increasing, and hence the species does not approach the thresholds for Vulnerable under the IUCN red list population trend criterion (>30% decline over ten years or three generations). The population size is very large, and hence does not approach the thresholds for Vulnerable under the IUCN red list population size criterion (<10,000 mature individuals with a continuing decline estimated to be >10% in ten years or three generations) (BirdLife International, 2016).

The estimated extent of northern gannet population occurance is 41700000 km2 (BirdLife International, 2016). Global population size is c. 1,500,000-1,800,000 mature individuals (BirdLife International, 2016), of which 31,500 pairs are estimated to breed in Iceland (Arnthór Garðarsson. 2008a, cited in Birdlife International, 2015).

According to the most recent bycatch estimates available from the MFRI, demersal otter trawl (including bottom trawl and Nephrops trawl) account for a maximum of 45 northern gannet deaths a year (see Table 3-13). Based on the estimated Icelandic population size of 63,000 individuals, an average annual catch of northern gannets caught as bycatch within bottom trawl and nephrops trawl would account for only 0.07% of the total estimated Icelandic population per year. Gillnets equate to 292 northern gannets per year, and long line 207 deaths per year, which combines with bottom and nephrops trawl to account for 0.79% of the population. Increasing population trends indicate that the species is highly likely to be above biologically based limits, and the limited interaction, both for bottom trawl and Nephrops trawl, together with cumulative impacts from other gears, are highly unlikely to have a significant effect on the population size.

SG 80 is met for both bottom trawl and nephrops trawl. SG 100 is not met since based on the available information it cannot be concluded that there is a high degree of certainty that this species is above biologically based limits.

Harbour seal

Harbour seals are one of the most widespread of the pinnipeds. They are found throughout coastal waters of the northern hemisphere, from temperate to polar regions. Available data show that the Eastern Atlantic harbour seal population is relatively large and widespread. A decline in numbers has recently occurred or is still occurring in some areas (e.g., Shetland and Orkney Islands, Firth of Tay), but in other parts of the range numbers are thought to be stable or increasing (Baltic Sea, southern Scandinavia). As a result, the Eastern Atlantic harbour seal does not meet any of the IUCN criteria for 'threatened' categories, and is listed as 'Least Concern' (Bowen, 2016).

However, despite the species' potential for long-distance movements, harbour seals are known to be regionally philopatric on a scale of several hundred kilometres. Studies of the *Phoca vitulina* population structure have shown that there are in fact a number of distinct population units in the North Atlantic, including a distinct population in Iceland (Stanley et al., 1996; Goodman, 1998; Andersen and Olsen, 2010; Andersen et al., 2011). A census of the Icelandic harbour seal population carried out in 2016 indicated a continuing decline in the harbour seal

		population. The estimated population size (7652 individuals) was 77% smaller than when first estimated in 1980, and 32% smaller than in 2011, when the last complete population census was undertaken (Figure 3-20). In addition, the estimate was 36% lower than a government issued management objective for the minimum population size of harbour seals in Iceland. The study concluded that based on criteria used by the International Union for Conservation of Nature and Natural Resources (IUCN), the conservation status of the Icelandic population should be considered as 'Endangered'. The reasons for the observed population decline are poorly understood, but the most likely factors contributing to the downward population trend are likely to be by-catch (in static net fisheries) as well as direct hunting, which still takes place in Iceland (Þorbjörnsson, 2017). The Icelandic Government management objective for minimum population size of harbour seal is 12,000 individuals (NAMMCO, 2006). Management actions include regular census of harbour seals in Icelandic waters. The latest census in 2016 showed decline in numbers to levels below the management objective for minimum population size (Hauksson et al., 2017). Current management is predominately related to gears that pose a higher risk to harbour seal, namely set nets and include restrictions in gear used in different areas and areal closures. Further management actions are currently being considered and implemented within Icelandic set net fisheries e.g. as required by MSC certificate conditions for a number of Icelandic set net fisheries. Increased monitoring of the population will create an important foundation for an improved management plan for the Icelandic population (MFRI, 2018). Presently, MFRI are working towards building population models to test whether the current level of bycatch and hunting can account for the reported population decline (MFRI, 2018). Based on the most recent MFRI data available (2014-2016), bottom trawl (including Nephrops trawl) account for a maximum of 28 harbour seal deaths per year (see Table 3-14), which would account for 0.4% of the total estimated Icelandic population per year. This percentage of bycatch is unlikely to be of concern. The MFRI observer surveys and skipper recordings of marine mammal interactions within the eLog system allow the level of interaction between gears and this species to be understood. These data recording systems are considered a partial strategy to monitor the level of interactions and demonstrates that the bottom trawl and nephrops trawl gears do not hinder the recover or rebuilding of harbour seals. MFRI consider the interaction between bottom trawl and nephrops trawl with harbour seals negligible (MFRI, pers. Comm.). It is considered very unlikely that seals will come into the trawl based on the operational depth of the trawls, which are sunk to at least 15m (ISF, pers. comm.). Overall, the team consider that SG 80 is met. As the harbour seal population is not considered to be above biologically based limits, SG100 is not met. <u>Grey seal</u> Grey seals have a sub-Arctic to cold temperate distribution in over the continental shelf in North Atlantic waters (Hall, 2002). Grey seals' diet varies by location, though they are largely benthic feeders, which in many areas primarily feed on sandeels found in sandy or gravelly benthic habitats (McConnell et al. 1999; Hall, 2002). There are three populations isolated both geographically and by timing of reproduction: (i) the western Atlantic population (centered in northeastern North America); (ii) the eastern Atlantic population, which is concentrated around the coast of the United Kingdom and Ireland but also includes breeding colonies in Iceland, the Faroe Islands and along the mainland coast of northern Europe as far south as Brittany in France (iii) the Baltic Sea. The Icelandic population has been estimated at 4,100 individuals (MFRI, G. Sigurðsson, pers. Communication). Grey seal numbers are known to have increased strongly in recent years (including the northeast Atlantic population which is found in Iceland) as a result of measures to protect this species (Klimova et al., 2014). Based on the overall increasing population trends, this species is classified as 'Least Concern' by IUCN (European Mammal Assessment team, 2007). The Icelandic Government management objective for minimum population size of grey seal is 4,100 individuals (NAMMCO, 2006). Management actions include regular census of grey seals

		in Icelandic waters. The latest census in 2012 showed decline in numbers to levels of 4,200 in 2012 (from 10,000 in 1982), and recent estimates from MFRI indicate population size of 4,100. Therefore, the grey seal population is now close to or at the recommended number. Currently actions are focused on increased monitoring of the population to create a foundation for an improved management plan for the Icelandic population (MFRI, 2018). The most recent MFRI data available (2014-2016), bottom trawl (including Nephrops trawl) account for a maximum of 22 grey seal deaths per year (see Table 3-14), which accounts for 0.5% of the total estimated annual number of grey seals which visit Icelandic waters to feed. This percentage of bycatch is unlikely to be of concern. The MFRI observer surveys and skipper recordings of marine mammal interactions within the eLog system allow the level of interaction between gears and this species to be understood. These data recording systems are considered a partial strategy to monitor the level of interactions and demonstrates that the bottom trawl and nephrops trawl gears do not hinder the recover or rebuilding of grey seals. MFRI consider the interaction between bottom trawl and nephrops trawl with grey seals negligible (MFRI, pers. Comm.). Overall, the team consider that SG 80 is met. As the grey seal population is not considered to be above biologically based limits, SG100 is not met.		
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?			TB: 1 Y 16 N
				TN: 1 Y 12 N
				SD: 1Y 11 N
		All gears The status of the minor secondary species is not certain (see Table 3-11 for list of secondary species). The only evidence is the low level of landings. This is not sufficient to demonstrate whether minor secondary species are above any biologically based limits. No ecological risk assessment has been undertaken. There is evidence that Atlantic halibut has been reduced below biologically based limits (its PRI), but that the stock has been recovering over the last few years. There is a prohibition on retaining viable halibut and landings have been very low. Because the abundance indices suggest that the stock has been increasing, the current fisheries are not preventing stock recovery. Each element (minor species) is assessed against scoring issue b. If it does not meet SG100, it is treated as though it still meets SG80 (which is blank), which is automatically met by virtue of being a minor species. Although there is evidence that Atlantic halibut meets SG100, the status of the other minor secondary species cannot be determined, so SG100 is not met for all gears.		
References		BirdLife International 2015; BirdLife International, 2016; Boveng, 2016; del Hoyo et al. 1992; European Mammal Assessment team 2007; Gilles et al. 2011; Hauksson et al., 2017; Frost and Lowry 1981; Hagemeijer and Blair 1997; Hall 2002; Hammill et al. 2014; ICES 2013; Kelly 1988; Klimova et al. 2014; Kovacs, 2015; NAMMCO, 2006; MFRI, 2018; MFRI, 2018; Ólafsdóttir et al. 2002; Sigurjónsson and Víkingsson 1997; Stenson 2003; Þorbjörnsson, 2017; Rice 1998.		

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl Main species: 3 reach 80 Minor species: 1 reaches 100, 16 reach 80	**80**
	Nephrops trawl Main species: 3 reach 80 Minor species: : 1 reaches 100, 12 reach 80	**80**
	Danish seine Main species: N/A Minor species: : 1 reaches 100, 11 reach 80	**80**
CONDITION NUMBER (if relevant):		
Outline Condition Number:		

PI 2.2.2 Evaluation Table for 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**			
	Guidepost	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 within 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 within 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?	TB: 3 Y	TB: 3 Y	TB: 20 N
		TN: 3 Y	TN: 3 Y	TN: 16 N
		SD: N/A	SD: N/A	SD: 12 N
	Justification	**All gears** Various measures are taken to ensure the protection of juvenile fish, vulnerable and critical habitats. Such measures will serve to reduce bycatch of secondary out of scope seabird and marine mammal species; although not established to protect such species, area closures will also serve to maintain bycatch of marine mammals and seabirds at low levels since bycatch of many sensitive species is highest in inshore areas, which is where the closures are located (MFRI, pers. communication). The measures includes regulations on the type of fishing gear allowed in different areas, rules on the minimum mesh size and closed areas including permanent closures for habitat protection and temporary closures to protect juvenile fish and spawning/nursery areas (see Figure 3-21 and 3-22). The long-term area closures in place may apply to specific fishing gear,		

		fishing-vessel size or all fishing for certain periods of time. For instance, in order to protect the spawning stock of cod, extensive seasonal closures are in operation during the spawning season (Regulation nr. 30/2005); all cod fisheries are closed within 12 miles along the south and west coast and within 6 miles along the north and east coast in April each year. Sorting grids are not used within bottom trawls, nephrops trawls or Danish seine fisheries. Sorting grids were trialed in the past, but found to damage the fish (bottom trawler skipper, pers. comm.). Additional measures in place to manage bycatch of marine mammals and seabirds in Icelandic fisheries include: • Marine mammal and seabird bycatch is monitored by mandatory eLog system, and onboard observers from the DF and the MFRI, which monitor ca. 1-2% of all fishing trips by bottom and nephrops trawl. • Fishers are not allowed to offer for sale, give away, nor accept as a gift, any bird that has been killed in fishing nets. • Any birds or mammal caught alive must be released. These measures are specifically in relation to monitoring interaction between the UoAs under assessment and are considered to form a partial strategy, which is expected to maintain / not hinder rebuilding of main secondary species at / to levels which are highly likely to be within biologically based limits, or to ensure that the UoA does not hinder their recovery. SG 60 and SG80 are met. However, this is not considered a comprehensive strategy and therefore SG100 is not met.

b	Management strategy evaluation			
	Guidepost	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?	TB: 20 Y	TB: 20 Y	TB: 1 Y 19 N
		TN: 16 Y	TN: 16 Y	TN: 1 Y 15 N
		SD: 12 Y	SD: 12 Y	SD: 1Y 11 N
	Justification	**All gears:** The measures which are currently in place (see scoring issue 'a' for a description) although not specifically established to reduce catches of secondary species, can be expected to protect such species and to maintain bycatch of marine mammals and seabirds at low levels. Furthermore, bycatch of many sensitive species is highest in inshore areas, which is where the closures are located (MFRI, pers. communication). SG 60 is met. There are a number of measures that aim to ensure compliance with the law, including monitoring and surveillance which are conducted by the DF and the coast guard to ensure compliance of regulations. Annual assessment of discarding by MFRI indicates that discarding is very limited, and control and surveillance information indicates that temporal and permanent fishing ground closures are respected. This provides objective basis for confidence that the measures, considered to form a partial strategy, will work. Data is being recorded and it is understood that the gears under assessment have a negligible impact on marine mammals and birds. SG 80 is met. However, this is not supported by testing and SG 100 is not met for these main secondary species. Since there is no direct strategy to manage catches of minor species (with the exception of Atlantic halibut), and the effect of the current harvest strategy on minor secondary species has not been tested, SG100 is not met.		

c	Management strategy implementation			
	Guidepost		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?		TB: Y	TB: N
			TN: Y	TN: N
			SD: Y	SD: N
	Justification	**All gears:** Control and surveillance information indicates that temporal and permanent fishing ground closures are respected, and restrictions on coastal fishing are likely to have reduced fishing mortality rates of bycatch species. There is thus some evidence that management measures are being implemented successfully; SG 80 is met. Lack of analysis of electronic logbook data (and associated scientific reporting) on bycatch rates of vulnerable species, and the fact that observer coverage to adequately monitor bycatch rates of vulnerable species remains low (1-2%) means that there is no clear evidence that all management measures are being implemented successfully. Moreover there is no evidence that these actions are achieving the objective of maintaining out-of-scope secondary species above biologically based limits. More monitoring of seabird and marine populations would be required to assess this. In addition, the status of most minor finfish is effectively unknown. Therefore, evidence is lacking to show that the objectives of maintaining stocks above biologically based limits is achieved. SG 100 is not met.		
d	Shark finning			
	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	TB: Y	TB: Y	TB: Y
		TN: Y	TN: Y	TN: Y
		SD: Y	SD: Y	SD: Y
	Justification	**All gears** There are several species of shark caught by the UoAs under assessment (Greenland shark, spiny dogfish, porbeagle shark, leafscale gulper shark). The discard prohibition in effect in Iceland effectively makes shark finning illegal. There is no local market for fins alone, but a limited market for whole sharks does exist. With very low quantities caught, there is no incentive to land fins separate from sharks themselves. In addition, the team witnessed the landing of a Greenland shark by a bottom trawl vessel during the site visit; the shark was landed whole with all fins attached (see photo below). As a result, there is a high degree of certainty shark finning is not taking place; SG100 is met.		

Photos of Greenland shark landed by bottom trawler, witnessed during site visit on 5 April 2018. (Photos by F. Nimmo)

e	Review of alternative measures to minimise mortality of unwanted catch			
	Justification	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?	TB: Y	TB: Y	TB: N
		TN: Y	TN: Y	TN: N
		SD: N/A	SD: N/A	SD: N
	Guidepost	**All gears** No catches of main in-scope secondary species have been reported for these gears. With regards to out-of-scope seabird and marine mammal species, review of the MFRI observer data represents an ongoing review of the effectiveness of UoA-related mortality of main secondary species. With regards to unwanted catches of minor in-scope species, the review of alternative measures to minimise mortality is addressed within the harvest strategy for all species and therefore a review is conducted routinely by the MFRI alongside all other issues pertinent to controlling fishing mortality. This on-going consideration is evident in stock assessments, scientific advice and policy documents. Such work is ongoing throughout the year. The use of sorting grids, which were mandatory within Icelandic trawls since 1997, was reviewed in 2013. This led to the decision for sorting grids be mandatory only for specific gear/target species in certain areas, specifically for trawls targeting shrimp (*Pandalus borealis*) and pelagic species. It is noted that "the application of sorting grids can have severe effects on water flow in the trawl, the selectiveness can be highly variable depending on catch rate and information given by catch sensors can be unreliable when the path of the catch is interrupted with a sorting		

		grid" (Viðarsson et al., 2014). In addition, anecdotal evidence from the skipper of a bottom trawl vessel cited sorting grids to be prohibitive to work with on-deck (from a labour perspective) and would result in damage to the fish. Sorting grids subsequently are not mandatory within the Icelandic trawl nets included within this assessment. There is evidence that the strategy to avoid unwanted catch is successful. Landings of in-scope secondary species that have market value are very low. This is at least partly due to improvements in technology that allow better targeting of fish to fill quotas. This will also increase avoidance of unwanted species. The fishing industry have a policy to make best possible use of all products, including bio-medical products and new markets for new products (such as developing markets for dried starry ray, dried cod heads, and encouraging restaurants to use more unusual species, see Clucas, 2014). This converts otherwise unwanted to wanted catch, which is perhaps the most effective way of dealing with this issue. SG 100 is met.
References		Clucas, 2014. Viðarsson et al., 2014.

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl Main species: 3 reach 85 Minor species: 17 reach 85	**85**
	***Nephrops* trawl** Main species: 3 reach 85 Minor species: 13 reach 85	**85**
	Danish Seine Main species: N/A Minor species: 12 reach 85	**85**
CONDITION NUMBER(S)		
Outline Condition Number:		

PI 2.2.3 Evaluation Table for 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			
	Guidepost	Qualitative information is **adequate to estimate** the impact of the UoA on the main secondary species with respect to status.	Some quantitative information is available and **adequate to assess** the impact of the UoA on main secondary species with respect to status.	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?	TB: 3 Y	TB: 3 Y	TB: 3 N
		TN: 3 Y	TN: 3 Y	TN: 3 N
		SD: N/A	SD: N/A	SD: N/A
	Justification	**All gears** Icelandic regulations require that all bycatch is recorded. All data recorded by onboard observers is routinely made available to the MFRI for analysis. Routine scientific surveys are supplemented by targeted research projects and population counts in Iceland, including for out-of-scope marine mammals and seabirds. For example during June-August 2015, the MFRI participated in a large scale cetacean sightings survey (NASS-2015) conducted in cooperation with the Faroes, Greenland and Norway under coordination of the NAMMCO Scientific Committee. The Icelandic part of the survey was conducted from two research vessels and one aircraft (NAMMCO, 2016). More recently, in July - September 2017 the Icelandic Seal Centre, the Vör Marine Research Centre and the MFRI joined forces to carry out an aerial census of the Icelandic harbour seal in order to update the available information on population estimates, trends and current status (Þorbjörnsson, 2017). Seabird surveys are carried out by the Icelandic Institute of Natural History, as well as through *ad hoc* scientific studies. MFRI updated statistics on interactions with marine mammals and seabirds, published in March 2018, found no interactions related to bottom trawl, nephrops trawl and Danish seine. The e-log system for reporting catches of marine mammals, birds and others was updated 2 years ago, to include a location on the logbook for including this detail – rather than the separate paper logbook. Improvements have been seen in reporting since then (MII, pers. comm.). Logging interaction with marine mammals and birds has become more prominent in recent years with DF and MII working together with the industry to improve logging and species identification. Species identification is good, with fishermen well aware of their surroundings and the marine ecosystem (DF, pers. comm.). Quantitative information on bycatch rates of main secondary species (out-of-scope marine mammal and seabird species in the present assessment) is thus available, and adequate to assess the impact of the UoA on main secondary species. SG 80 is met. However, this is based on observer data that has been raised to estimate interaction across the fleets. The data does not allow a high degree of certainty to be achieved and SG100 is not met. A recommendation (Recommendation 1) has been raised to ensure that electronic logbook records of out-of-scope secondary species are correctly filled and submitted by fishers in future (if any), and that such records are adequately monitored by the MFRI through ad hoc onboard observations and annual analysis of available data.		
b	**Information adequacy for assessment of impacts on minor secondary species**			

	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.
	Met?			TB: 17 Y
				TN: 13 Y
				SD: 12 Y
	Justification	**All gears** Information on fishing impacts on minor in-scope secondary species is available from the same data sources as for primary species (including both fisheries dependent and fisheries independent data), except that they may be somewhat less well studied since such species are not the focus of scientific sampling programmes and research projects. The Icelandic Fisheries Management Act requires that all catches shall be landed. Discarding is thus illegal, and landings of all in-scope species, are routinely recorded. All catches landed in Iceland must be weighed using specially authorized scales and the landing data is instantly transmitted to the database of Directorate of Fisheries (DF). There are strict requirements for the keeping of log books on-board all fishing vessels, containing information on fishing practices such as location, dates, gear and catch quantity. Log books must be made available to inspectors from the DF and to MFRI for scientific purposes. A team of inspectors from DF monitors landing and weighing practices and inspectors may board fishing vessels to monitor catch composition, handling methods and fishing equipment. Following a random investigation, inspectors can join the vessel crew to the same fishing ground the vessel visited during the previous fishing trip, in order to examine their fishing practices. Also, the system of instant recordings of landings allows for the use of DF database to trace the origin and date of catch and to compare catches by an individual vessel to other vessels fishing at the same location and date. Discrepancies in catch proportion can lead to further inspections. Species are also monitored through the scientific surveys, even if this information is not used. The closer monitoring of Atlantic halibut has been initiated because management has intervened to reduce mortality, and information is sufficient to evaluate the effect of this intervention. SG100 is met.		
c	Information adequacy for management strategy			
	Guidepost	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?	TB: 3 Y	TB: 3 Y	TB: 20 N
		TN: 3 Y	TN: 3 Y	TN: 16 N
		SD: N/A	SD: N/A	SD: 12 N
	Justification	**All gears** Information is collected on spatial and temporal fishing patterns through the use of VMS, and the presence/absence of bycatch of vulnerable species on the fishing grounds is evaluated through the use of onboard observers, scientific research at sea, and sampling of landed catches. There is thus a recurrent monitoring and scientific survey system in place to estimate the trend and relative quantities of secondary species, which is necessary prerequisite to the implementation of bycatch management measures. The team considers that the information is adequate to support a partial strategy to manage main secondary species. SG 80 is met.		

		The information available at present would however not be adequate to evaluate with a high degree of certainty whether the strategy is achieving its objective. In particular satisfactory information to support a strategy to manage out-of-scope species is lacking. SG 100 is not met.
References		Gardarsson and Jónsson 2014; NAMMCO 2016; Þorbjörnsson 2017.

OVERALL PERFORMANCE INDICATOR SCORE:	
Bottom trawl Main species: 3 reach 80 Minor species: 17 reach 85	**85**
***Nephrops* trawl** Main species: 3 reach 80 Minor species: 13 reach 85	**85**
Danish Seine Main species: N/A Minor species: 12 reach 85	**85**
CONDITION NUMBER	
Outline Condition Number:	

PI 2.3.1 Evaluation Table for ETP species outcome

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			
	Guidepost	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?	Not relevant	Not relevant	Not relevant
	Justification	This SI is not scored as there are no national or international requirements that set limits for ETP species for Icelandic fisheries.		
b	Direct effects			
	Guidepost	Known direct effects of the UoA are likely to not hinder recovery of ETP species.	Known 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?	TB: Y	TB: Y	TB: N
		TN: Y	TN: Y	TN: N

		SD: Y	SD: Y	SD: Y
	Justification	**ETP elements** As described in Section 3.4.7.3 of the main report, consideration of the scale of impact of gears under assessment on ETP species is required for 8 species of whale (sei whale, blue whale, fin whale, bowhead whale, sperm whale, common minke whale, humpback whale and North Atlantic right whale), the hooded seal and the remaining 2 species of marine birds (black guillemot and Atlantic puffin). The direct effects of interaction between whales with bottom trawl, Nephrops trawl and Danish seine is considered to be negligible. According to observer reports from MFRI and personal communication with MFRI staff there has been no registration of whale interaction with the gears of commercial vessels or by MFRI during their spring and fall bottom trawl surveys in the last 5 years. Direct mortality from these fishing gears is therefore considered negligible. The bycatch of black guillemot and Atlantic puffin in bottom trawl, Nephrops trawl and Danish seine is considered to be negligible. According to observer reports from MFRI and personal communication with MFRI staff there has been no registration of black guillemot and Atlantic puffin bycatch by commercial vessels or by MFRI during their spring and fall bottom trawl surveys in the last 5 years. Direct mortality from these fishing gears is therefore considered negligible. Interaction of hooded seal with these fishing gears is rare because of the nature of the fishing. According to observer reports from MFRI and personal communication with MFRI staff there has been no registration of hooded seal bycatch by bottom trawl, Nephrops trawl or Danish seine vessels, nor by MFRI during their spring and fall bottom trawl surveys in the last 5 years. Discussions with MFRI have indicated that the original conclusion of negligible bycatch in these gears remains unchanged (MFRI Pers. Comm.). However, during the site visit anecdotal information from the Captain and skipper of a bottom trawler indicated the capture of a hooded seal within a haul in the past. While this is understood to be a rare occurrence, the identification of interaction with hooded seals, together with the recorded interaction with harbour seals and grey seals, warrants the inclusion of hooded seal as an ETP species for bottom trawl and Nephrops trawl fisheries. It is concluded that the potential for interaction with Danish seine is negligible due to the nature of fishing practises, specifically that nets are closed before hauling, reducing the likelihood of any potential for interaction with seals. **Bottom trawl and nephrops trawl** Hooded seal are not listed within the observer data produced by MFRI as interacting with bottom trawl gears. However, during the bottom trawler vessel visit undertaken as part of the site visit, the skipper indicated an instance of having caught a hooded seal. In accordance with the precautionary principle, hooded seals are included as an ETP species for assessment within the bottom trawl and nephrops trawl UoAs. Hooded seal Hooded seals are found at high latitudes in the North Atlantic, and seasonally they extend their range north into the Arctic Ocean. They breed on pack-ice and are associated with it much of the year, though they can spend significant periods of time in the pelagic realm (Lavigne and Kovacs 1988, Folkow and Blix 1999, Folkow et al. 2010). Four distinct populations can be found on pack ice: (i) near Jan Mayen Island, (ii) off Labrador and northeastern Newfoundland, (iii) in the Gulf of St. Lawrence, and (iv) in the Davis Strait. The total hooded seal population is currently estimated to be 650,000, including 400,000 individuals in the northwest Atlantic Ocean, and 250,000 in the Jan Mayen population (MarineBio.org). The Icelandic population has been estimated at between 67,104 and 98,573 (table 3-16). With changing sea ice conditions reducing the pack ice habitat needed by all hooded seals, there is good reason to believe that numbers in all stocks might be declining. For instance, hooded seals in the Greenland 'West Ice' area continue to show a declining trend.		

		Comparing pup production estimates for 1997 and 2012 indicates a population decrease of 3.7% per year and a reduction in population size of 43% in 15 years (Kovacs, 2016). The most recent estimate of the total size of this population is 82,830 (SE=8,028) and models suggest a continued decline of approximately 7% per year in the coming decade (Øigård et al. 2014). Overall, this stock is less than 10% of its abundance observed some 60 years ago (ICES, 2013). Overhunting was clearly involved in the collapse of this stock as quotas were being set for a population size much larger than it actually was. However, the cause of the significant on-going decline in this population is thought to be related to climate change induced alternation of its sea ice breeding habitat and increased predation by polar bears and killer whales in the pupping areas (Øigard et al., 2014); prey availability might also be an issue. As a result of these population declines this species is currently classified by IUCN as 'Vulnerable' (Kovacs, 2016). Based on the most recent MFRI data available, no hooded seal deaths were recorded by bottom trawl, Nephrops trawl or Danish seine. However, stakeholder consultation indicates they may occur. Taking a precautionary approach, the highest estimate of seal interaction for harbour and grey seals has been taken as a proxy for hooded seal interaction i.e. average annual bycatch of 28 seals. This would account for 0.03-0.04% of the total estimated annual number of hooded seals which visit Icelandic waters to feed. This percentage of bycatch is unlikely to be of concern. SG 80 is met. Unobserved morality is considered to be very low to negligible. Incidents of gear loss are rare (ISF, per comm), and if it does occur, ghost fishing is understood to be low, especially in comparison to other gear types. The multifilament net material has a larger diameter than gillnet monofilament and is therefore visible or of such a size that it can be sensed by fish or marine mammals (Macfadyen et al., 2009). Surveys have shown lost trawl net gear to be overburdened by silt and therefore more visible. Many of the synthetic twines are buoyant, and sometimes the twine buoyancy is augmented by floats attached to major pieces of trawl webbing. This attracts pelagic marine species, invertebrates such as the attached tunicates and barnacles, and pelagic invertebrates. This webbing may also attract other marine species that can become entangled e.g. Page et al. (2003) found New Zealand fur seals were commonly entangled in loops of packing tape and trawl net fragments suspected to be from rock lobster and trawl fisheries (as cited in Macfadyen et al., 2009). No evidence of such interaction is known in Icelandic waters, and given the low level of gear loss, the risk is considered by the team to be very low to negligible. SG 100 is not met because based on the available information it cannot be concluded that there is a high degree of confidence that there are no significant detrimental direct effects of the UoAs on this ETP species. **Danish seine** There are no significant interactions recorded between Danish seine fisheries and ETP species. As such, there is a high degree of confidence that there are no significant detrimental direct effects of this UoA on ETP species, and SG60, SG80 and SG100 are met.		
c	Indirect effects			
	Guidepost		Indirect effects have been considered 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 fishery on ETP species.
	Met?		Y	N
	Justification	**All gears** It is known that some seabird species accompany fishing vessels, forming large aggregations to take advantage of fish waste (e.g. del Hoyo, et al., 1992; Hatch and Nettleship, 1998), and that lost fishing gears are a threat to marine megafauna including seals (e.g. Stelfox et al., 2016). The team however considers that such indirect effects are highly likely to not create		

		unacceptable impacts since there are no apparent indirect effects of any of the UoAs on hooded seal populations known to the team. The removal of lemon sole (the P1 target species) is highly unlikely to reduce its availability as a prey item for hooded seal, or other predator species, or lead to ecosystem level changes. Lemon sole is not considered to be a keystone species within the ecosystem. Flatfish are important predators in benthic communities, however the range of flatfish species in Icelandic waters, together with the quantity removed by the UoAs (noting that lemon sole is caught as a by-catch in other targeted fisheries), does not pose any risk of effects or changes at an ecosystem level. Studies into the diet of hooded seal have shown squid *Gonatus fabricii* and polar cod (*Boreogadus saida*), capelin (*Mallotus villosus*), and sand eels (*Ammodytes* spp.) to be important, and to a lesser extent redfish (*Sebastes* sp.) and Greenland halibut (*Reinhardtius hippoglossoides*) (Haug et al, 2007)." In addition, inrelation to the indirect effect of marine pollution, Iceland is signatory to the MARPOL Convention (The International Convention for the Prevention of Pollution from Ships, MARPOL 73/78**).** MARPOL is an international marine environmental convention developed by the International Maritime Organization in 1973 (modified in 1978) to minimize pollution of the oceans and seas. Annex I relates to discharge of oil, Annex II & III relate to chemical pollution and harmful substances, Annex IV to control of sewage pollution from ships, Annex V relates to garbage and marine debris and bans the dumping of plastic into the ocean and Annex VI relates to air pollution from vessels. SG 80 is thus met for all gears. There is however insufficient information to concluded that there is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species; SG 100 is not met.
References		Birdlife International 2000, 2012, 2015; del Hoyo, et al., 1992; Harris and Wanless 2011; Hatch and Nettleship, 1998; Haug et al, 2007; ICES 2013; Kovacs 2016; Macfadyen et al., 2009; Øigård *et al*. 2014; Stelfox et al., 2016.

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**80**
	***Nephrops* trawl**	**80**
	Danish Seine	**90**
CONDITION NUMBER (if relevant):		
Outline Condition Number:		

PI 2.3.2 Evaluation Table for ETP species management strategy

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)			
	Guidepost	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 UoAs 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 UoAs 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?	Not relevant	Not relevant	Not relevant
	Justification	This scoring issues is not scored because there are no requirements for protection or rebuilding provided through national Icelandic ETP legislation or international agreements (see Section 3.4.7).		
b	Management strategy in place (alternative)			
	Guidepost	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?	Y	Y	N
	Justification	**<u>ETP elements</u>** As described in Section 3.4.7.3 of the main report, ETP elements considered include 8 species of whale (sei whale, blue whale, fin whale, bowhead whale, sperm whale, common minke whale, humpback whale and North Atlantic right whale), the hooded seal and 2 species of marine birds (black guillemot and Atlantic puffin). Interaction with the whale species and marine birds is considered negligible for all gears. **All gears** Various measures are taken to ensure the protection of juvenile fish, vulnerable and critical habitats and such measures will serve to reduce bycatch of ETP seabird and marine mammal species. Although not specifically established to protect such species, area closures in particular will also serve to maintain bycatch of marine mammals and seabirds at low levels since bycatch of many sensitive species is highest in inshore areas, which is where the closures are located. In addition bottom trawl and nephrops trawl are prohibited from operating within 12 Nm from the coast, which further limits interaction with ETP species. The measures include regulations on the type of fishing gear allowed in different areas, rules on the minimum mesh size and closed areas including permanent closures for habitat protection and temporary closures to protect juvenile fish and spawning/nursery areas (see Figure 3-21 and 3-22). The long-term area closures in place may apply to specific fishing gear, fishing-vessel size or all fishing for certain periods of time. For instance, in order to protect the spawning stock of cod, extensive seasonal closures are in operation during the spawning		

		season (Regulation nr. 30/2005); all cod fisheries are closed within 12 miles along the south and west coast and within 6 miles along the north and east coast in April each year. Additional measures in place to manage bycatch of marine mammals and seabirds in Icelandic fisheries include: • Marine mammal and seabird bycatch is monitored by mandatory eLog system, and onboard observers from the DF and the MFRI, which monitor ca. 1-2% of all fishing trips by bottom and nephrops trawl. • Fishers are not allowed to offer for sale, give away, nor accept as a gift, any bird that has been killed in fishing nets. • Any birds or mammal caught alive must be released. These measures are specifically in relation to monitoring interaction between the UoAs under assessment and are considered to form a strategy, which is expected to maintain / not hinder recover of ETP species. SG 60 and SG80 are met. However, this is not considered a comprehensive strategy. SG100 is not met.		
c	Management strategy evaluation			
	Guidepost	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species).	There is an objective basis for confidence that the 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?	Y	Y	N
	Justification	**All gears** The measures which are currently in place (see scoring issue 'a' for a description) although not established to reduce catches of ETP species, can be expected to protect ETP species and to maintain bycatch of marine mammals and seabirds at low levels since bycatch of many sensitive species is highest in inshore areas, which is where the closures are located. SG 60 is thus met. There are a number of measures that aim to ensure compliance with the law, including monitoring and surveillance which are conducted by the DF and the coast guard to ensure compliance of regulations. This allows objective confidence that these measures will work. SG60 and SG80 are met. Quantitative evidence exists through observer data that has been analysed and extrapolated to cover fleet wide interactions with ETP species. However, the proportion of fleet observered, together with the lack of analysis of data from the eLog system, does not allow determination of the success of management to be made with high confidence. Furthermore, it is considered that the measures do not combine to form a cohesive, comprehensive strategy specifically addressing impacts on ETP species. SG100 is not met.		
d	Management strategy implementation			
	Guidepost		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?		Y	N

	Justification	**All gears** Control and surveillance information indicates that temporal and permanent fishing ground closures are respected, and restrictions on coastal fishing are likely to have reduced fishing mortality rates of ETP marine mammal and seabird species. There is thus some evidence that management measures are being implemented successfully; SG 80 is met. Clear evidence that the strategy is being implemented successfully and is achieving its objective of ensuring the UoA does not hinder recovery of ETP species is lacking, SG100 is not met.		
e	Review of alternative measures to minimize mortality of ETP species			
	Guidepost	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?	Y	Y	N
	Justification	**All gears** The review of the onboard observer data by MFRI scientists represents an ongoing review of the effectiveness of current measures to minimise unwanted ETP interactions. The evaluation of the performance of the current measures occurs every two to three years for observer bycatch analysis and reporting, and with review of the effectiveness of the system in the past two years which resulted in improvements in the e-Log recording system. As such the frequency of reviews is considered regular. Bottom trawl, nephrops trawl and Dansish seine are considered lower risk, with negligible ETP interactions (MFRI pers. Comm.) and therefore management response and review frequency is appropriate. Based on the very low levels of interaction (no hooded seal are recorded within observer data for interactions with demersal trawl or seine gear), it is concluded that alternative measures are not required. SG60 and SG80 are met. However, there is no biennial review of the potential effectiveness of such measures, so SG100 is not met.		
References	ICES, 2017			

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**80**
	***Nephrops* trawl**	**80**
	Danish Seine	**80**
CONDITION NUMBER (if relevant):		
Outline Condition Number:		

PI 2.3.3 Evaluation Table for ETP species information

PI 2.3.3		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.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impacts			
	Guidepost	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.	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.	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.
	Met?	Y	Y	N
	Justification	**<u>ETP elements</u>** As described in Section 3.4.7.3 of the main report, ETP elements considered include 8 species of whale (sei whale, blue whale, fin whale, bowhead whale, sperm whale, common minke whale, humpback whale and North Atlantic right whale), the hooded seal and 2 species of marine birds (black guillemot and Atlantic puffin). Interaction with the whale species and marine birds is considered negligible for all gears. **All gear** Routine scientific surveys are supplemented by targeted research projects and population counts in Iceland, including for ETP marine mammal and seabirds. For example during June-August 2015, the MRI participated in a large scale cetacean sightings survey (NASS-2015) conducted in cooperation with the Faroes, Greenland and Norway under coordination of the NAMMCO Scientific Committee. The Icelandic part of the survey was conducted from two research vessels and one aircraft (NAMMCO, 2016). Seabird surveys are carried out by the Icelandic Institute of Natural History, as well as through *ad hoc* scientific studies (e.g. Gardarsson and Jónsson (2014). Icelandic regulations require that all bycatch is recorded. Information is collected on spatial and temporal fishing patterns through the use of Vessel Monitoring System, and the presence / absence of bycatch of ETP species on the fishing grounds is evaluated through the use of onboard observers, logbooks (e-Log), scientific research at sea, and sampling of landed catches. MFRI observer data is available to quantify the level of interaction with ETP species in these fisheries. This data is recorded on 1-2% of fishing effort and is therefore considered as some quantitative data, meeting SG60 and SG80.		

		The level of observer coverage (1-2%) does not allow a high degree of certainty. SG100 is not met.		
b	Information adequacy for management strategy			
	Guidepost	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, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.
	Met?	Y	Y	N
	Justification	**All gears** Information is collected on spatial and temporal fishing patterns through the use of Vessel Monitoring System, and the presence / absence of bycatch of ETP species on the fishing grounds is evaluated through the use of onboard observers, logbooks, scientific research at sea, and sampling of landed catches. There is thus a recurrent monitoring and scientific survey system in place to estimate the trend and relative quantities of ETP species, which is a necessary prerequisite to the implementation of bycatch management measures and manage fishing impacts on such species. The team considers that the information is adequate to measure trends and support a strategy to manage impacts on ETP species. SG 80 is met. The information available at present would however not be adequate to evaluate with a high degree of certainty whether the strategy is achieving its objective. SG 100 is not met. A recommendation (Recommendation 2) has been raised to ensure that electronic logbook records of ETP species are correctly filled and submitted by fishers in future (if any), and that such records are adequately monitored by the MFRI through ad hoc onboard observations and annual analysis of available data. This recommendation is in line with Recommendation 1 set for out-of-scope secondary speices for PI 2.2.3.		
References		Gardarsson and Jónsson 2014; NAMMCO 2016; Þorbjörnsson 2017.		

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**80**
	***Nephrops* trawl**	**80**
	Danish Seine	**80**
CONDITION NUMBER (if relevant):		
Outline Condition Number:		

PI 2.4.1 Evaluation Table for Habitats outcome

<table>
<tr><td colspan="2">PI 2.4.1</td><td colspan="6">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.</td></tr>
<tr><td colspan="2">Scoring Issue</td><td colspan="2">SG 60</td><td colspan="2">SG 80</td><td colspan="2">SG 100</td></tr>
<tr><td rowspan="6">a</td><td colspan="7">Commonly encountered habitat status</td></tr>
<tr><td>Guidepost</td><td colspan="2">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.</td><td colspan="2">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.</td><td colspan="2">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.</td></tr>
<tr><td rowspan="3">Met?</td><td>TB</td><td>Y</td><td>TB</td><td>Y</td><td>TB</td><td>N</td></tr>
<tr><td>TN</td><td>Y</td><td>TN</td><td>Y</td><td>TN</td><td>N</td></tr>
<tr><td>SD</td><td>Y</td><td>SD</td><td>Y</td><td>SD</td><td>Y</td></tr>
<tr><td>Justification</td><td colspan="6">
<table>
<tr><td rowspan="2">Gear</td><td colspan="6">Commonly encountered habitats</td></tr>
<tr><td>Coarse sediments</td><td>Fine mud</td><td>Mixed sediment</td><td>Rock / hard substrata</td><td>Sand</td><td>Sandy mud - muddy sand</td></tr>
<tr><td>TB</td><td>80</td><td></td><td>80</td><td></td><td>80</td><td></td></tr>
<tr><td>TN</td><td></td><td>80</td><td>80</td><td></td><td>80</td><td>80</td></tr>
<tr><td>SD</td><td>100</td><td>100</td><td>100</td><td></td><td>100</td><td>100</td></tr>
</table>
Bottom trawl
Trawl fishing effort In Icelandic waters is primarily concentrated in areas characterised by coarse sediments, mixed sediments and sands. High bottom trawling effort has been ongoing for decades in these habitats, and they are still productive fishing grounds. The current effort by the bottom trawl fishery is considerably less intensive than it used to be. Significant reductions in fishing effort in recent years (compared to early 1990s fishing effort, see ICES 2017) means that any impacts bottom trawl gear may be having in such habitats will have decreased concurrently.
Scientific research has shown that compared to hard bottom sites, species diversity is low in Icelandic deep-water sedimentary habitats (Santos et al., 2008). Moreover, there is evidence in the scientific literature that the effects of otter trawling on less stable sedimentary habitats (including coarse sediments and sandy bottoms) are relatively minor, and that such habitats recover quickly from the effects of fishing activities (Collie et al. 2000; Dernie et al. 2003; Kaiser et al. 2006). Indeed, research on the short- and long-term effects of otter trawling on a macrobenthic infaunal community in subtidal Icelandic waters that had never been trawled before found that no significant treatment effects could be detected on total abundance or on multivariate structure; tests for individual species revealed only a single short-term effect for a bivalve. Trawling did however cause significant short-term reduction in species richness and persistent effects on the Shannon-Wiener diversity index (Ragnarsson and Lindegarth 2009). Based on these studies the team considers that the habitat structure, biological diversity, abundance and function of coarse sediment, mixed sediment and sand habitats would be able to recover to at least 80% of its unimpacted structure, biological diversity and function within 5-20 years, if fishing were to cease entirely.
Overall, the team considers that it is highly unlikely that bottom trawling will reduce the structure and function of commonly encountered habitats (coarse sediment, mixed sediment and sand) to the point where there would be serious or irreversible harm. SG 60 and SG 80 are met.
Ragnarsson and Lindegarth (2009) carried out their research in shallow waters where storm induced disturbance will be higher than in the trawl fishing grounds being assessed. The</td></tr>
</table>

		team therefore considers that this study does not constitute sufficient 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. SG 100 is not met. ***Nephrops* trawl** The habitat of *Nephrops norvegicus* is characterized by fine sand and mud, where sea-pen (*Virgularia mirabilis*, *Pennatula phosphorea*, and *Funiculina quadrangularis*) and burrowing megafauna communities can be found (OSPAR 2010d). Based on an assessment against the Texel-Faial criteria (selection criteria for habitats are: global importance, regional importance, rarity, sensitivity, ecological significance, status of decline) carried out by OSPAR such communities are ecologically significant, but were not classified as rare or regionally important. Moreover, seapen- and burrowing megafauna communities are on the OSPAR List of threatened and/or declining species and habitats for region II (Greater North Sea) and III (Celtic Seas), but not for region I, which includes Icelandic waters (OSPAR 2010d). Seapens are sensitive to mechanical damage by *Nephrops* trawling, in particular *F. quadrangularis* due to the brittle nature of its axial rod and inability to retract into the sediment (Greathead et al., 2007). It is however known that in Icelandic waters there is only very limited overlap between the distribution of sensitive pennatulaceans and areas where *Nephrops* trawling takes place. Pennatulaceans are mainly restricted to waters deeper than 500 m depth, in fact the average depth where these anthozoans are found is 800 m (Ólafsdóttir et al. 2014). *Nephrops* trawling on the other hand takes place at depths of 100 - 500 m, and the fishing grounds are mainly located to the north and southwest of Iceland (see *Nephrops* trawl effort mapped in Figure 3-23). In the absence of significant populations of seapens burrowing megafauna including burrowing crustaceans, small polychaetes and bivalves will be found in *Nephrops* habitats (Ball et al., 2000). Studies on the impact of *Nephrops* trawling indicate that fishing intensity is the major factor controlling long-term negative trends in the benthos (Ball et al. 2000). The team however considers that in the long term (within 20 years), the habitat structure, biological diversity, abundance and function of soft bottom habitats impacted by the UoA would be able to recover to at least 80% of its unimpacted structure due to a number of factors: • Sensitive sea-pens frequently present in *Nephrops* habitats are restricted to deeper waters in Iceland. As there is very limited overlap between sensitive sea-pen habitats and *Nephropos* fishing grounds, the potential for impact is very low. • The *Nephrops* trawl used in Icelandic waters has a ground rope but is not fitted with bobbins or tickler chain (www.fisheries.is), which therefore reduces the depth of penetration into the sediment and thus lowers the level of impact on burrowing megafauna including burrowing crustaceans, polychaetes and bivalves. • Despite the fact that high bottom trawling effort has been ongoing for decades, including trawling for *Nephrops*, fishing grounds have remained productive. This indicates that the impacts of this UoA on burrowing crustacean and likely other burrowing megafauna species is limited. • Following a decline in fishing effort by 60-70% from the early 1970s to the year 2000 (Garcia et.al. 2006), and a subsequent further reduction of the number of boats in the *Nephrops* fishery by 50% during the period 2001-2013, fishing effort of this UoA has been restricted to just a few areas in recent years. The team considers that recovery of these areas would be facilitated by recruitment from nearby unimpacted areas. Overall, it is considered that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats, including seapen and burrowing megafauna communities, to a point where there would be serious or irreversible harm, and that the habitats would be able to recover to at least 80% of unimpacted structure, biological diversity and function within 5-20 years if fishing were to cease entirely. SG60 and SG80 are met. There is no evidence that this is highly unlikely, SG100 is not met. **Danish seine**

The Danish seine cannot be used to fish on rough grounds and is instead used on relatively flat sandy or muddy seabeds lacking significant obstructions which could damage the gear. Since Danish seines encircle the target species rather than being towed across large areas of substrate this gear has a relatively limited spatial footprint, reducing seabed disturbance. Due to the characteristics of Danish seine fishing the team considers that this 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. SG60 and SG80 are met.

A recent study on the impact of the Danish seine on benthos showed that it had limited negative impact on sedimentary habitats in the study area (Thorarinsdóttir et al. 2010). The study compared fished and closed areas within Skagafjörður and found no differences in species composition between the two treatments, although abundance tended to be higher in the closed area (significant difference for two out of nine benthic taxa from grab sampling). On this basis, the team considered that there is evidence that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats, although such habitats may suffer some reversible changes. SG 100 is met.

b VME habitat status

Guidepost	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.

Met?						
TB	Y	TB	N	TB	N
TN	Y	TN	Y	TN	N
SD	Y	SD	Y	SD	N

Justification

Gear	**VMEs**					
	Maerl beds	*Modiolus* reefs	*Lophelia* reefs	Coral gardens	Sponges	Hydrothermal vents
TB			60	60	60	80
TN				80	80	80
SD	80	80				

Bottom trawl

Maerl beds

Since coralline algae require light for photosynthesis maerl beds are generally only found at depths to about 40 m; Icelandic maerl beds have rarely been reported below 20 m depth. Bottom trawling does not take place in waters shallower than 80 m depth and is rare in waters shallower than 100 m depth, and is not allowed within certain distance from land (generally around 12 nm) in Iceland (DF and MFRI, per comm). There is thus no potential overlap between this UoA and the distribution of maerl beds in Icelandic waters.

Modiolus reefs

Modiolus reefs have been reported at depths ranging from 5 - 50m in Icelandic waters. Bottom trawling does not take place in waters shallower than 80 m depth, is rare in waters shallower than 100 m depth, and is not allowed within a certain distance from land (generally around 12 nm) in Iceland (DF and MFRI, per comm). There is thus no potential overlap between this UoA and the distribution of horse mussel beds in Icelandic waters.

		<u>*Lophelia* reefs</u> In Icelandic waters, most fishing with otter trawls (around 70%) takes place at depths between 100 and 500 m; lemon sole are common at depths of ca. 20 -200 m (MFRI, pers. comm.); *Lophelia* reefs are found at depths of 200-1,400 m, but are concentrated 400 – 800 m. There is thus overlap between bottom trawl gear and *Lophelia* reefs between 200 and 500 m, with the highest potential for overlap at 400 - 500 m. The slope areas off the south coast of Iceland are very steep, with depths descending from around 400 m to more than 1500 m within few nautical miles, and parts of the slope areas are considered difficult for trawling. Therefore, vulnerable habitats have some depth refuge from fisheries impacts in Icelandic waters. There is explicit protection of several *Lophelia* areas where no fishing gears with bottom contact are allowed, including bottom trawling. Permanent area closures for bottom trawling are in operation along the shelf break off W Iceland including the seabed on the shallow part of the Reykjanes Ridge where *Lophelia* reefs occur (Figure 3-29). Detailed habitat mapping has so far concentrated on the areas most at risk from trawling or other threats. Ongoing habitat mapping may identify further areas and the intention is to protect these. In particular since 2015, the bycatch of invertebrates is being monitored during the annual autumn ground fish survey in deep water carried out by MFRI. All invertebrates in the trawl catches observed are identified by benthologists (about half of the trawls carried out). This data will give considerable amount of information on benthos, including corals, as well as other species vulnerable to fishing in the near future (MFRI, pers. communication). However, no recording of benthic bycatch by commercial fishing vessels is in place. Overall, based on the overlap of the UoA with known distribution of *Lophelia* reefs, including encouterability (depth profile overlap), together with the network of closed areas, it is considered **unlikely** that bottom trawling would reduce the structure and function of *Lophelia* reefs habitats to a point where there would be serious or irreversible harm. SG60 is met. A single contact by the bottom trawl gear has a significant impact on corals, which have slow recovery rates. Therefore, adverse impacts by bottom trawling is significant. It cannot be concluded that the assessed bottom trawl fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. SG 80 is not met for bottom trawl. This has been harmonised with the ISF Iceland haddock, ISF Iceland redfish, ISF Ling and saithe, ISF cod and halibut and ISF anglerfish fisheries, where there is a condition for this PI. <u>Coral gardens</u> In Icelandic waters, most fishing with otter trawls (around 70%) takes place at depths between 100 and 500 m / lemon sole are common at depths of ca. 20 -200 m (MFRI, pers. comm.), and coral gardens are primarily found in the depth range of ca. 500-1700 m (see Table 3-21). However, lemon sole can be found at deeper depths and the UoA operates in deeper depths when targeting other species, so there may be some overlap between the UoA and coral gardens. The slope areas off the south coast of Iceland are very steep, with depths descending from around 400 m to more than 1500 m within few nautical miles, and parts of the slope areas are considered difficult for trawling. Therefore, vulnerable habitats have some depth refuge from fisheries impacts in Icelandic waters. Nevertheless, in the past the bottom trawl fishery has reduced coral habitat structure. This impact is inferred from evidence elsewhere in the world, including Norway and New Zealand, and observations (underwater photography) of two locations in Icelandic waters (Ragnarsson et al., 2016). However, the historical extent of the level of impact in Icelandic waters is unknown There is explicit protection of several *Lophelia* areas where no fishing gear with bottom contact are allowed, including bottom trawling since permanent area closures for bottom trawling are in operation along the shelf break off W Iceland including seabed on the shallow

		part of the Reykjanes Ridge where *Lophelia* reefs occur (Figure 3-29). However, no such closures are in place to protect coral gardens characterised by aggregations of colonies or individuals of one or more coral species of leather corals (Alcyonacea), (Gorgonacea), sea pens (Pennatulacea), black corals (Antipatharia), and hard corals (Scleractinia) other than *Lophelia*. Detailed habitat mapping has so far concentrated on the areas most at risk from trawling or other threats. Ongoing habitat mapping may identify further areas and the intention is to protect these. In particular since 2015, the bycatch of invertebrates is being monitored during the annual autumn ground fish survey in deep water carried out by MFRI. All invertebrates in the trawl catches observed are identified by benthologists (about half of the trawls carried out). This data will give a considerable amount of information on benthos, including coral garden species, as well as other species vulnerable to fishing in the near future (MFRI, pers. communication). However, no recording of benthic bycatch by commercial fishing vessels is in place. Overall, based on the overlap of the UoA with known distribution of coral gardens, including encouterability (depth profile overlap), together with the network of closed areas, it is considered **unlikely** that bottom trawling would reduce the structure and function of deep-sea coral garden habitats to a point where there would be serious or irreversible harm. SG60 is met. A single contact by the bottom trawl has a significant impact on coral gardens, which have slow recovery rates. Therefore, adverse impacts by bottom trawling is significant. It cannot be concluded that the assessed bottom trawl fishery is highly unlikely to reduce habitat structure and function of coral gardens to a point where there would be serious or irreversible harm. Therefore SG 80 is not met for bottom trawl. This has been harmonised with the ISF Iceland haddock, ISF Iceland redfish, ISF Ling and saithe, ISF cod and halibut and ISF anglerfish fisheries, where there is a condition for this PI. <u>Sponges</u> In Icelandic waters, most fishing with otter trawls (around 70%) takes place at depths between 100 and 500 m; lemon sole are common at depths of ca. 20 -200 m. Deep-sea sponge aggregations are found primarily in the depth range of ca. 250 -1300 m, and habitat forming sponge communities are common at depths of up to 500 m (Ospar, 2010d). There is thus overlap between the UoA and sponge communities between 300 and 500 m, although a comparison of the known distribution of sponges in Icelandic waters (Table 3-22) with known fishing grounds of bottom trawl (Figure 3-24) shows that the areal overlap is limited to a few locations off the northwest of Iceland. There is no explicit protection of areas which are rich in sponge communities where no fishing gear with bottom contact are allowed, although a number of seasonal or annual closures to bottom trawling exist which might have beneficial effects on the sponge habitats occurring there. Detailed habitat mapping has so far concentrated on the areas most at risk from trawling or other threats. Ongoing habitat mapping may identify further areas and the intention is to protect these . In particular since 2015, the bycatch of invertebrates is being monitored during the annual autumn ground fish survey in deep water carried out by MFRI. All invertebrates in the trawl catch observed are identified by benthologists (about half of the trawls carried out). This data will give a considerable amount of information on benthos, including sponges, as well as other species vulnerable to fishing in the near future (MFRI, pers. communication). However, no recording of benthic bycatch by commercial fishing vessels is in place. Overall, based on the overlap of the UoA with known distribution of deep-sea sponges, including encouterability (depth profile overlap), together with the network of closed areas, it is considered **unlikely** that bottom trawling would reduce the structure and function of deep-sea sponge habitats to a point where there would be serious or irreversible harm. SG60 is met.

		A single contact by the bottom trawl has a significant impact on sponges, which have slow recovery rates (Ospar 2010d). Therefore, adverse impacts by bottom trawling is significant. It cannot be concluded that the assessed bottom trawl fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. SG80 is not met for bottom trawl. This has been harmonised with the ISF Iceland haddock, ISF Iceland redfish, ISF Ling and saithe, ISF cod and halibut and ISF anglerfish fisheries, where there is a condition for this PI. Hydrothermal vents The depth distributions of trawl fishing and hydrothermal vent fields overlap, and trawling is known to take place close to hydrothermal vent fields (see map of trawling effort superimposed on vent field distribution in Table 3-23). The hydrothermal vents at Steinahóll are situated inside a closed area for otter trawling which has been in operation since 1994. As such the UoA is highly unlikely to reduce structure and function of the hydrothermal vent habitats to a point where there would be serious or irreversible harm. SG60 and SG80 are met. Mapping of hydrothermal vent areas is however ongoing, with surveys planned to survey several potential vent sites on the Reykjanes Ridge for 2017 (MFRI, pers. communication). As such it cannot be argued that there is evidence that the fishery is highly unlikely to impact hydrothermal vent habitats. SG 100 is not met. ***Nephrops* trawl** Maerl beds Since coralline algae require light for photosynthesis maerl beds are generally only found at depths to about 40 m; Icelandic maerl beds have rarely been reported below 20 m depth. *Nephrops* trawling does not take place in waters shallower than 100 m depth and is not allowed within a certain distance from land (generally around 12 nm) in Iceland (DF and MFRI, pers. communication). There is thus no potential overlap between this UoA and the distribution of maerl beds in Icelandic waters. *Modiolus* reefs *Modiolus* reefs have been reported at depths ranging from 5 - 50m in Icelandic waters. *Nephrops* trawling does not take place in waters shallower than 100 m depth and is not allowed within certain distance from land (generally around 12 nm) in Iceland (DF and MFRI, pers. communication). There is thus no potential overlap between this UoA and the distribution of horse mussel beds in Icelandic waters. *Lophelia* reefs *Nephrops* trawling does not take place on hard substrata where *Lophelia* reefs are found. Coral gardens Soft corals occur on the softer muddy habitats favoured by *Nephrops*. However fishing with Nephrops trawls in Icelandic waters primarily takes place in shallower waters at depths above 500 m; in Icelandic waters Nephrops is found in the warmer waters off the south, southeast and southwest coast, mostly at depths of 110-270 m (see www.fisheries.is). Coral gardens on the other hand are found primarily in the depth range of ca. 500-1700 m (see Table 3-21). Overlap between the UoA and coral gardens is thus extremely limited. Consequently the team considers that the UoA is highly unlikely to reduce structure and function of coral garden habitats to a point where there would be serious or irreversible harm, and SG60 and SG80 are met. There is no evidence that this is high unlikely, so SG100 is not met.

Sponges

Deep-sea sponge aggregations may be found on hard substrata, such as boulders and cobbles which may lie on sediment, but are also found on soft substrata (OSPAR, 2010e) favoured by *Nephrops*.

However fishing with *Nephrops* trawls in Icelandic waters primarily takes place in shallower waters at depths above 500 m; in Icelandic waters *Nephrops* is found in the warmer waters off the south, southeast and southwest coast, mostly at depths of 110-270 m (see www.fisheries.is). Deep-sea sponge aggregations on the other hand are found primarily in the depth range of ca. 300-750 m, and a comparison of the known distribution of sponges in Icelandic waters (Table 3-22) with known fishing grounds of bottom trawl (Figure 3-24. Fishing effort distribution for Icelandic bottom trawl, Nephrops trawl and Danish seine (MFRI, 2017). 3-24) shows that the areal overlap is limited to a few locations off the northwest of Iceland where *Nephrops* trawling does not take place. Overlap between the UoA and sponges is thus very limited and consequently the team considers that the UoA is highly unlikely to reduce structure and function of deep-sea sponge habitats to a point where there would be serious or irreversible harm, and SG80 is met. There is no evidence that this is highly unlikely, so SG100 is not met.

Hydrothermal vents

The depth distributions of *Nephrops* trawl fishing and hydrothermal vent fields overlap, and *Nephrops* trawling is known to take place close to hydrothermal vent fields in the North of Iceland (compare map of *Nephrops* trawl fishing effort with map of vent field distribution in Table 3-23).

The hydrothermal vents at Steinahóll are situated inside a closed area for otter trawling which has been in operation since 1994. As such the UoA is highly unlikely to reduce structure and function of the hydrothermal vent habitats to a point where there would be serious or irreversible harm. SG 80 is met.

Mapping of hydrothermal vent areas is however ongoing, with surveys planned to survey several potential vent sites for 2018 (MFRI, pers. communication). As such it cannot be argued that there is evidence that the fishery is highly unlikely to impact hydrothermal vent habitats. SG 100 is not met.

Danish seine

Maerl beds

The distribution of Danish seine fishing effort overlaps with areas where maerl habitats are found (see Table 3-18. Maerl beds 3-18), in particular inside fjords along the northern coast of Iceland. However, maerl beds are generally only found at depths to about 40 m, Icelandic maerl beds have rarely been reported below 20 m depth, and Danish seine fishing generally takes place at depths of 40-60 m. It is therefore unlikely there would be fishing by Danish seine over mearl beds. As such the UoA is highly unlikely to reduce structure and function of the maerl habitats to a point where there would be serious or irreversible harm. SG 80 is met. Although scientific evidence indicates that it is highly unlikely that the Danish seine would reduce habitat structure and function to a point where there would be serious or irreversible harm, this has not been proven. SG 100 is not met.

Modiolus reefs

The distribution of Danish seine fishing effort overlap with areas where *Modiolus* reefs have been recorded (see Table 3-19), in particular off the south-western coast of Iceland. Moreover, horse mussel beds have been reported at depths of 5-50 m in Icelandic waters, which overlaps with the depth range where Danish seines are used.

It is however unlikely that there would be fishing by Danish seine over horse mussel beds, as it would lead to fishing gear damage, such as the footrope being damaged after getting hooked in the mussel bed matrix. Danish seines are instead used on smooth bottoms, and it is likely that fishermen avoid fishing on grounds where there are beds with horse mussel

(MFRI pers. communication). As such the UoA is highly unlikely to reduce structure and function of the maerl habitats to a point where there would be serious or irreversible harm. SG 80 is met.

In the absence of more up to date information on the distribution of *Modiolus* reefs in Icelandic waters and due to the overlap of Danish seine fishing effort with the location of Modiolus beds off the south-west of Iceland, SG 100 is not met.

<u>*Lophelia* reefs</u>

Danish seines cannot be used on rough / uneven bottoms, and fishing takes place in waters which are too shallow for *Lophelia* reefs to be encountered.

<u>Coral gardens</u>

Danish seines cannot be used on rough / uneven bottoms, and fishing takes place in waters which are too shallow for coral gardens to be encountered.

<u>Sponges</u>

Danish seines cannot be used on rough / uneven bottoms, and fishing takes place in waters which are too shallow for deep-sea sponges to be encountered.

<u>Hydrothermal vents</u>

Danish seines cannot be used on rough / uneven bottoms, and fishing takes place in waters which are too shallow for hydrothermal vents to be encountered.

c **Minor habitat status**

Guidepost		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.
		N

Justification

Gear	Minor habitats					
	Coarse sediments	Fine mud	Mixed sediment	Rock / hard substrata	Sand	Sandy mud - muddy sand
TB		80		80		80
TN	80			80		
SD				80		

All Gears

The minor habitats are those that are not commonly encountered by the gears (i.e. those not considered under SI(a) for each gear.

There is no specific evidence that any of the UoAs under assessment are highly unlikely to reduce the structure and function of minor habitats to a point where there would be serious or irreversible harm. SG 100 is not met.

References

Ball et al. 2000; Barbera et al., 2017; Chuenpagdee et al. 2003; Collie et al. 2000; Dernie et al. 2003; Garcia et.al. 2006; Grieve et al., 2014; ICES 2017; Jennings et al. 2001; Kaiser et al. 2006; OSPAR 2010d; Ragnarsson and Lindegarth 2009; Ragnarsson et al, 2016 ; OSPAR, 2010e; Santos et al. 2008; Sharp et al. 2009; Thorarinsdóttir et al. 2010.

OVERALL PERFORMANCE INDICATOR SCORE:	
Bottom trawl	**75**
***Nephrops* trawl**	**80**
Danish Seine	**85**
CONDITION NUMBER (if relevant):	**2**

PI 2.4.2 Evaluation Table for 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						
	Guidepost	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.		There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.		There is a strategy in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.	
	Met?	TB	Y	TB	N	TB	N
		TN	Y	TN	N	TN	N
		SD	Y	SD	Y	SD	N

Justification

	VMEs					
Gears	**Maerl beds**	***Modiolus* reefs**	***Lophelia* reefs**	**Coral gardens**	**Sponges**	**Hydrothermal vents**
TB			80	60	60	80
TN				60	60	80
SD	80	80				

All gears

The Ministry of the Environment has developed a National Strategy Plan for the preservation of biological diversity (Ministry of Environment 2010). Two of the key elements of this strategy are (a) develop fishing methods with less impact on marine ecosystems, and (b) protect vulnerable benthic ecosystems. Act 97/1997 ("um veiðar í fiskveiðilandhelgi Íslands") also provides a framework which allows managers to close vulnerable habitats to fishing as and when the need arises. The Nature Conservation Act no. 44/1999 also provides measures to protect marine habitats. Iceland has ratified a number of conventions on the protection and management of marine species, such as the Convention on Biological Diversity, the OSPAR Convention and the CITES Convention.

These conventions have established objectives for conserving endangered, threatened or protected (ETP) species and habitats, and within them a number of measures have been developed to detect and reduce impacts. For example, the OSPAR Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area has identified a number of key species and habitats which are considered threatened or declining (OSPAR 2008 a and b). Iceland has nominated 14 areas to the OSPAR Network of Marine Protected Areas (OSPAR 2013).

There have been rapid developments in gear technology, with many fishermen operating with semi-pelagic trawl doors, not touching the bottom. This is due to promoting efficiency and oil consumption – with fishing practices being monitored based on fish per kg of oil. This is an informal voluntary move, and not set within a code of conduct (ISF, pers. comm.).

Other current developments relate to the MFRI asking the MII to adopt a move in rule when any coral is noted in the nets (ISF, pers. comm.).

There are thus measures in place that are expected to achieve the Habitat Outcome 80 level of performance and SG 60 is met for all UoAs.

Bottom and *Nephrops* Trawls

		The Icelandic management strategy for marine habitats in general, and VMEs in particular, is mainly implemented through a system of closed areas which effectively prevent both bottom trawls and *Nephrops* trawls from being used in known areas of cold-water coral concentrations along the edge of the continental shelf. Nephrops trawl are not allowed to operate shallower than 55 fathoms. Bottom trawl must be outside 3 nautical miles, but there is no limit re depth of operation (DF, pers. comm.). A known hydrothermal vent area is also closed to trawling. This represents a partial strategy for cold water corals and hydrothermal vents, but is not yet in place for coral gardens or sponge concentrations, and does not meet SG80 for these two VME types. Iceland is a Contracting Party to the North East Atlantic Fisheries Commission (NEAFC). In 2014 NEAFC adopted Recommendation 19 (amended in 2015) that requires vessels to move 2 nautical miles away from trawl tracks when encountering "the presence of more than 30 kg of live coral and/or 400 kg of live sponge of VME indicators". Icelandic vessels abide by commonly accepted move-on rules when encountering VMEs, however these remain informal. As a consequence the UoAs bottom trawl and Nephrops trawl score at SG60 level and a condition has been imposed, which is harmonised with the ISF anglerfish and ISF Icelandic cod, haddock and Greenland halibut assessments. Danish seine Large areas of Icelandic waters are closed for fishing, some of them temporarily (hours per day, days in total or seasonal) and others permanently (years). Danish seine vessels have a range of restrictions on aerial operation, including limits of operation within some fjords, gear restrictions include no use of otter doors (see Regulation 1062/2013 for fjord restrictions). Areas are usually closed for fishing with different gear types due to the presence of juvenile fish over extended periods of time or in order to protect spawning grounds. Although area closures are aimed at protecting juvenile fish, the measures have a secondary effect, i.e. protecting seabed habitats from being damaged by fishing activities. Given the lower impact of Danish seine on bottom habitats, no specific strategy is considered necessary in this case and SG80 is met. However, it is not a full strategy with a comprehensive management plan supported by a comprehensive impact assessment and based upon full EEZ habitat mapping. Consequenctly SG 100 is not met. Scoring has been harmonised with previous MSC assessments of these gears, including most recently the ISF anglerfish and ISF cod and haddock (Icelandic UoAs) fishery assessments.
b	Management strategy evaluation	
	Guidepost	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.
	Met?	TB Y / TB N / TB N TN Y / TN N / TN N SD Y / SD Y / SD N
	Justification	Bottom and *Nephrops* trawls The measures in place for all VMEs and habitat types encountered e.g. closed areas for bottom gears are well proven to be effective, providing plausible argument that the measures/partial strategy are considered likely to work. Therefore it is considered that this meets SG60. These have been investigated in detail for cold water corals and which provides objective basis for confidence that closed areas are appropriate for this VME. It is acknowledged that

		this partial strategy is subject to a condition for soft corals and sponges (see 2.4.1a above), which harmonises with previous MSC assessments including ISF anglerfish, ISF cod and haddock, ISF Iceland golden redfish and the ISF Iceland saithe & ling fisheries. As such this under implementation and does not yet provide objective basis for confidence that it will work, as it is not yet a current measure. Therefore it is considered that SG80 is not met. Danish seine Large areas of Icelandic waters are closed for fishing, some of them temporarily (hours per day, days in total or seasonal) and others permanently (years). Areas are usually closed for fishing with different gear types due to the presence of juvenile fish over extended periods of time or in order to protect spawning grounds. Although area closures are aimed at protecting juvenile fish, the measures have a secondary effect, i.e. protecting seabed habitats from being damaged by fishing activities. Closed areas are widely adopted as fisheries management measures to protect benthic habitats. Combined with the known limited impacts of Danish seine on benthic habitats, the team considers that there is some objective basis for confidence that the measures will work, based on information directly about the UoA and habitats involved. This meets SG80. However, there is no comprehensive management plan supported by an impact assessment and testing based on information directly about the UoAs and habitats involved, so SG 100 is not met. Scoring has been harmonised with previous MSC assessments of these gears, including most recently the ISF anglerfish and ISF cod and haddock (Icelandic UoAs) fishery assessments.				
c	Management strategy implementation					
	Guidepost		There is some quantitative evidence that the measures/partial strategy is being implemented successfully.		There is clear quantitative evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).	
	Met?		TB	Y	TB	N
			TN	Y	TN	N
			SD	Y	SD	N
	Justification	All gears Operation of all Icelandic fishing vessels is monitored by VMS and AIS and the MFRI has access to electronic logbooks for scientific purposes (high resolution data). During site visits the DF has confirmed that vessels respect area closures, both with regards to areas closed to protected sensitive habitats such as *Lophelia* reefs and areas closed to protect juvenile fish / spawning grounds (which have the additional benefit of protecting bethic habitats). It is considered that there is thus some quantitative information that the partial strategy is being implemented successfully, especially for Lophelia reefs. SG 80 is met. However, as yet there is no clear quantitative evidence that the partial strategy is being implemented successfully for all habitat types and VMEs; SG 100 is not met. Scoring has been harmonised with previous MSc assessments of these gears, including most recently the ISF anglerfish and ISF cod and haddock (Icelandic UoAs) fishery assessments.				
d	**Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs**					
	Guidepost	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		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.		measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	
	Met?	TB	Y	TB	Y	TB	N
		TN	Y	TN	Y	TN	N
		SD	Y	SD	Y	SD	N
	Justification	Bottom and *Nephrops* trawls VMS, AIS and other effort distribution information confirms that fishing vessels avoid closed areas and thus these are not subject to disturbance. Based on stakeholder consultation with MFRI, ISF and vessel skipper, the move-on rules for occasions when habitat fragments/parts are brought on board are well understood. Therefore it is considered that this meets SG 80. Whilst there is full VMS and AIS coverage of all gear types impacting these habitats, and known cold water coral areas are now well protected, there is no clear quantitative evidence that the UoAs considered in the present assessment, or other similar MSC UoAs (e.g. Icelandic anglerfish, cod, halibut, golden redfish, saithe, ling), fully comply with both their management requirements and with protection measures afforded to coral garden and deep-sea sponge VMEs. SG 100 is not met. Danish seine Given the known levels of effort, and the low levels of observed impact on habitats, this achieved SG 80. However, there is no clear quantitative evidence that Danish seine, or other similar MSC UoAs (e.g. Icelandic cod, halibut, golden redfish, saithe, ling), fully comply with both their management requirements and with protection measures for all habitats. SG 100 is not met. Scoring has been harmonised with previous MSc assessments of these gears, including most recently the ISF anglerfish and ISF cod and haddock (Icelandic UoAs) fishery assessments.					
References		Ministry of Environment 2010; OSPAR 2008a; OSPAR 2008b; OSPAR 2013.					

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**70**
	***Nephrops* trawl**	**70**
	Danish Seine	**80**
CONDITION NUMBER (if relevant):		**3**

PI 2.4.3 Evaluation Table for Habitats information

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			
	Guidepost	The types and distribution of the main habitats are broadly understood.	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.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	Met?	Y	Y	N
	Justification	Since the Icelandic system for collecting data on the distribution of habitats and fishing effort does not vary in its general form according to habitat type or fishery, the rationale below considers the information available in general, covering all types of habitat. All gears The BIOICE (Benthic Invertebrates of Icelandic waters) program was in operation in 1992-2004, and had the aim of producing a basic inventory of benthic fauna within Icelandic territorial waters. The objectives were to map the distribution of benthic invertebrates within the Icelandic EEZ, and to evaluate the species composition and biodiversity. Extensive sampling took place within Icelandic waters to achieve the project's objectives; in total, 1050 samples at 579 stations were collected during 19 cruises at depths between 20 - 3000 m (Omarsdottir et al., 2013). Benthic samples have been collected from a variety of habitats, characterised by a range of temperature conditions (12° to -0.9°C) using a variety of sampling gear including benthic sleds, trawling, sediment sampling and deep-sea photographs. The BIOICE project has provided information on the benthic invertebrates in Icelandic waters, from which the nature, distribution and vulnerability of habitats can be inferred. Following the BIOICE project, the IceAGE (Icelandic Animals, Genetics and Ecology) project has been providing information on benthic habitats around Iceland. The objectives of this project are to evaluate changes in species distributions in Icelandic waters due to temperature changes (Astthorsson et al., 2007), to use current data as well as the earlier BIOICE data to model the distributions of benthic organisms (see also Meißner et al., 2014), and to collect genetic samples in order to increase the available information on species identification (Omarsdottir et al., 2013). Independent of these projects, ROVs have also been used for habitat mapping, and the MFRI has identified areas of vulnerable benthic habitats in Icelandic waters (cold water corals, areas with aggregations of large sponge, distribution of soft coral and coral gardens, distribution of maerl beds) in relation to bottom trawl fishing activities (Steingrímsson and Einarsson 2004, Garcia et al. 2006). The MFRI is currently carrying out a number of research activities in order to continue mapping benthic habitats in Icelandic waters (biology and geology, using multibeam echo sounder), and studying the interaction between fish and cold water coral habitats: • The CoralFISHproject (http://eu-fp7-coralfish.net/) was recently completed and a report detailing the CoralFISH project is in progress. Two manuscripts from the CoralFISH project will be submitted soon, one comparing fish communities inside and outside cold-water coral habitats based on longline catches, and another examining bottom fishing activities. A manuscript on coral habitat classification observed during this project has furthermore been submitted (MFRI pers. communication). • Since 2015, the bycatch of invertebrates is being monitored during the annual autumn ground fish survey in deep water carried out by MFRI. All invertebrates in the catch are identified by benthologist in those trawls observed; half of the trawls are currently observed. This data will give considerable amount of information on		

<table>
<tr><td colspan="2">PI 2.4.3</td><td colspan="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.</td></tr>
<tr><td></td><td></td><td colspan="3">benthos, including sponges and corals, as well as other species vulnerable to fishing (MFRI pers. communication).
• In 2016, MFRI conducted a specific survey with the primary objective to map, and explore possible different habitat areas in several locations north and south of Iceland. This survey was a part of general mapping of habitats within Icelandic waters where previous surveys targeted areas where high abundance of vulnerable species, particularly coral, were reported (MFRI, pers. communication).
• In 2018 - ongoing, several potential vent sites on the Reykjanes Ridge will be surveyed (MFRI, pers. communication).

To date ca. 12% of the entire Iceland EEZ habitats has been mapped in detail using multi-beam echo-sounders (Burgos et al., 2014), and the intention is to map the entire EEZ by 2029. To supplement research, data models have been developed to predict the distribution of corals on the Icelandic shelf (Burgos et al, 2014).
Overall, it is considered that nature, distribution and vulnerability of the main habitats are known at a level of detail relevant to the scale and intensity of the UoA, so SG 80 is met. Detailed habitat maps are not yet available for the entire Icelandic EEZ, so SG 100 is not met.</td></tr>
<tr><td>b</td><td colspan="4">Information adequacy for assessment of impacts</td></tr>
<tr><td></td><td>Guidepost</td><td>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.</td><td>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 location of use of the fishing gear.</td><td>The physical impacts of the gear on all habitats have been quantified fully.</td></tr>
<tr><td></td><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td></td><td>Justification</td><td colspan="3">All gears
Information is available on the distribution of benthic habitats in Icelandic waters (see section 3.4.8). All Icelandic vessels carry VMS and AIS, regardless of vessel size. Through VMS and AIS there is detailed information on the distribution of fishing effort of the UoAs under assessment around Iceland (see section 3.4.8), and the VMS / AIS data is available for scientific purposes. Detailed maps showing the distribution of fishing grounds for important target species are available (MFRI, 2017c). The UoA's footprints can thus be identified. Catches of VME indicator organisms are monitored in scientific surveys carried out annually by the MFRI and closed areas have been established to protect certain VMEs (see Figure 3-21). Information is thus 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 location of use of the fishing gear. SG 80 is met.
Although the physical impacts of fishing gears have in some cases been investigated in detail (e.g. Thorarinsdóttir et al. 2010), it cannot be said that the physical impacts of the gear on all habitats they encounter have been quantified fully. SG100 is not met.</td></tr>
</table>

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.		
c	Monitoring			
	Guidepost		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in habitat distributions over time are measured.
	Met?		Y	Y
	Justification	All gears The area coverage of the assessed fisheries is monitored through logbooks, VMS, and AIS thus their spatial distribution is known in relation to the main habitats. The habitat mapping by MFRI is ongoing as described above, together with studies on the ecological function of vulnerable habitats (e.g. CoralFISH project, 2008). Recently a project was established that collects data on benthic bycatch in the MFRI autumn survey. This data will provide information on the temporal trends in the state of benthic communities and habitats and thus can be used for monitoring purposes and to assess changes in habitat distributions over time. SG 100 is met.		
References		Burgos et al, 2014; Garcia et al. 2006; Steingrímsson and Einarsson 2004; Thorarinsdóttir et al. 2010.		
OVERALL PERFORMANCE INDICATOR SCORE: ALL GEARS				85
CONDITION NUMBER (if relevant):				

PI 2.5.1 Evaluation Table for 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			
	Guidepost	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?	Y	Y	Y
	Justification	All gears Lemon sole is found all around Iceland, but the highest abundance and the main fishing grounds are off the West and Southwest coast. Lemon sole is a demersal and shallow water species, mainly found on a sandy or gravel substrate and occurring mostly at 20-200 m depths. The general fishing grounds for lemon sole are on the west and south coasts. Hardly any catch is recorded north and east of Iceland. No obvious changes are observed in the general distribution of the fishing grounds in recent years. Over the past 30 years the lemon sole fishery has ranged from less than 0.4 kt (1985) to 2.7 kt (2006) and more recently 1.7 kt (2016). Over the same time period the estimated biomass index has fluctuated substantially; biomass is currently relatively high, but fluctuating since 2003 (MRI, 2017). Despite this variation in both stock size and catch levels, there is no indication that the Icelandic marine ecosystem *per se* has been affected by the lemon sole		

PI 2.5.1		The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.
		fishery, which is mainly limited to fishing grounds off the West and Southwest coasts of Iceland. Extensive studies on the feeding ecology of a large number of fish species, marine mammals and seabirds have in fact shown that capelin (*Mallotus villosus*) is a key prey species, and cod (Gadus morhua) is a major fish predator in the marine ecosystem around Iceland (MRI, 1997). Research on lemon sole diet composition has found that this species feeds on a variety of benthic prey including zoobenthos, mollusks, echinoderms, sponges and crustacea. Lemon sole are preyed upon by a variety of fish and marine mammal species including cod, whiting, anglerfish and harbour seal. Overall, lemon sole are not thought to be a key prey species for any particular piscivorous fish, mammal or bird, although they may be taken opportunistically by a range of predators. The lemon sole fishery has little effect on capelin or cod population (see also PI 2.1.1 primary species). None of the other retained species are considered as key prey items and lemon sole are not caught in vulnerable habitats. Instead there is evidence that the key driving factor for ecosystem change in Iceland is abiotic (Valdimarsson et al. 2012), driven by climatic variation e.g. North Atlantic Oscillation (NAO) and an overall trend towards warmer waters around Iceland. Therefore the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure with evidence available based on information about lemon sole ecology and the Icelandic marine ecosystem, as is exaplained above. SG100 is met for all gears.
References		Best 1999; Choisy and Jones 1983; MRI 1997; MFRI 2017; Valdimarsson et al. 2012.
OVERALL PERFORMANCE INDICATOR SCORE: ALL GEARS		**100**
CONDITION NUMBER (if relevant):		

PI 2.5.2 Evaluation Table for 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			
	Guidepost	There are measures in place, if necessary which take into account the potential impacts of the fishery 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?	Y	Y	Y
	Justification	All gears The Icelandic authorities have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which impact less on marine ecosystems, and which aim to protect vulnerable benthic ecosystems (Ministry of the Environment 2010).This strategic plan gives managers a framework within which to take action if evidence suggested that lemon sole fishery, or any other fishery, might pose a risk or harm to ecosystem structure and function (Ministry of the Environment 2010). Moreover, the Icelandic Fisheries Management Act constitutes a strategy with measures to address all main impacts of the UoA on the ecosystem. The objective of the Act is to promote conservation and efficient utilization of marine stocks. The Icelandic strategy is composed of three main elements: (1) closed areas: closed areas have been long-established for both bottom trawl and longlines fishing fleets, which has provided protection for VMEs in particular; (2) multi-species stock management: trophic relationships between key predatory commercial species such as cod with commercial prey species such as capelin are known and integrated into fisheries management planning; and (3) key target species management: considerations include discard and other mortality, environmental changes on target stocks, multi-species considerations in mixed fisheries, physical environmental issues related to area and gear; and the understanding of ecosystem components by species / stock complexes. In order to provide the required scientific information the MFRI carries out wide ranging and extensive research on the status and productivity of commercial stocks, and long-term research on the marine environment and the ecosystem around Iceland. The results of this research are the foundations of the advice on sustainable catch levels of fish stocks (e.g. MRI, 2016), and the designation of closed areas to protect critical as well as sensitive habitats such as VMEs. There is evidence that at least some of these measures are in place since the Icelandic Coast Guard monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing and inspection of mesh sizes and other gear related practices. Inspectors may accompany fishing vessels during fishing trips or board the vessels to check their cargo and fishing gear; masters must provide them with assistance. Violation against the provisions of the Fisheries Management Act is liable to fines, regardless of whether committed deliberately or through negligence. The quota system itself has been demonstrated to work, and the Directorate of Fisheries catch database would provide evidence if the assessed fisheries were to catch significant amount of key ecosystem species. SG 100 is met for all gears.		
b	Management strategy evaluation			

	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems).	There is some objective basis for confidence that the measures/partial strategy will work, based on some information directly about the UoA and/or the ecosystem involved	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or ecosystem involved
	Met?	Y	Y	N
	Justification	All gears The main measures - the closed areas (to protect juvenile and spawning fish as well as vulnerable habitats), multi-species stock management and key target species management through the quota system (which includes species of key importance to the ecosystem such as capelin and cod) - are all widely adopted and proven methods in fisheries management. These measures are considered likely to work and SG 60 is met for all gears. Climate variability during the 20th century has affected the marine ecosystem in Icelandic waters and variations of environmental conditions have caused changes in the abundance and distribution of many fish stocks as well as other components of the Icelandic marine ecosystem. This is understood and its impact on species are an ongoing area of research. Benthic surveys, stock assessments, primary productivity surveys, and ecosystem modelling are carried out on a routine basis and provide an objective basis for confidence that the strategy will work to ensure the UoA does not pose a risk of serious or irreversible harm to overall ecosystem structure and function. SG 80 is met for all gears. The available information showes that there is still some uncertainty over the effectiveness of the strategy in protecting certain sensitive communities (e.g. soft corals and sponges) from bottom / *Nephrops* trawling, so SG 100 is not met for the gears which impact these habitats. Although there have been studies evaluating the impacts of Danish seine fishing on benthic habitats in Icelandic waters, there has been no testing of the strategy in place to manage all ecosystem impacts of this gear, and as such it cannot be concluded that there is high confidence that the current strategy will work. SG 100 is not met.		
c	Management strategy implementation			
	Guidepost		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?		Y	N
	Justification	All gears The main measures - closed areas, multi-species stock management and key target species management - have all been implemented though various means, such as regulation (esp. closed areas), a ban on most discards, and real time quotas for key species. Control and enforcement of these measures is also strong, with widespread use of VMS, AIS at sea and port surveillance and controls, with resultant levels of high compliance. Evidence is provided in the form of regular stock assessments, monitoring control and surveillance reviews, and high compliance levels. There is thus some evidence that the strategy is being implemented successfully. SG 80 is met. Clear evidence that the strategy is being implemented successfully and is achieving its objectives is not available. The strategy is focussed mainly on managing commercial species (including the ecosystem structures and functions required by such commercial species), but less emphasis is placed on managing impacts on vulnerable species and habitats. In		

		particular uncertainties remain over the effectiveness in protecting certain benthic communities from bottom / *Nephrops* trawling. SG 100 is not met.
References		Ministry of the Environment 2010; MRI 2016.
OVERALL PERFORMANCE INDICATOR SCORE:		**85**
CONDITION NUMBER (if relevant):		

PI 2.5.3 Evaluation Table for 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			
	Guidepost	Information is adequate to identify the key elements of the ecosystem.	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Y	Y	
	Justification	All gears Extensive studies have been conducted on the marine ecosystems of Icelandic waters (e.g. Astthorsson et.al., 2007; Valdimarsson & Jónsson, 2007; ICES, 2017). Studies on the feeding ecology of a large number of fish species, marine mammals and seabirds have provided information on the ecological function of most of the species caught by the assessed fisheries. These studies have shown that capelin is a key prey species in the Icelandic waters ecosystems. Biomass estimates for stocks of fish, whales and seabirds in Icelandic waters and production estimates of *Calanus* spp. and other zooplankton species have been used to calculate the biomass of individual components in the Icelandic marine ecosystem (Astthorsson et al. 2007). As a result, there is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters, and this information is used in multi-species modelling (e.g. GADGET models; see MRI 2016 for an overview of stocks recently modelled by multi-species models) in MRI assessments. The models have been used to evaluate interactions between fisheries and key ecosystem elements. Information about these interactions have been taken into account for management purposes. This meets SG80.		
b	Investigation of UoA impacts			
	Guidepost	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?	Y	Y	N
	Justification	All gears The Directorate of Fisheries database provides detailed information on catches of target and retained species. This provides information about the impact of the assessed fishery on the populations of non-target species involved, and would provide evidence of impact if any key ecosystem species were affected. The main impacts of the UoAs on bottom habitats and trophic structures can also be inferred from the existing information. Many interactions between fisheries and key ecosystem elements have been investigated in detail, especially trophic interactions with key predator - prey relationships, and with bottom substrates. In particular, there is a high level of spatial and temporal information on most forms of fishing and captures. SG80 is met.		

		Based on the available information it can be inferred that lemon sole is not a key ecosystem species and the UoAs are not impacting key ecosystem elements. However, the main interactions between the UoA and ecosystem elements have not all been investigated in detail. SG 100 is not met.				
c	Understanding of component functions					
	Guidepost		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?		TB	Y	TB	N
			TN	Y	TN	N
			SD	Y	SD	Y
	Justification	All gears There is a comprehensive understanding of the key elements of the ecosystems of Icelandic waters, and the relationships between predators, prey and habitats are known (e.g. Astthorsson et al., 2007; MRI, 1997; Valdimarsson & Jónsson 2007; ICES 2017). Although lemon sole is not a key ecosystem element in Icelandic waters, it's biology and ecology is well known (FAO, 2018, Seafish, 2017). The main functions of the relevant primary, secondary, and ETP species caught by the UoAs as well as the habitats where fishing is taking place are also known SG80 is thus met for all gears. Bottom trawl and *Nephrops* trawl The impacts of bottom trawlers and Nephrops trawlers on P1 target species, primary, secondary and ETP species and habitats are generally known, in particularly when it comes to impacts on *Lophlia* reefs. However impacts of these gears on soft corals and deep-water sponges have yet to be studied in detail, so SG 100 is not met. Danish seine The Directorate of Fisheries database provides quantitative information on retained species taken by the assessed fishery, logbook monitoring of marine mammal and seabird bycatch is mandatory and supplemented with information from onboard observations, and detailed information is available on habitats impacted by fishing activities. The distribution of fishing effort and landings in particular are recorded accurately and analysed on an annual basis. Based on the available information the impacts of the UoA on relevant ecosystem components can be identified. There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters, and this information is used in multi-species modelling (BORMICON and GADGET models) for MFRI assessments. The models have been used to evaluate interactions between fisheries and key ecosystem elements and information about these interactions have been taken into account for management purposes (e.g. Pálsson 1997, Stefánsson and Pálsson 1998, Stefánsson 2003, Barbaro et al. 2008). SG 100 is met.				
d	Information relevance					
	Guidepost		Adequate information is available on the impacts of the UoA on these components to allow some of the main consequences		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.	

			for the ecosystem to be inferred.	
	Met?		Y	Y
	Justification	All gears Adequate information on the impacts - in terms of severity, duration and spatial location - of all the UoAs on the components is recorded through the use of logbooks, VMS / AIS tracking, monitoring of landings, and onboard observations. Information on by-catch of secondary and ETP species has improved conseriderably in recent years and is expected to improve further. The role of non-target catches and habitats in the wider Icelandic ecosystem is known through scientific studies, which are routinely carried out in Iceland. Based on this information some of the main consequences for the ecosystem can be inferred. SG80 is met. A considerable number of studies have been carried out to elucidate the main ecosystem drivers within the Icelandic marine ecosystem, including studies of trophic interactions, the impact of climatic and other abiotic factors and ecosystem modelling (see main report, sections 3.4.1 and 3.4.9 for details). As a result there is a comprehensive understanding of the key elements of Icelandic marine ecosystems. UoA impacts on the components (non-target catches including ETP species and habitats) are known, and the resulting main consequences for the Icelandic ecosystem can be inferred. SG100 is met.		
e	Monitoring			
	Guidepost		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?		Y	N
	Justification	All gears Iceland has a comprehensive set of on-going scientific research programmes, and fisheries are monitored through a variety of means. Regular estimates of primary productivity are undertaken, and research on environmental forcing pressures such as climate change is ongoing. Stock assessments of key commercial species are undertaken on a regular basis, and the stock status of species with key ecosystem importance such as capelin and cod is well known. Data on landed catch is instantly entered in the Directorate of Fisheries database. Surveillance by the Directorate of Fisheries and Coast Guard is constantly monitoring catch levels of juvenile fish, and such information is utilised to implement real-time area closures to protect juvenile fish. Efforts to improve information on bycatch of marine mammals and seabirds have been stepped up in recent years by introducing a revised electronic logbook (now specifically requesting information on such bycatch), and by increasing coverage through onboard observations. The MFRI has recently started recording benthic bycatch in scientific surveys on an annual basis, and there is a commitment to map the entire EEZ seabed in the next 10 years. Coupled with monitoring of fishing effort distributions based on VMS / AIS data such information will allow for the detection of any increase in risk level to habitats, and SG80 is met for all gears. The strategy is provided by the Fisheries Management Act as well as a strategic plan to preserve biodiversity in Icelandic waters (Ministry of the Environment 2010). The main drivers of the Icelandic marine ecosystem are well understood, and sufficient data is collected to allow the consequences of fishing on the ecosystem to be inferred. However the information is incomplete, and as such SG 100 is not met.		
References		Astthorsson et.al. 2007; Barbaro et al. 2008; ICES 2017; MRI 1997; Ministry of the Environment 2010; MRI 2016; Pálsson 1997; Stefánsson and Pálsson 1998; Stefánsson 2003; Valdimarsson & Jónsson 2007. FAO, 2018, Seafish, 2017.		
OVERALL PERFORMANCE INDICATOR SCORE:				

	Bottom trawl	**85**
	***Nephrops* trawl**	**85**
	Danish Seine	**90**
CONDITION NUMBER (if relevant):		

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); and** • **Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and** • **Incorporates an appropriate dispute resolution framework.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Compatibility of laws or standards with effective management			
	Guidepost	There is an effective national legal system and a framework for cooperation with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2	There is an effective national legal system and **organised and effective cooperation** with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2.	There is an effective national legal system and binding procedures governing cooperation with other parties which delivers management outcomes consistent with MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	Iceland has a well-established system for fisheries management in place, now codified in the 1990 Act on Fisheries Management, amended in 2006 (Fisheries Management Act). The Act details procedures for the determination of TAC (Art. 3) and allocation of harvest rights, including permits and catch quotas (Art. 4–14). It also lays out the system for individual transferable quotas in some detail (Art. 15), as well as procedures for monitoring, control and surveillance (Art. 16–18) and the application of sanctions (Art. 24–27). Further provisions are provided in a number of other acts, such as the 1997 Act on Fishing in Iceland's Exclusive Fishing Zone and the 1996 Act concerning the Treatment of Commercial Marine Stocks, as well as in regulations at lower levels of the legal hierarchy, issued by the relevant management authorities. Iceland is also signatory to, and has ratified, the major international agreements pertaining to fisheries management, such as the 1982 Law of the Sea Convention and the 1995 Fish Stocks Agreement. Fishing by foreign vessels is regulated by the 1998 Act on Fishing and Processing by Foreign Vessels in Iceland's Exclusive Economic Zone. Icelandic vessels' fishing outside Icelandic the Icelandic EEZ is regulated by the 1996 Act on Fishing outside of Icelandic Jurisdiction. The Ministry of Industries and Innovation (Atvinnuvega- og nýsköpunarráðuneytið) – which has two ministers: one for Tourism and Innovation and one for Fisheries and Agriculture – is the policy-making body in Icelandic fisheries management and sets annual TAC based on scientific recommendations from the Marine Research Institute (Hafrannsóknastofnun). The Minister of Fisheries and Agriculture, in turn, is responsible for two departments: one on fisheries and aquaculture and one for food and agriculture. The Directorate of Fisheries (Fiskistofa) is the implementing body within the management system, formally subordinate to the Ministry as an agency. It issues fishing licenses, allocates annual vessel quotas and oversees the daily operation of the individual transferable quota system. The Directorate is also responsible for monitoring, control and surveillance, in cooperation with the Coast Guard (Landhelgisgæsla Íslands), which is a civilian law enforcement agency under the Ministry of the Interior (see PI 3.2.3 below). Through the Fisheries Management Act, other relevant acts and regulations issued by the Ministry and the Directorate, binding procedures for cooperation between the different governmental agencies involved are in place, able to provide management outcomes that are consistent with MSC Principles 1 and 2. SG 100 is met.		

b	Resolution of disputes			
	Guidepost	The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system.	The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the 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?	Y	Y	Y
	Justification	There is an effective, transparent dispute resolution mechanism in place in Iceland, 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. The proceedings of the courts are open to the public and the rulings are easily accessible on the internet. Although rare, there have been examples of fishers taking their case to court, and the system has proven effective in resolving disputes in a timely manner. In practice, however, the vast majority of disputes are resolved within the management system, which incorporates ample formal and informal opportunities for fishers and other stakeholders to interact with the authorities (see SI 3.1.2 b) below), e.g. to clear out disagreement and conflict among users and between users and authorities. SG 100 is met.		
c	Respect for rights			
	Guidepost	The management system has a mechanism to generally respect the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	Iceland is highly dependent on fisheries, and the rights of traditional users were in the main secured when individual transferable quotas were introduced on the basis of historical fishing. One of the main objectives of Icelandic fisheries management, in addition to conservation and efficient utilization of marine living resources (see PI 3.1.3 below), is to ensure stable employment and settlement throughout Iceland. According to the Fisheries Management Act (Art. 10), the Minister of Fisheries each fishing year shall have available harvest rights amounting to up to 12,000 tonnes which he or she may use to offset major economic or social disturbances that may occur in times of sizeable fluctuations in catch quotas, or for regional support to smaller communities that have experienced significant reduction in employment as a result of unexpected cutbacks in quotas. Such additional quotas can be allocated for up to three years at a time. The Act (Art. 6) further grants all citizens the right to fish in Icelandic waters provided the catch is for their own consumption. Overall, distribution of harvest rights is considered to be consistent with the social and cultural context of Icelandic fisheries. Since the legal rights of people dependent on fishing are given by law, which is second in the legal hierarchy after the Constitution, the management system has formally committed to them. SG 100 is met.		
References	Act on Fishing in Iceland's Exclusive Fishing Zone No. 79/1997.			

	Act on Fisheries Management No. 38/1999, amended as Act No. 116/2006. Act on Fishing and Processing by Foreign Vessels in Iceland's Exclusive Economic Zone No. 28/1998. Act concerning the Treatment of Commercial Marine Stocks No. 57/1996. Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stocks Agreement), 1995. Arnason, R. (2005), 'Property rights in fisheries: Iceland's experience with ITQs', Review of Fish Biology and Fisheries 15: 243–264. Danielsson, A. (1997), 'Fisheries management in Iceland', Ocean & Coastal Management 35: 121–135. Eythórsson, E. (2000), 'A decade of ITQ-management in Icelandic fisheries: consolidation without consensus', Marine Policy 24: 483–492. Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industries and Innovation during the site visit. United Nations Convention on the Law of the Sea, 1982. Websites of the Directorate of Fisheries (www.fiskistofa.is) and the Ministry of Industries and Innovation (www.stjornarradid.is).
OVERALL PERFORMANCE INDICATOR SCORE:	**100**
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			
	Guidepost	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction.	Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction.
	Met?	Y	Y	Y
	Justification	The functions, roles and responsibilities of all actors in the Icelandic system for fisheries management are explicitly defined in the Fisheries Management Act and supporting legislation and are, according to our interviews during site visit, well understood for all areas of responsibility and interaction. As laid out under SI 3.1.1 a) above, governance functions are split between the Ministry of Industries and Innovation, the Directorate of Fisheries, the Marine Research Institute and the Coast Guard. Different user groups are well integrated in the management process; see SI 3.1.2 b) below. The joined-up approach to fisheries management in Iceland is exemplified by the joint Statement on Responsible Fisheries signed by the key parties in 2007. SG 100 is met.		
b	Consultation processes			
	Guidepost	The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained.	The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used.
	Met?	Y	Y	N
	Justification	Iceland has a long tradition of continuous consultation and close cooperation between government agencies and user-group organizations. As emphasized by stakeholders interviewed during the site visit, lines of communication are short in Iceland and much consultation takes place informally, in direct and often spontaneous contact between representatives of user groups and authorities. At a more formal level, all major interest organizations in the fishing industry are regularly invited to sit on committees established to review changes in legislation and management, and they meet for regular consultations with the Ministry, the Directorate and the Parliament's (Alþingi) Permanent Committee for Fisheries and Agriculture. These include, but are not restricted to, Fisheries Iceland (Samtök fyrirtækja í sjávarútvegi – SFS), which was established in 2014 as the result of a merger between two of the most influential user-groups in Icelandic fisheries: the Federation of Icelandic Fishing Vessel Owners and the Federation of Icelandic Fish Processing Plants. Other stakeholders include the National Association of Small Boat Owners and the Icelandic		

		Seamen's Federation. Local authorities also engage actively in fisheries issues and have easy access to the management system. All new legislation and major management initiatives are subject to public hearing, with drafts available online. There are no environmental NGOs in Iceland at the moment that target fisheries specifically. Major international NGOs that usually engage actively in discussions about fisheries management, such as Greenpeace and WWF, do not have offices in Iceland. Local NGOs tend to prioritize nature protection on land. One exception is BirdLife Iceland (Fuglavernd), which is, among other things, concerned with bird interaction in gillnet fisheries. Also, more generally oriented NGOs such as Icelandic Environmental Association (Landvernd) and Iceland Nature Conservation Association (Náttúruverndarsamtök Íslands) are engaged in marine issues more widely and provide input to public hearings. Their formal point of contact at the Icelandic Government is the Ministry of Industries and Innovation (MII). Consultation processes cover policies and regulatory issues, and also include discussions of the annual scientific recommendations by the Marine Research Institute. Shortly after presenting the recommendations to the Ministry, representatives of the Institute enter into dialogue with the fishing industry regarding the status of the stocks and the nature of the recommendations. The Ministry also consults with the industry before setting the final TACs. Hence, the management system includes consultation processes that regularly seek and accept relevant information, including local knowledge, and demonstrates consideration of the information obtained. SG 80 is met. The authorities normally explain to user groups how information is used or not used, formally or indirect informal communication. However, environmental NGOs find such explanation often lacking, according to interviews at the site visit. SG 100 is not met.		
c	Participation			
	Guidepost		The consultation process provides opportunity for all interested and affected parties to be involved.	The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.
	Met?		Y	N
	Justification	As follows from SI 3.1.2 b) above, the consultation processes provide opportunity for all interested and affected parties to be involved in discussions about fisheries management in Iceland, e.g. through public hearings. All stakeholders consulted at the site visit also report that it is easy to get a meeting with authorities, even at ministerial level. SG 80 is met. Authorities invite relevant stakeholders associated with the fishing industry to meetings and seminars and actively seek their opinion on management measures. Hence, they do not only provide opportunity but also encouragement for their participation and actively facilitate their effective engagement. The SG 100 requirement is met as far as user groups are concerned. However, this is not the case with environmental NGOs, which, according to interviews during the site visit, would have liked to see the authorities more actively encouraging and facilitating their participation. SG 100 is not met.		
References		Act on Fisheries Management No. 38/1999, amended as Act No. 116/2006. Arnason, R. (2005), 'Property rights in fisheries: Iceland's experience with ITQs', *Review of Fish Biology and Fisheries* 15: 243–264. Eythórsson, E. (2000), 'A decade of ITQ-management in Icelandic fisheries: consolidation without consensus', *Marine Policy* 24: 483–492. Interviews with representatives of the Directorate of Fisheries, Fuglavernd (BirdLife Iceland), Icelandic Sustainable Fisheries, Landvernd (Icelandic Environmental Association), the Ministry of Industries and Innovation and Náttúruverndarsamtök Íslands (Iceland Nature Conservation Association) during the site visit.		

	Kokorsch, M., Karlsdóttir, A. and Benediktsson, K. (2015), 'Improving or overturning the ITQ system? Views of stakeholders in Icelandic fisheries', *Maritime Studies* 14:15. Statement on Responsible Fisheries in Iceland (2007). http://www.fisheries.is/management/government-policy/responsible-fisheries/ Websites of the Directorate of Fisheries (www.fiskistofa.is), Fisheries Iceland (www.sfs.is) and the Ministry of Industries and Innovation (www.stjornarradid.is).
OVERALL PERFORMANCE INDICATOR SCORE:	**85**
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			
	Guidepost	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?	Y	Y	Y
	Justification	The objectives of Icelandic fisheries management, as stated in the Fisheries Management Act (Art. 1), are to ensure conservation and efficient utilization of marine living resources in the Icelandic EEZ; and, as stated in the Act concerning the Treatment of Commercial Marine Stocks, to encourage sustainable utilization of commercial marine stocks in order to ensure maximum long-term return for the Icelandic nation (Art. 1). The precautionary approach is not mentioned explicitly in either act, but the requirement to protect marine resources and take the best scientific knowledge into account (Fisheries Management Act, Art. 3), among other things, equals the requirements of the precautionary approach, as laid out in the FAO Code of Conduct. Since these principles are codified in formal law, their application is required by management policy. Iceland is also signatory to, and has ratified, the UN Fish Stocks Agreement, which requires the use of the precautionary approach. SG 100 is met.		
References		Act concerning the Treatment of Commercial Marine Stocks No. 57/1996, amended as Act No. 144/2008. Act on Fisheries Management No. 38/1999, amended as Act No. 116/2006. Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks (UN Fish Stocks Agreement), 1995. FAO Code of Conduct for Responsible Fisheries, 1995.		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
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			
	Guidepost	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?	Y	Y	P
	Justification	Well defined and measurable short and long-term objectives consistent with achieving the outcomes of MSC Principle 1 are explicit in the Fisheries Management Act and supporting legislation relating to the Icelandic lemon sole fishery, such as the overarching objective to maintain the stock at sustainable levels and the specific objectives defined in the regulatory framework to achieve this. SG 100 is met for P1. Short and long-term objectives related to P2 issues also exist (see the management PIs described under P2 above), so SG 80 is met for these as well. However, the P2 objectives are less well defined and measurable, so SG 100 is not met. Since this PI only has one SI, a partial score is allowed. With a 100 score for P1 objectives and an 80 score for P2 objectives, the final score is 90.		
References		Act on Fishing in Iceland's Exclusive Fishing Zone No. 79/1997. Act on Fisheries Management No. 38/1999, amended as Act No. 116/2006. Act on Fishing and Processing by Foreign Vessels in Iceland's Exclusive Economic Zone No. 28/1998. Act concerning the Treatment of Commercial Marine Stocks No. 57/1996.		
OVERALL PERFORMANCE INDICATOR SCORE:				**90**
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			
	Guidepost	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Y	Y	
	Justification	Established decision-making procedures in the Icelandic fisheries management system – evolved over several decades and now codified in the Fisheries Management Act and supporting legislation – ensure that strategies are produced and measures taken to achieve the fishery-specific objectives. This applies to the lemon sole fisheries as it does to Icelandic fisheries in general; see PIs 3.1.1 and 3.1.2 above. Measures include, among other things, the establishment of TACs on the basis of scientific advice, technical regulation of the fisheries (such as gear regulations) and closure of areas; cf. P1 and P2 above. SG 80 is met.		
b	Responsiveness of decision-making processes			
	Guidepost	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Y	Y	N
	Justification	According to our interviews during the site visit, the established decision-making procedures respond to serious and other important issues identified in research, monitoring, evaluation or by groups with an interest in the fishery. This is ensured through the formal and informal arenas for regular and ad hoc consultations between governmental agencies and the industry; cf. SIs 3.1.2 a) and 3.1.2 b) above. In addition, there is close contact between authorities and scientific research institutions. Both scientists and user-group representatives claim that the relevant government agencies are open to any kind of input at any time. They feel that the authorities' response to serious and other important issues is transparent and timely and that the ensuing policy options take adequate account of their advice. From the authorities' point of view, these consultations contribute to enhanced quality of decision-making and also to the legitimacy of the regulations. SG 80 is met. However, environmental NGOs consulted during the site visit express concern whether their input is adequately responded to by authorities (see SI 3.1.2 b) above), so it will be hard to claim that *all* issues are indeed responded to in an appropriate manner. SG 100 is not met.		

c	Use of precautionary approach			
	Guidepost		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Y	
	Justification	Decision-making processes are based on relevant scientific research by the Marine Research Institute, and national legislating requires the use of the precautionary approach, as operationalized in the FAO Code of Conduct for Responsible Fisheries (see PI 3.1.3 above). SG 80 is met.		
d	Accountability and transparency of management system and decision-making process			
	Guidepost	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?	Y	Y	N
	Justification	The Directorate of Fisheries and the Marine Research Institute produce annual reports that are available to the public on request and via their websites. In these reports, actions taken or not taken by the relevant authority are accounted for, including those proposed on the basis of information from research, monitoring, evaluation and review activity. This information is also conveyed at the frequent meetings between authorities and all interested stakeholders and, not least, on the website of the Directorate of Fisheries. The website contains detailed and updated information on quotas and catches broken down to individual vessels, species and gear, among other things. SG 80 is met. In order to meet SG100 for this SI, the information must be provided through 'formal reporting', and it must be 'comprehensive'. In the opinion of the assessment team, availability on the respective management authorities' websites counts as formal reporting appropriate to the context of the fishery, as much as written letters to stakeholders would have done. However, the reporting focuses less on by-catch and other ecosystem elements than on commercial species, so it is debatable whether it can be characterized as sufficiently comprehensive. SG 100 is not met.		
e	Approach to disputes			
	Guidepost	Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery.	The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges.	The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges.
	Met?	Y	Y	Y

	Justification	The national management authority is not subject to continuing court challenges. When occasionally taken to court by fishing companies, the management authority complies with the judicial decision in a timely manner. The management authority works proactively to avoid legal disputes through the tight cooperation with user-groups at the regulatory level, ensuring as high legitimacy as possible for regulations and other management decisions. Regulatory and enforcement authorities offer advice to the fleet on how to avoid infringements. Only the most serious cases go to prosecution by the police and possible transfer to the court system. SG 100 is met.
References		Act on Fisheries Management No. 38/1999, amended as Act No. 116/2006. Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industries and Innovation during the site visit. Websites of the Directorate of Fisheries (www.fiskistofa.is), the Marine Research Institute (www.hafro.is) and the Ministry of Industries and Innovation (www.stjornarradid.is).
OVERALL PERFORMANCE INDICATOR SCORE:		**85**
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			
	Guidepost	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?	Y	Y	N
	Justification	Monitoring, control and surveillance is taken care of by the Directorate of Fisheries, in collaboration with the Coast Guard, the Marine Research Institute and coastal municipalities. The enforcement system is based on reports from the vessels, physical inspections at sea and weighing in harbour, as well as information exchange with other states' enforcement authorities. The structure and procedures of the enforcement system are codified in the Fisheries Management Act (Art. 17–18), while requirements to the weighing system are laid out in the Act concerning the Treatment of Commercial Marine Stocks (Art. 5–12) and in the Regulation on Weighing and Recording of Catch. All Icelandic fishing vessels are required to keep an electronic logbook and report catches to the Directorate of Fisheries using an electronic recording and reporting system (ERS). AIS and VMS are obligatory for all vessels regardless of size, also inshore. Inspectors from the Directorate may accompany fishing vessels on trips or operate from Coast Guard vessels. The Coast Guard has three offshore patrol vessels, as well as a number of smaller boats, helicopters and a surveillance aircraft. At-sea inspections include control of the logbook, catch and gear. If a certain amount of the catch is found to be below size limit, the inspector can initiate a short-term close (usually two weeks) for the fishery of that particular species, vetted by the Marine Research Institute and confirmed by the Directorate of Fisheries.		

		Inspections are conducted using a risk-based framework ('business intelligence software') aimed at utilizing resources to optimize compliance at any given moment. Most importantly, 100 % of the landed fish is weighed by an authorized 'weighmaster', employed by the municipality and hence independent of both buyer and seller. Landing data are immediately added to the Directorate's catch database, where the reported quantities of fish are deducted from the vessel's quota. The Directorate operates a dynamic and interactive website, where stakeholders at all times can monitor the precise quota status for each species and observe the performance of individual vessels, their catch from each fishing trip and vessel quota status. The fact that the vast majority of catch is exported provides a further control mechanism enabling a mass balance comparison of fish in (i.e. landing declarations) with fish out (i.e. production or export volumes). Hence, a system for monitoring, control and surveillance has been implemented in the fishery and has demonstrated an ability to enforce relevant regulations; see SI 3.2.3 c) below on compliance in the fishery. SG 80 is met. However, in corroborating logbook data on ETP and out of scope species, there appears to be limited possibility of checking whether self-reported data are correct. SG 100 is not met.

b	Sanctions			
	Guidepost	Sanctions to deal with non-compliance exist and there is some evidence that they are applied.	Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence.	Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence.
	Met?	Y	Y	N
	Justification	The sanctioning system in Icelandic fisheries is codified in the Fisheries Management Act (Art. 24–27) and the Act concerning the Treatment of Commercial Marine Stocks (Art. 13–24). A system for graduated sanctions is applied. For a first-time offence, a warning ('reprimand') is given if the infringement is of a less serious nature (Fisheries Management Act, Art. 24). In the other end of the spectrum, serious or repeated deliberate violations can be liable to imprisonment of up to six years (Art. 25). Fines for first offences shall not exceed ISK 4,000,000,-, depending upon the nature and scope of the violation. Repeated offences shall be fined by a minimum of ISK 400,000 and a maximum of ISK 8,000,000,- (Art. 25). Withdrawal of fishing permit can be applied in a number of situations. As an example (cf. the Act concerning the Treatment of Commercial Marine Stocks, Art. 14), if information of the Directorate of Fisheries suggests that a vessel has caught in excess of its catch quotas for any species, the Directorate must notify this to the vessel operator and master of the vessel concerned, stating in addition that the vessel's commercial fishing permit is suspended on the fourth working day thereafter unless sufficient catch quotas have been transferred to the vessel within that time. If the recipient of the notification is of the opinion that the information of the Directorate of Fisheries concerning the vessel's catch is incorrect and that the vessel has not caught in excess of its catch quotas, he/she must convey such objections to the Directorate of Fisheries within three days. If a permit is suspended for the second time during the same fishing year due to catch exceeding catch quotas, the Directorate of Fisheries shall suspend a vessel's commercial fishing permit for two weeks in addition to the time resulting from the suspension provided for in the first paragraph, for six weeks if it occurs for the third time and for twelve weeks if it occurs more often. As another example (Fisheries Management Act, Art. 17), the Directorate of Fisheries shall suspend the commercial fishing permits of vessels failing to submit catch log books; such suspensions shall remain in force until submissions are received or explanations provided for the reasons for failure to submit. In the first instance of a violation which is liable to suspension of fishing permit, the suspension shall apply for at least one week and no longer than 12 weeks, depending upon the nature and scope of the violation. In the case of repeated violations, a suspension shall apply for at least four weeks and not longer than one year (Act concerning the Treatment of Commercial Marine Stocks, Art. 15). If a vessel's commercial fishing permit has repeatedly been suspended, as provided for in Articles 14 and 15 of this Act, the Directorate of Fisheries may decide that a fishing inspector shall be stationed aboard the vessel at the expense of the vessel operator for a specific period of up to two months. The vessel operation must then pay all cost arising from the presence of the fishing inspector aboard, including salary cost (Art. 16). If there is suspicion of more serious infringements, the case may be transferred to the Ministry (Art. 18) or to a court (Art. 20). All decisions on the suspension of harvest rights are to be made publicly available (Art. 21). Hence, sanctions to deal with non-compliance exist, are consistently applied and generally thought to provide effective deterrence. SG 80 is met. However, due to the limited possibilities to check whether self-reported data on ETP and out of scope catches are correct, it cannot be concluded that they demonstrably provide effective deterrence. SG 100 is not met.		

c	Compliance			
	Guidepost	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?	Y	Y	N
	Justification	According to the Directorate of Fisheries, the fishery under assessment is very clean; in recent years, no 'substantial' infringements (affecting the sustainability of the stock) have been detected, only a few 'technical' infringements such as forgetting to apply for the annual renewal of the fishing license. As follows from SI 3.2.3 a) above, Iceland has an MCS system in place for physical inspection of catches, through observers and spot checks at sea and, not least, 100 % coverage of independent landing checks. In addition to these coercive compliance mechanisms, various forms of norm-, legitimacy- and communication-related mechanisms have also proven to be effective in delivering compliance in fisheries. In Iceland, there is a degree of social control in the small coastal communities from which the fishery takes place ('neighbour watch'), and the high level of user-group involvement (see PI 3.1.2 above) may provide regulations with a degree of legitimacy that increases fishermen's inclination to comply with them. The same applies to the relationship between fishermen and enforcement officers, which is reported to be good, not least because the Coast Guard is not only policing the fishing ground; it is also the most important service provider and search and rescue operator at sea. Further, inspectors are reported to approach the fishermen in a respectful manner and provide guidance on how to avoid infringements, thus taking a more consultative role in addition to their traditional policing role towards the fishing fleet. The MSC Fisheries Standard does not give any specific guidance as to what level of compliance is required to conclude that fishers 'comply with the management system under assessment'. Nor would that be reasonable since the absence of infringements in inspection statistics might as well imply that inspectors are not competent (or willing) enough to detect non-compliance, or that they focus attention on those parts of the fishery where compliance is highest (contrary to the of the purpose of the risk-based control above). Hence, official compliance information can only give an indication, and must be seen in relation to other factors, such as the comprehensiveness of the enforcement system, the legitimacy of the management system as such, assumptions on the reliability of data provided by the enforcement authorities and other anecdotal evidence of compliance. It is the qualitative judgment of the assessment team that the requirement that fishers 'comply with the management system' is generally met in this fishery – this does not imply that infringements never take place (which is probably not the case in any fishery), but that most rules are generally respected. SG 80 is met. However, in corroborating logbook data on ETP and out of scope species, there appears to be limited possibility of checking whether self-reported data are correct. Therefore it cannot be concluded with a high degree of confidence that regulations are complied with. SSG 100 is not met. .		
d	Systematic non-compliance			
	Guidepost		There is no evidence of systematic non-compliance.	
	Met?		Y	
	Justification	According to the Directorate of Fisheries, there is no evidence of systematic non-compliance in the fishery. The assessment team has not come across information which would indicate such systematic non-compliance. SG 80 is met.		

References	Act on Fisheries Management No. 38/1990, amended as Act No. 116/2006. Act on the Icelandic Coast Guard No. 58/2006. Act concerning the Treatment of Commercial Marine Stocks No. 57/1996, amended as Act No. 144/2008. Annual report for the Directorate of Fisheries, 2016. Gezelius, S.S. (2012), Regulation and Compliance in the Atlantic Fisheries, Dordrecht: Springer. Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries, the Ministry of Industry and Innovation as well as individual fishermen during the site visit. Regulation No. 224, 14 March 2006, on Weighing and Recording of Catch. Websites of the Coast Guard (www.lhg.is) and the Directorate of Fisheries (www.fiskistofa.is).
OVERALL PERFORMANCE INDICATOR SCORE:	**80**
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			
	Guidepost	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?	Y	Y	N
	Justification	The Ministry of Industries and Innovation and the Fisheries Directorate report that there is a constant process of internal review and consultation, including of scientific advice, and that there is a patchwork review of technical regulations and enforcement measures. Regulatory measures taken by the Ministry and Directorate are continuously reviewed by the Icelandic Parliament, in committee hearings but more often at ad hoc meetings, which reflects that Iceland is a small and fishery-dependent country, with short lines of communication. The National Audit Office (Ríkisendurskoðun) is an independent body operating under the auspices of the Parliament, as part of the legislature's monitoring of the executive branch. In addition to traditional financial audits, the office conducts so-called performance reviews, aimed at evaluating the effectiveness of the executive's implementation of parliamentary decisions, including within fisheries management. Hence, key parts of the management system are subject to review, and SG 80 is met. It is a principal challenge to claim that 'all' parts of a fisheries management system are subject to review, but it seems reasonable to expect some sort of a formal and holistic evaluation of the system as such to be in place, which is not the case here. SG 100 is not met.		
b	Internal and/or external review			
	Guidepost	The fishery-specific management system is subject to occasional internal review.	The fishery-specific management system is subject to regular internal and occasional external review.	The fishery-specific management system is subject to regular internal and external review.
	Met?	Y	Y	N
	Justification	The fishery-specific management system is subject to various forms of internal self-evaluation within the Icelandic bodies of governance (see SI 3.2.4 a) above). These take place on a regular basis; hence the requirement for a 100 score is met as far as internal reviews are concerned. The system is also subject to parliamentarian control in hearings and, more importantly, through the performance reviews of the National Audit Office. These count as external since they are evaluations of the executive branch of government performed by an independent body on behalf of the legislature. SG 80 is met. In order to achieve a 100 score the external reviews have to be performed on a regular basis. While the National Audit Office monitors the working of the executive branch on a running basis, different ministries are prioritized at different times. The Office's Performance Audit Division operates according to a three-year priority schedule that is reviewed annually. The schedule defines the sectors and issues to which audits are to be directed during the period. The Ministry of Industry and Innovation is not among the four ministries prioritized in the first three-year period after the Office was reformed in 2016/2017. While it is a principal question how frequently evaluations have to be performed in order to count as 'regular' (as opposed to 'occasional'), it is too early to		

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.**
		conclude that external reviews of the fishery-specific management system are performed on a regular basis. SG 100 is not met.
References		Act on the Auditor General and the Auditing of Government Accounts No. 46/2016. Icelandic National Audit Office – Annual Report 2016. Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industry and Innovation during the site visit. Website of the National Audit Office (https://rikisendurskodun.is).
OVERALL PERFORMANCE INDICATOR SCORE:		**80**
CONDITION NUMBER (if relevant):		

Appendix 1.2: Risk Based Framework (RBF) Outputs

The Risk Based Framework (RBF) was planned to be used in this assessment for the scoring of Performance Indicator 2.2.1 (Secondary species outcome) for the lemon sole fishery unit of assessment (UoA).

However, having established the availability of catch statistics, the team decided to not use the RBF approach. Stakeholder notification of that decision was issued.

Appendix 1.3: Conditions, Recommendations and Client Action Plan

No conditions have been carried over from a previous assessment and no new conditions relate to previous conditions (FCR 7.24.2.2, 7.23.13.1, 7.23.13.2 (except 7.23.13.2.b)). However, three conditions as well as three recommendations have been raised which should harmonise with other assessments. These have been identified in the condition text.

The conditions were forwarded to the Client who submitted a plan of action to address those during the potential certification period.

Conditions

C1 - PI 1.2.2

Condition 1 **UoA: ISF Iceland lemon sole – All gears**	
Performance Indicator	**PI 1.2.2 There are well defined and effective harvest control rules in place** **SI a)** 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
Score	75
Rationale	The harvest control rule is based on calculating the TAC corresponding to a proxy of F_{MSY} in the latest stock assessment model. At least this part of the harvest control rule is well defined and is clearly consistent with the overall MSY-based harvest strategy. However, to what extent exploitation might be reduced as PRI is approached is not clear. The clear target exploitation levels required and delivered by the harvest control rules, together with the intention to reduce exploitation below the trigger point, meet the SG60. However, the lack of a well-defined response should the stock fall below the a trigger reference point prevents the SG80 being met.
Condition	A well-defined harvest control rule should be put in place that is consistent with the harvest strategy and defines how the exploitation rate will be reduced as the stock approaches the PRI. Evidence should be provided that the HCR is precautionary within 4 years.
Milestones	It is recognised that changes to the harvest control rule may require another benchmark assessment. Therefore, timing may need to fit into the MFRI stock assessment cycle. Year 1: Evidence is available indicating reassessment of the harvest control rule. Score 75. Year 2: Evidence is available indicating reassessment of the harvest control rule. Score 75. Year 3: Evidence is available indicating reassessment of the harvest control rule. Score 75. Year 4: A new harvest control rule is adopted that reduces exploitation as the limit reference point is approached. Score 80.
Client action plan	Year 1 & 2 actions Engage with MFRI and MII for establishing a harvest control rule (HCR) including how the exploitation rate will be reduced as the stock approaches the limit reference point. The client group shall engage with the MFRI and outline an approach to meeting the

	conditions imposed by the MSC Certification Requirements. The client group aims to establish a basis for developing improved strategies for the sustainable management of resources utilized by ISF vessels. ISF will record the process and maintain a log of all interactions where the action plan is being discussed and carried out in cooperation with all parties, e.g. MFRI, MII, and Directorate of Fisheries, Universities, independent consultants and ISF members. Means of verification Correspondence and meeting minutes between ISF and authorities, regarding the establishment of an HCR for Icelandic lemon sole. Year 3 action Follow up on results of engagement in year 1 and 2 regarding a harvest control rule. The client group promotes the necessity for a harvest control rule, ensuring reduced exploitation rates as the stock approaches a limit reference point. The client will conduct an evaluation of a harvest control rule, either through MFRI or internal options as set out above. The actions in year 3 are dependent on outcomes in previous years. If a clear and precautionary HCR is implemented by the MII in previous years, there is no need for further actions. If not, ISF will seek support within the client group to further look for alternatives to develop and adopt a precautionary HCR. ISF will record the process and maintain a log of all interactions where the action plan is being discussed and carried out in cooperation with all parties, e.g. MFRI, MII, and Directorate of Fisheries, Universities, independent consultants and ISF members. Means of verification ISF provides evidence showing the progress of the HCR's development, communication, meeting minutes showing that the HCR is in process, and likely to be adopted during year 4. Year 4 action Implement measures developed and evaluated in year. This may need to fit into MFRI assessment cycle. ISF will record the process and maintain a log of all interactions where the action plan is being discussed and carried out in cooperation with all parties, e.g. MFRI, MII, and Directorate of Fisheries, Universities, independent consultants and ISF members. Means of verification A published HCR by MII.
Consultation on condition	ISF will consult and cooperate with Icelandic MFRI and MII during the process.

C2 – PI 2.4.1

Condition 2 **UoA: ISF Iceland lemon sole bottom trawl fishery**	
Performance Indicator	**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.** SI b) 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
Score	Bottom trawlers: 75

Rationale	The slope areas off the south coast of Iceland are very steep, with depths descending from around 400 m to more than 1500 m within few nautical miles, and parts of the slope areas are considered difficult for trawling. Therefore, vulnerable habitats have some depth refuge from fisheries impacts in Icelandic waters. Nevertheless, in the past the bottom trawl fishery has reduced coral habitat structure and the present fishing patterns of the bottom trawl UoA overlap with vulnerable habitats of corals. There is explicit protection of several *Lophelia* areas where no fishing gear with bottom contact are allowed, including bottom trawling since permanent area closures for bottom trawling are in operation along the shelf break off West Iceland including seabed on the shallow part of the Reykjanes Ridge where *Lophelia* reefs occur. No such closures are in place to protect coral gardens characterised by aggregations of colonies or individuals of one or more coral species of leather corals (Alcyonacea), (Gorgonacea), sea pens (Pennatulacea), black corals (Antipatharia), and hard corals (Scleractinia) other than *Lophelia*. There is no explicit protection of areas which are rich in sponge communities where no fishing gear with bottom contact are allowed, although a number of seasonal or annual closures to bottom trawling exist which might have beneficial effects on the sponge habitats occurring there. Limited recording of benthic bycatch by commercial fishing vessels is in place. This has been harmonised with the ISF Iceland anglerfish, ISF Iceland cod, ISF Iceland haddock, ISF Iceland golden redfish, blue ling and tusk, ISF Iceland saithe, ling, Atlantic wolfish and plaice, and ISF Greenland halibut fisheries, where there is a condition for this PI.
Condition	By the fourth surveillance audit necessary conservation and management measures for all vulnerable marine habitats shall be in place and implemented, such that the trawl fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. This condition is harmonised with that for ISF Iceland anglerfish, ISF Iceland haddock, ISF Iceland golden redfish, blue ling and tusk, and the ISF Iceland saithe, ling, Atlantic wolfish and plaice fisheries.
Milestones	Year 1: There shall be evidence of the Client's plan to evaluate potential damage to *Lophelia* reefs, sponges, coral gardens appropriate to this UoA. There shall be evidence of engagement with the relevant authorities. Score 75 Year 2: By the end of Year 2 there shall be evidence of ongoing work towards the implementation of the plan; i.e. developing options for conservation and management measures to all vulnerable habitats, such that the fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. Score 75 Year 3: Evaluate the options developed in year 2. Consider suggested modifications, if needed and finalise and agree on conservation and management measures. By the end of the year a partial strategy for the protection of *Lophelia* reefs, sponges, coral gardens from trawling shall be agreed upon, either at client group level or at a higher level. Score 75 Year 4: Implement the agreed upon partial strategy. Score 80. A formal commitment to the agreed upon conservation and management measures shall remain in place for the duration of the certification period.
Client action plan	Year 1 Actions

	ISF has been running a pilot project in close cooperation with fishing companies HB Grandi and Brim hf, and the Icelandic MFRI, to increase and normalise onboard logging of coral and sponges brought on board by fishing gear. ISF will approach MFRI to further research coral and sponge aggregations in trawling areas to evaluate potential damage to deep-sea sponge aggregations and soft corals. Evidence ISF will provide evidence of engagement with MFRI with the goal of evaluating potential damage to vulnerable habitats by trawling activities. In the unlikely event, MFRI is unable to perform the research, ISF will seek for 3rd party consultant for evaluation purposes. Year 2 Actions ISF will meet with MRI to discuss findings from annual research on sponge and coral incidents. The meeting is intended to review statistics and discuss alternative actions, if needed. ISF will meet with members of the client group to discuss the condition and ask for feedback on current and future actions made by each member to address the condition. The actions will be formalized into a plan, intended for engagement by members of the client group to meet the condition. The purpose is to ensure that bottom trawling is highly unlikely to cause serious or irreversible harm to sponges and coral gardens. Evidence If Year 1 conclusions require there to be plan, then at the Year 2 audit, ISF will present an action plan, with evidence that it has been agreed by all participating parties (e.g. a signed agreement, meeting minutes, letters of support etc.). Year 3 Actions ISF will meet with members from the client group to discuss effects of actions taken in year 2 and adjust for improved efficiency, as needed. The goal is to protect deep sea sponge aggregations and coral gardens from impacts of trawling and seek an agreement among the members of the client group for this type of conservation. The actions of Year 3 are contingent on the outcome of findings showing whether and how conservation actions are required. If a plan has been proven necessary and agreed upon in year three, ISF will monitor the implementation of the plan in year 4 in cooperation with the members of the client group. Evidence If required, the plan is implemented; it is updated as new information is available. At the Year 3 audit, ISF will present the updated plan if necessary, with evidence of implementation (e.g. benthic logbook data, MFRI report or other similar). Year 4 Actions ISF will meet with members from the client organisation to discuss conservation needs and approach the fisheries authorities regarding a formal conservation and management measures, if they are not in place already. ISF will approach the Ministry of fisheries to underline the need from the viewpoint of sustainability certifications. ISF will further approach MFRI for overlapping analysis of VMS records and OSPAR threatened or declining habitats.

	Evidence ISF will present the partial strategy, which will be, if formed and implemented, under control of Icelandic fishing authorities. ISF will present a map of potential overlapping of VMS records and OSPAR threatened or declining habitats.
Consultation on condition	ISF will consult and cooperate with Icelandic MFRI and MII during the process.

C3 – PI 2.4.2

Conditions 3 **UoA: ISF Iceland lemon sole bottom trawl & *Nephrops* trawl fisheries**	
Performance Indicator	**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** SI a) There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above SI b) 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.
Score	Bottom trawlers: 70 *Nephrops* trawlers: 70
Rationale	The Icelandic management strategy for marine habitats in general, and VMEs in particular, is mainly implemented through a system of closed areas which effectively prevent both bottom trawls and *Nephrops* trawls from being used in known areas of cold-water coral concentrations along the edge of the continental shelf. A known hydrothermal vent area is also closed to trawling. This represents a partial strategy for cold water corals and hydrothermal vents, but is not yet in place for coral gardens or sponge concentrations, and does not meet SG80 for these two VME types. Vessels abide by commonly accepted move-on rules when encountering VMEs in these areas, but these are informal.
Condition	By the fourth surveillance audit necessary conservation and management measures for deep-sea sponge aggregation and coral gardens shall be in place and implemented, such that there is a partial strategy in place and implemented for these habitat types specifically, ensuring that the bottom and *Nephrops* trawl fisheries do not cause serious or irreversible harm to habitat structure and function in Icelandic waters. This strategy will include, where necessary, appropriate formalised move-on measures to avoid interactions with <u>all</u> forms of VMEs. With regard to the bottom trawl UoA, this condition is harmonised with that for ISF Iceland anglerfish, ISF Iceland haddock, ISF Iceland golden redfish, blue ling and tusk, and the ISF Iceland saithe, ling, Atlantic wolfish and plaice fisheries. With regards to Nephrops UoA, this condition is harmonised with that for ISF Iceland anglerfish, ISF Iceland cod and ISF Greenland halibut fisheries.
Milestones	Year 1: There shall be evidence of the Client's plan to evaluate potential damage to deep-sea sponge aggregations and coral gardens appropriate to the UoAs. There shall be evidence of engagement with the relevant authorities. In addition, measures to repeatedly avoid interactions with VMEs will be developed and formalised within the UoAs. Score 70 Year 2: By the end of Year 2 there shall be evidence of ongoing work towards the implementation of the plan; i.e. developing options for conservation and management measures to all vulnerable habitats, such that the fishery does not cause serious or

	irreversible harm to habitat structure, on a regional or bioregional basis, and function. Score 70 Year 3: Evaluate the options developed in year 2. Consider suggested modifications, if needed and finalise and agree on conservation and management measures. By the end of the year a partial strategy for the protection of deep-sea sponge aggregations and coral gardens from trawling shall be agreed upon, either at client group level or at a higher level. Score 70 Year 4: Implement the agreed upon partial strategy and provide evidence of the implementation. Score 80. A formal commitment to the agreed upon conservation and management measures shall remain in place for the duration of the certification period.
Client action plan	Year 1 Actions Based on work done pilot project with HB Grandi, ISF will meet with MRI and request an engagement by MRI to conserve vulnerable habitats and ask for options and plans to prevent serious or irreversible harm to habitat structures, if necessary. ISF will engage their members to agree upon and implement methods of benthic bycatch monitoring by vessels fishing under the certificate, and if proven necessary, with the aim of reducing impacts to an acceptable level. Evidence At the Year 1 audit, ISF will present evidence from the monitoring efforts, however, it will continue to MFRI who stores and reports on data collected from the fisheries. ISF will look into a forming of a stakeholder panel from the fisheries to disseminate information on progress and to channel tasks regarding the condition to representative stakeholders within or outside of ISF. The panel will convene twice a year during the lifetime of the certificate, or as needed, and be comprised of ISF representatives and from other stakeholders as fitting for each condition. Year 2 Actions ISF will meet with MFRI to discuss findings from annual research on all VMEs incidents. The meeting is intended to review statistics and discuss alternative actions, if needed. ISF will meet with members of the client group to discuss the condition and ask for feedback on actions made by each member to address the condition. The actions will be formalized into a plan, intended for engagement by members of the client group to meet the condition. The purpose is to ensure that bottom trawling is highly unlikely to cause serious or irreversible harm to all VMEs. Evidence The plan, if required, is updated according to the results of ongoing monitoring, and agreed by ISF and all relevant parties. If needed at the Year 2 audit, ISF will present an action plan, with evidence that it has been agreed by all participating parties (e.g. a signed agreement, meeting minutes, letters of support etc.) Year 3 Actions ISF will meet with members from the client group to discuss effects of actions taken in year 2 and adjust for improved efficiency, as needed. The goal is to protect deep sea sponge aggregations, coral gardens and other VMEs from impacts of trawling and seek

	an agreement among the members of the client group for this type of conservation. The actions of Year 3 are contingent on the outcome of findings showing whether and how conservation actions are required. If a plan has been proven necessary and agreed upon in year three, ISF will monitor the implementation of the plan in year 4 in cooperation with the members of the client group. Evidence If required, the plan is implemented; it is updated as new information is available. At the Year 3 audit, ISF will present the updated plan if necessary, with evidence of implementation (e.g. benthic logbook data, MRI report or other similar). Year 4 Actions ISF panel from the fisheries will convene and meet with MFRI to discuss implementation and progress of the partial strategy, if it will prove necessary for conservation purposes. Evidence ISF will provide and present a timeline of meetings, actions and reports which are to follow up on the contents of the partial strategy.
Consultation on condition	ISF will consult and cooperate with Icelandic MFRI and MII during the process.

Recommendations

Recommendation 1 **UoAs: Bottom trawl, *Nephrops* trawl, Danish seine.**	
Performance Indicator	**PI 2.2.3 Secondary species information** 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
Purpose	Interactions with seabird and marine mammals should be recorded in the electronic logbooks of client vessels. However, logbook returns since their introduction in 2009 have indicated very few such entries.
Recommendation	The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals. This recommendation applies to all gears. This recommendation is harmonised with that for ISF Iceland anglerfish.
Client Action Plan	ISF will meet with MII, MFRI and the Directorate of Fisheries to explain how important it is to have the logbooks credible regarding recorded marine mammals and seabirds as bycatch. ISF will discuss that action can be done by ISF member and other fishing ships around Iceland.
Consultation on Recommendation	Consultation between the fishing industry and Marine Research institute as well as the Directorate of Fisheries will be necessary as part of fulfilment of this recommendation.

Recommendation 2 **UoAs: Bottom trawl, *Nephrops* trawl, Danish seine.**	
Performance Indicator	**PI 2.3.3 ETP species information** Information on the nature and amount of ETP species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage ETP species
Purpose	Interactions with seabird and marine mammals should be recorded in the electronic logbooks of client vessels. However, logbook returns since their introduction in 2009 have indicated very few such entries.
Recommendation	The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals. This recommendation applies to all gears. This recommendation is harmonised with recommendation 1 for secondary out-of-scope species.
Client Action Plan	ISF will meet with MII, MFRI and the Directorate of Fisheries to explain how important it is to have the logbooks credible regarding recorded marine mammals and seabirds as bycatch. ISF will discuss that action can be done by ISF member and other fishing ships around Iceland.
Consultation on Recommendation	Consultation between the fishing industry and Marine Research institute as well as the Directorate of Fisheries will be necessary as part of fulfilment of this recommendation.

Recommendation 3 **UoAs: Bottom trawl, *Nephrops* trawl, Danish seine.**	
Performance Indicator	**Traceability**
Purpose	Management of risks to segregation and traceability within the fishery.
Recommendation	The team requests that the client issues a reminder to all of the client members, as well as auctions, to observe the following: – to ensure full segregation of catch of each species by gear in the event more than one gear is applied during the same fishing trip; – to ensure full segregation of catch of each species by management region, i.e. fish caught inside the Icelandic EEZ is kept separate, in the event a vessel catches the same species on the same trip inside and outside the Icelandic EEZ; – - to observe and implement appropriate measures of packing and labelling certified products prior to moving them to sub-contracting cooler or freezer storages upon landing, to ensure client members´ responsibility for product integrity prior to sale or further handling.
Client Action Plan	ISF will communicate internally, among the certificate sharers and owners of the certificates to explain how important it is to have the logbooks credible. To do so, ISF will continue to present the conditions and client action plan within the client group and outside, when needed.
Consultation on Recommendation	Consultation among the ISF client group to pass on the understanding and necessity for improvements, according to the recommendation.

Appendix 2: Peer Review Reports

Report from Peer Reviewer 1

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes/No** **Yes**	**CAB Response**
Justification: The Team arrived at an appropriate conclusion based on the evidence presented in the assessment report. The background information is comprehensive and the scores are well supported by the rationales. Overall, the assessment report is well organized, clear, and comprehensive.		*No response needed*

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? ***[Reference: FCR 7.11.1 and sub-clauses]***	**Yes/No** **Yes**	**CAB Response**
Justification: The conditions raised are appropriately written and the timeframes seem reasonable. Condition 1 will likely require a new benchmark assessment and thus will be subject to the stock assessment cycle of MFRI. Conditions 2 and 3 will benefit from harmonization in place with other assessments, including : 1) ISF Iceland anglerfish, 2) ISF Iceland cod 3) ISF Iceland haddock, 4) ISF Iceland golden redfish, 5) ISF Iceland saithe and ling, and 6) ISF Greenland halibut.		*No response needed*

Do you think the client action plan is sufficient to close the conditions raised? ***[Reference FCR 7.11.2-7.11.3 and sub-clauses]***	**Yes/No** **Yes**	**CAB Response**
Justification: All three conditions will require the active engagement of MFRI and MII. Evidence of productive interactions in the past (to close conditions for other fisheries) suggests that the CAP will be successful.		*No response needed*

Performance Indicator Review

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.1	Yes	Yes		Relevant information is used, and the information and rationale support the score. Lemon sole is an ICES Category 3 stock (reliable stock biomass indices are available, but analytical age-length based assessments are not possible). For SI a, the score of 80 is justified by the probability of stock position relative to the point where recruitment would be impaired, using a reasonable qualitative argument. For SI b, the score of 80 is justified (in the absence of PRI and MSY values) using a proxy for stock status (Fproxy), with biologically appropriate time periods for fluctuation.	*No response needed*
1.1.2	N/A	N/A		The lemon sole stock is not depleted.	

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.1	Yes	Yes		Relevant information is used, and the information and rationale support the score. No formal management plan exists, and the harvest strategy consists of a written commitment to follow MFRI advice. This advice consists of a HCR using a proxy for stock status (Fproxy) with a target reference point. Annual TACs are based on a spring survey and thus are responsive to the state of the stock. Empirical results since implementation in 2010 suggest the HS has been effective. The team reports that discard of lemon sole is considered negligible and policy documents indicate a will to minimize unwanted catches of target stocks.	*No response needed*

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	**CAB Response**
1.2.2	Yes	Yes	Yes	Relevant information is used, and the information and rationale support the score. For SIa, the team notes that no HCR is in place to reduce exploitation as the stock status approaches the PRI proxy. Thus, the proposed condition is warranted. For SIc, the Team notes that exploitation levels of the last six fishing seasons are generally in line with the national TAC issued by the Iceland government (MII), with recent exceptions most likely due to quota transfers between species in the multispecies fisheries.	*No response needed*

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.3	Yes	No		Relevant information is used, however, the information and rationale do not support the score of 100 for SIa. As per SA2.6.2-2.6.3, 'A comprehensive range of information' at the 100 level means to include information provided by a full strategic research plan. An example of information apparently not available for the lemon sole fisheries includes that needed to perform age or length-based assessments. Such information could greatly improve estimates of stock status (presently inferred from catch and survey data only).	The team disagrees with the conclusion that a score of 100 is not supported in SIa. Comprehensive information are collected and the implementation of a new research survey (beam trawl survey coordinated in the framework of ICES WGBEAM) is part of a strategic research plan foreseen by MFRI. Also the reference to perform age or length-based assessments is appropriate in 1.2.4 and not in 1.2.3.
1.2.4	Yes	Yes		Relevant information is used, and the information and rationale support the score. The stock is assessed using a biomass index for adults and juveniles derived from catch and survey information. The assessment is appropriate for the information available, and is peer reviewed.	*No response needed*

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.1.1	Yes	Yes		Relevant information is used, and the information and rationale support the score. The scoring tables are well organized, complete, and clear. With respect to SIb, the Team notes that spotted wolffish, common dab, and long rough dab are not clearly above PRI. The Icelandic species TACs, a discard ban, and a spawning area closure (long rough dab) are given as a "demonstrably effective strategy …ensuring that collectively all MSC UoAs, and all Icelandic fisheries, do not hinder recovery and rebuilding of these species". Thus, the Team has addressed the cumulative impact requirement as per SA 3.4.	*No response needed*

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.1.2	Yes	No		Relevant information is used; however, the information and rationale do not support the score of 100 for SIc. Under SIb, the Team notes that the harvest strategy has not been tested for all primary species stocks. Thus it is not clear how a score of 100 is warranted under SIc, where the Team notes there is sufficient information for all stocks to evaluate whether objectives maintaining or rebuilding biomass is being achieved. Seems inconsistent and needs clarification.	*Agreed and reduced SIc from 100 to 80.*
2.1.3	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*
2.2.1	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*
2.2.2	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.2.3	Yes	Yes		Relevant information is used, and the information and rationale support the score. The electronic logbook recommendation is harmonized with that for ISF Iceland anglerfish.	*No response needed*
2.3.1	Yes	Yes		Relevant information is used, and the information and rationale support the score. The text is clear and summarizes the basis of each gear specific score.	*No response needed*
2.3.2	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*
2.3.3	Yes	Yes		Relevant information is used, and the information and rationale support the score. The electronic logbook recommendation is harmonized with that for secondary out-of-scope species.	*No response needed*

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.4.1	Yes	Yes	Yes	Relevant information is used, and the information and rationale support the score. The scoring tables are well organized, complete, and clear across gear and habitat types. The condition is harmonized with that for ISF Iceland anglerfish, ISF Iceland haddock, ISF Iceland golden redfish and the ISF Iceland saithe & ling fisheries (bottom trawl).	*No response needed*
2.4.2	Yes	Yes	Yes	Relevant information is used, and the information and rationale support the score. The scoring tables are well organized, complete, and clear across gear and habitat types. The condition is harmonized with that for ISF Iceland anglerfish, ISF Iceland haddock, ISF Iceland golden redfish and the ISF Iceland saithe & ling fisheries (bottom trawl), and with ISF Iceland anglerfish and ISF Iceland cod and halibut (Nephrops trawl).	*No response needed*

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.4.3	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*
2.5.1	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*
2.5.2	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*
2.5.3	Yes	Yes		Relevant information is used, and the information and rationale support the score. A useful evaluation of SIc is provided by gear type.	*No response needed*
3.1.1	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*
3.1.2	Yes	Yes		Relevant information is used, and the information and rationale support the score. The recently assessed Iceland Cod fishery scored this at 100. The score of 85 here is apparently is in response to NGO consultation concerns.	*No response needed*

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.1.3	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*
3.2.1	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*
3.2.2	Yes	Yes		Relevant information is used, and the information and rationale support the score. The recently assessed Iceland Cod fishery scored this at 100. The score of 85 here is apparently is in response to NGO consultation concerns.	*No response needed*
3.2.3	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*
3.2.4	Yes	Yes		Relevant information is used, and the information and rationale support the score.	*No response needed*

Report from Peer Reviwer 2

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes**	**CAB Response**
Justification: The report is very well written and thorough – I commend the Assessment Team. Nevertheless, I do not agree with the Assessment Team's findings on some points and believe that at least one more condition is warranted on out-of scope secondary and/or ETP species information, as detailed against the individual PIs, below. None of my concerns threaten the Assessment Team's findings, though, such that I agree that the fishery overall does meet the requirements for certification.		*The team thanks the reviewer for the comments.* *The team strongly consider that observer data, which provides 1.61% coverage of the fleet, and is regularly undertaken, is adequate to qualify as "some quantitative information". A condition under 2.2.3 or 2.3.3 is therefore not warranted. However, the team have placed recommendations on both these performance indicators.*

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? ***[Reference: FCR 7.11.1 and sub-clauses]***	**Yes, mostly**	**CAB Response**
Justification: The three conditions are not compliant currently with MSC requirement 7.11.3, where the 'Consultation on Condition' Section states "*ISF will consult and cooperate with Icelandic MFRI and MII during the process*." 7.11.3 states "***The CAB shall not accept a client action plan*** *if the client is relying upon the involvement, funding and/or resources of other entities (fisheries management or research agencies, authorities or regulating bodies that might have authority, power or control over management arrangements, research budgets and/or priorities) without: 7.11.3.1* ***Consulting with those entities when setting conditions,*** *...."* Conditions 2 and 3 also allow that in Year 1 "*There shall be evidence of engagement with the relevant authorities*." Instead, given that the Conditions will require investment of time or money, changes to management and possibly a re-arrangement of research priorities, it is clear from 7.11.3.1, the CAB needs to be satisfied that MFRI and MII are already engaged, and that (7.11.3.2) the conditions are achievable and realistic in the period specified. I don't think this is a particularly serious issue but as a requirement it does need to be addressed. A letter of support for working on the conditions, as is commonly provided by management authorities elsewhere for other MSC fisheries, would adequately demonstrate that 7.11.3 is met.		*The team believes that the client is in continued contact with relevant authorities during the certification process as foreseen by MSC requirement 7.11.3. The two supporting letters attached in Appendix 3.1.1 and 3.1.2 are clear evidences of the involvement of respectively MFRI and MII for the improvement of the HCRs and safeguard and management of habitats.*

Do you think the client action plan is sufficient to close the conditions raised? ***[Reference FCR 7.11.2-7.11.3 and sub-clauses]***	**Yes**	**CAB Response**
Justification: Subject to the point on 7.11.3, above, generally things appear fine.		

Performance Indicator Review

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.1	Yes	Yes	N/A	Nothing further.	No response needed.
1.1.2	Not scored – the stock is not depleted	N/A	N/A	Nothing further	
1.2.1	Yes	Yes	N/A	Nothing further.	No response needed.
1.2.2	Yes	Yes	Yes	Note comments on consultation on the condition, above. Otherwise, nothing further.	The supporting letters from MFRI and MII clearly state that cooperation with ISF is welcome. Therefore the team thinks that both MFRI and MII commit themselves to start consultation on this particular condition in the future as evidenced in the CAP.
1.2.3	Yes	Yes	N/A	Nothing further.	No response needed.
1.2.4	Yes	Yes	N/A	Nothing further.	No response needed.
2.1.1	Yes	No	N/A	Main species are scored appropriately. Minor species – I disagree that the common dab and spotted wolffish is scored correctly. It is stated that there is a demonstrably effective strategy in place to ensure that recovery and	Agreed and edited score and justification so that common dab and spotted wolfish do not meet SG100.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				rebuiding is not hindered. Given that, for common dab, biomass is bumping along the bottom and F continues to be very high, and for spotted wolffish biomass is at its lowest level in the time series and F is has been high since 2000 and remains above Fproxy, how does this meet SA3.4.6? Instead, to justify the scoring at 100 (does not hinder) it would be necessary to look at the proportion taken in the UoAs relative to other fisheries, which has not been done.	
2.1.2	Yes	Yes mostly	N/A	Scoring is generally OK but I again raise that management of some of the minor species is characterised as good when F continues to be high and status is poor. This is exposed at SIc where SG100 requires that the strategy is achieving it's overall objective. I have no problem for most species (including all main primaries) but for several minor species (particularly common dab, spotted wolffish) there is little to demonstrate that the stocks are being rebuilt and can be managed at around MSY. SG80 is a better score, here.	Agreed and reduced SIc from 100 to 80.
2.1.3	Yes	Yes	N/A	Nothing further.	No response needed
2.2.1	Yes	Yes mostly	N/A	P.53. Harbour seal: Given the continued decline of the Icelandic population, and the 2016 census	Bottom trawl and nephrops trawl are estimated to account for removing a

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				report that indicated the population meets the IUCN's 'Endangered' criteria (36% lower than the Government's minimum population objective), it would be useful to spend more time justifyign why the team considers that the bycatch in the fishery "…*is unlikely to be of concern*". Also, the annual bycatch in bottom trawls is reported to be estimated at a maximum of 28 animals. Given the (very) low observer coverage and noted poor return rate for logbooks, what is the confidence interval for that estimate?	combined total of up to 0.4% of the Icelandic population. This, together with the location of the fishery and significantly lower risk of interaction by demersal trawl gear compared to static net gear (as evidenced by MFRI bycatch observer data) is considered jutification for interactions to be unlikely to be of concern. Observer coverage was 1.61% in 2016 for otter trawl gear. The CV (coefficient of variation) = 100%.
2.2.2	Yes	No	N/A	The only main secondary species are out-of-scope species. It is accepted in the report that "***logbook returns have been poor****, and variations in estimated numbers of bycatch species evident in the most recent data indicate that the* ***available information may not be accurate and verifiable for all bycatch species.***" This is noted specifically with respect to out of scope and ETP species. If logbook returns have been poor and information may not be accurate and verifiable, though, then this does not meet the SG80 requirements for a 'partial strategy', which (according to Table SA8) "*represents a cohesive arrangement which*	It is considered that the awareness of the need to change the measures is evidenced by the updated e-Log system, which promotes more efficient recording of incidental capture of out-of-scope and ETP species.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				may comprise one or more measures, an understanding of how it/they work to achieve an outcome and ***an awareness of the need to change the measures should they cease to be effective.***" Essentially, if the bycatch data are poor (and 1-2% observer coverage provides no confidence that they are good) then how is it known if measures cease to be effective? For main species I have no problem with SG60, but to give an SG80 pass here for SIa (possibly also SIc where this issue is discussed) when it is known that logbooks are not completed is inappropriate. SIe – I don't agree with the scoring, here. It is stated: "*No catches of main secondary species have been reported for these gears.*" Of course, out of scope species are main, as the report notes elsewhere. Then "*With regards to out-of-scope seabird and marine mammal species, review of the MFRI observer data represents an ongoing review of the effectiveness of UoA-related mortality of main secondary species.*" However, a simple review of 1-2% observer data (note that is a target level of coverage not	Added clarification as follows "No catches of main in-scope secondary species…" Reduced score for SIe from SG100 to SG80. Added clarification as follows: "The use of sorting grids, which were mandatory within Icelandic trawls since

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				the achieved level) does not get to the issue, here for main, out of scope species. The aim is to ensure that the viability of alternative options to reduce waste are explored and alternative measures implemented where appropriate. I'm sure it is possible to demonstrate that this has been undertaken at some point in the past, but a simple review of the data (which will have no analytical power at such a low coverage) does not meet SG80 for out of scope species, never mind SG100.	1997, was reviewed in 2013. This led to the decision for sorting grids to be mandatory only for specific gear/target species in certain areas, specifically for trawls targeting shrimp (*Pandalus borealis*) and pelagic species. It is noted that "the application of sorting grids can have severe effects on water flow in the trawl, the selectiveness can be highly variable depending on catch rate and information given by catch sensors can be unreliable when the path of the catch is interrupted with a sorting grid" (Viðarsson et al., 2014). In addition, anecdotal evidence from the skipper of a bottom trawl vessel cited sorting grids to be prohibitive to work with on-deck (from a labour perspective) and would damage the target fish. Sorting grids subsequently are not mandatory within the Icelandic trawl nets included within this assessment.".
2.2.3	Yes	No	N/A	A question – what is the achieved level of coverage in the fleet? The target appears to be 1-2%, but I don't think the achieved level in each UoA is provided?	Observer coverage was 1.61% in 2016 for otter trawl gear.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				Also, it is said that "logging interactions with marine mammals and birds has become more prominent in recent years…", such that "quantitative information on bycatch rates of main secondary species … is thus available". However, it is then noted that the assessment of impact on main secondary species is "based on observe data that has been raised to estimate interaction across the fleets". The scoring text raises several questions with respect to the 'quantitativeness' of the data for out of scope (main) species. First, what is the achieved level of observer coverage, noting that even 2% provides a very low analytical power. Second, I suspect that observers are deployed on a risk-based strategy, with no focus on secondary species... how representative of the fishery is the observer coverage, then? Third, what are the confidence intervals around the bycatch estimates? Fourth, how good are the log data now – '*logging interactions .. has become more prominent*' may be interpeted in various ways. Essentially, there may be out of scope bycatch	Disagree that the observer coverage data should be considered qualitative. Score remains at SG80 for SIa and SG100 for Sib (both of which require <u>some</u> quantitative information). 1. Observer coverage was 1.61% in 2016 for otter trawl gear. 2. Based on 705 observed tows, out of total 43,597 tows on 2016, equates to coverage of 1.61%. Not spatially stratified. 3. The CV (coefficient of variation) = 100%. 4. Hence recommendation has been proposed.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				numbers available but I think they are much better characterised as 'qualitative' (i.e. SG60) than quantitative. I note a recommendation has been set, here, but this is much more appropriate as a condition.	Disagree that the observer coverage data should be considered qualitative. Score remains at SG80 for SIa and SG100 for Sib (both of which require some quantitative information).
2.3.1	Yes	Yes	N/A	Not a comment on the overall score, but I will note that scoring hooded seal as an ETP appears to have been carried out on the basis of a conversation with a skipper. While that is OK, it highlights the quality of information available for ETP (and out of scope secondary) species from the observer data, and raises the question of 'what else may be caught in the fishery?'.	The inclusion of hooded seal is considered precautionary by the team. It was mentioned by a skipper to have occurred a number of years ago, and before recording such incidents within logbooks occurred.
2.3.2	Yes	No	N/A	It is accepted in the text that the measures referred to in SIa are "*not specifically established to protect such* [i.e., ETP] *species*". This is fine for a 'partial strategy', and I note that the scoring text for SIa also states "*These measures are ... considered to form a partial strategy ... SG60 and SG80 are met.*" However, PI 2.3.1 SIa SG80 requires a 'strategy' while Table SA8 specifies that a 'strategy' should "*be*	The team consider that the measures in place sufficiently form a strategy. The measures are specifically realted to the species assessed within this component and therefore it is appropriate they are defined as a strategy (as opposed to partial strategy), This is harmonised with 1) ISF Iceland anglerfish, 2) ISF Iceland cod 3) ISF Iceland haddock, 4) ISF Iceland golden redfish (blue ling and tusk), 5) ISF Iceland saithe and ling

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				designed to manage impact on that component specifically". Essentially, I agree that measures are in place for SIa, but that is insufficient to meet SG80. Also, similar to out of scope (main) secondary species, the scoring here gives prominence to the logbook data but it is known (as indicated in PI 2.3.1 – hooded seal) that logs/elogs are not completed for these species. However, Table SA8 also indicates that a strategy "*should contain mechanisms for the modification fishing practices in the light of the identification of unacceptable impacts*", and it is curently not apparent that this is possible? The issue is discussed in SIc, but how does the system currently provide objective basis for confidence? SIe. As with main secondaries, I am not convinced that the team has tackled this apporpriately. A simple review of very limited data is not what is intended, here. I note again that the observer data are very limited in scope, and that there appears to be no justification for confidence in the logbook data. Fundamentally, there is no evidence presented that measures	(Atlantic wolffish and plaice), and 6) ISF Greenland halibut. The inclusion of hooded seal is considered precautionary by the team. It was mentioned by a skipper to have occurred a number of years ago, and before recording such incidents within logbooks occurred. Disagree. The team consider the following to form evidence of implementation: • regular analysis and reporting by MFRI on bycatch data • The e-Log form and process of recording was presented by the

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				are '*implemented as appropriate*'. Nevertheless, it is stated that review of current measures occurs 'annually' If this is deemd to meet SG80 then it should also be deemed to meet SG100 (where the only difference is the requirement for a biennial revew (i.e., every two years).	skipper during the vessel visit providing verification of the system. Updated text as follows "The evaluation of the performance of the current measures occurs every two to three years for observer bycatch analysis and reporting, and with review of the effectiveness of the system in the past two years which resulted in improvements in the e-Log recording system. As such the frequency of reviews is considered regular." No change to score.
2.3.3	Yes	Possibly	N/A	I clearly still have my concerns over the data, noting that it is apparent that, for ETP species, the logbooks are not being completed, landings data are not therefore going to be useful, and that even 2% observer data will not provide any power for analysis (particularly if the coverage is not in some way representative, which I am sure it is not). With all that in mind, it is difficult to see how 'measuring trends' (SIb SG80) will be possible with even remote levels of confidence. But, if a condition is raised in 2.3.1 or 2.3.2 then a further one here would be unwarranted.	Disagree. The team consider the assessment to be precautionary given the lower risk posed by the gear (which is supported by experience elsewhere in the world, e.g. demersal trawl are considered to have a lower risk of incidental capture of the critically endangered harbour porpoise in the Greater North Sea, compared to static gear, OSPAR, 2017), the operation of the gear and through personal communication with MFRI who collectively cite interactions as being negligible. No change to score.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.4.1	Yes	Yes	Yes	Nothing further.	No response needed
2.4.2	Yes	Yes	Yes	Generally, I note the reference to the NEAFC VME protocols and the comment in the rationale that "*Vessels abide by commonly accepted move-on rules when encountering VMEs in these areas, but these are informal*." However, I also note the CAP for Condition 2 which states: "*ISF has been running a pilot project in close cooperation with fishing companies HB Grandi and Brim hf, and the Icelandic MFRI, to increase and normalise onboard logging of coral and sponges brought on board by fishing gear.*" Given that there is an effort to improve logging of corals and sponges, what verification has the team done to assert that the data are in any way reliable such that vessels really do abide by the NEAFC move-on rules? Is there any evidence of a move-on requirement being set up anywhere by the UoA? Otherwise, comments on consultation on the condition are provided, above. .	The team verified with ISF the procedure taken by their members when coral and sponges were brought on board. The team verified with the skipper, during the vessel visit, that coral and sponges are very rarely caught. The skipper considered most coral grounds to be closed to fishing which was evidenced by the vessel plotter. No change to score.
2.4.3	Yes	Probably, yes	N/A	SIc. I only comment that SG100 is scored on the basis of a project that appears to have only	The coralFISH project cited within the assessment justification began in 2008 (this

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				revently been intiated and for which there are apparently no results; this seems a little generous. Nevertheless, SG80 is clearly met.	detail / date has been added to the justification). It remains appropriate that SG100 is met.
2.5.1	Yes	Yes	N/A	Nothing further.	No response needed
2.5.2	Yes	Yes	N/A	Nothing further.	No response needed
2.5.3	Yes	Yes	N/A	Nothing further.	No response needed
3.1.1	Yes	Yes	N/A	Scoring is OK but a comment here – I am not convinced that the statement "the rights of traditional users were in the main secured when individual transferable quotas were introduced on the basis of historical fishing" is quite what the MSC had in mind, here. ITQs are an efficiency tool that tend to consolidate quota into a relatively few operators, rather than being a tool to ensure the rights of traditional users are observed.	The team agrees, and text has been amended. There is no need for change in the score
3.1.2	Yes	Yes	N/A	Nothing further.	
3.1.3	Yes	Yes	N/A	Nothing further.	
3.2.1	Yes	Yes	N/A	Nothing further.	

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.2	Yes	Yes	N/A	Nothing further.	
3.2.3	No	No	N/A	This PI is scored 100, which is too high. SIa states: "*Hence, Iceland has in place a comprehensive and transparent system for monitoring, control and surveillance, and there are a number of possibilities for enforcement authorities to physically check whether the data provided by fishers through self-reporting are indeed correct*." On this, I have already been commented that the observer data is of little value (even at 2%) in corroborating logbook data on ETP and out of scope secondary species – there appears to be very little if any possibility of checking whether self-reported data are correct – in fact, it is accepted in the report that the data are not correct for these groups. SIb then states: "*The comprehensive enforcement system (see SI 3.2.3 a) above) combined with the high level of compliance (see SI 3.2.3 c) below) makes it reasonable to assume that the system provides effective deterrence*." However, again, it is accepted that the low level of observer coverage makes it possible to under-report out of scope and ETP	The text has been amended and the score has been reduced from 100 to 80 for SIa, SIb and SIc, as well as the PI as such.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				species. This does not appear to comprise 'effective deterrence' Similarly, SIc *SG80 requires that "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."* Given that P2 information is 'of importance', and that we know elogs are not completed for ETP and out of scope secondary species, I would put a question mark over SG80, and it definitely shouldn't meet SG100. If a condition on this issue has been raised elsewhere then a condition here may be unnecessary. However, the issue should certainly be identified in the text, irrespective (including, possibly, with respect to systematic non-compliance, SId?).	
3.2.4	Yes	Yes	N/A	Nothing further.	

OSPAR, 2017. Harbour Porpoise Bycatch https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/biodiversity-status/marine-mammals/harbour-porpoise-bycatch/

Peer Reviwer 2 Comments, contd.:

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary) can be added below and on additional pages

1) Tables 3-5(a, b, c) and 3-7. Lemon sole is listed as a primary species, when it is the P1 target species in the assessment.

   Team Reply: *Tables updated to classify lemon sole as P1 target species.*

2) P.39. It is indicated that common dab should be considered to be "*in recovery*". However, the biomass plot provides no indication that this is the case, and the fact that there is no directed fishery (where the TAC = 500 t, which is "around the dab bycatch") when "*fishing mortality has been very high in last years*" provides no confidence that management is effecting a recovery. Note that I actually agree with the scoring for common dab as presented in Table 3-8 (i.e., "*Status = 80*", albeit by default), but, as a minor species, the text in Table 3-8 (that I disagree with) indicates that a score of 100 is correct (i.e., PI 2.1.1, SIb, SG100 = "*If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species*", while the text states "*However, the TAC in place limits catches to advised levels. This together with the discard ban forms a demonstrably effective strategy for common dab, ensuring that collectively all MSC UoAs, and all Icelandic fisheries, do not hinder recovery and rebuilding of this species.*"

   Team Reply: *Agreed and updated score of 2.1.1 SIb to meet SG80, not SG100.*

3) Similar to 2), above, note that the same issue with respect to scoring a minor species also applies to (at least) long rough dab.

   Team Reply: *It remains the consideration of the assessment team that the high juvenile index is evidence of rebuilding.*

4) Tables 3-7 and 3-8. These provide fundamentally useful information, but it would help if they were combined so that as readers were reviewing the status and management summary they could see clearly which species were being dealt with as main or minors, rather than having to flick between tables. Also, I wouldn't normally expect to see scoring ("*Status*") in the introductory sections (i.e., in Table 3-8), and maybe there is no reason why not, but the absence of the 'main or 'minor' information at that point actually means one is required to flick back and forwards to see if the scoring is correct. Common dab provides a useful example – the information presented in Table 3-8 states that "*collectively all MSC UoAs, and all Icelandic fisheries do not hinder recovery and rebuilding*", but all MSC UoAs are only relevant as a main species, which Table 3-7 indicates is not the case for this species.

   Team Reply: *This text has been deleted for common dab. The classification of main or minor varies for gear and the current means of presentation is considered the most efficient.*

5) Similar to 4), above, the information on northern shrimp (offshore) indicates that the stock is not in good shape. This could be important as a main species but as a minor species (for TB only) the status is of essentially no consequence for the fishery under assessment given that minors score 80 for status (PI2.1.1 SIb) by default.

   Team Reply: *Noted, but no change to the presentation of the information has been made.*

6) Table 3-8, Nephrops. It is stated that biomass is at its lowest level, but the figure is cut off to the right so it is not possible to see this graphically.

Team Reply: *Edited graph, so full graph can be seen*

7) Table 3-8, Spotted wolffish. It is stated that "*The recruitment index, total biomass index and fishable biomass index has been decreasing in recent years.* ***In 2017 the biomass index was at its lowest level since measurement started in 1985****. ... Fproxy has been high since 2000 and despite a decrease from 2013 onwards,* ***fishing mortality remains above target Fproxy.*** *It is not clear that the stock is above PRI,* ***trends in biomass continue to reduce****. However, the TAC in place limits catches to advised levels. This together with the discard ban forms a demonstrably effective strategy for spotted wolfish, ensuring that collectively all MSC UoAs, and all Icelandic fisheries, do not hinder recovery and rebuilding of this species.*"

This does not meet the SA3.4.6 requirements. These specify that "*At the SG80 level, where a species is below the level at which recruitment could be impaired, the team shall recognise "evidence of recovery" or a "demonstrably effective strategy" as being in place such that all MSC UoAs do not collectively hinder recovery of the species using any or a combination of the following as rationale:*
a. Direct evidence from time series estimates of stock status. [PR comment: Definitely not met]
b. Indirect evidence from time series of indicators or proxies of stock status indicative of the state of the whole stock [PR comment: not met]
c. Indicators, proxies or absolute estimates of exploitation rate that show that fishing mortality experienced by the stock is lower than FMSY. [PR comment: I don't think FMSY is known so not clearly met]
d. Direct evidence that the proportion of combined catch by all MSC UoAs relative to the total catch of the stock does not hinder recovery.[PR comment: not met, although the SG100 requirement for minor species is specific to the fishery under assessment, only]"

I suggest revising the language. However, as spotted wolffish is a minor species, this should not affect scoring.

Team Reply: *Edited and scored at SG80 under 2.1.1b.*

8) P.48. Notes: "*In order to manage bycatch of non-target species ..... There is strict surveillance of fishing vessels (including observers on board) …*" It is then reported on page 49 that observers aim to go on 1-2% of all fishing trips, with coverage good for the largest fisheries (e.g. bottom trawlers) and lower on smaller fisheries (e.g. Danish seines). The achieved observer coverage rate should also be reported, though, albeit that even at 2% it is very unlikely to be of any particular use in managing/monitoring discarding.

Team Reply: *These refer to different types of observers i.e., marine mammal and seabird observers, and observers ensuring compliance with discard ban, gear technology requirements etc.*

9) P.55: "*Marine mammal and seabird bycatch is monitored by mandatory e-Log system and onboard observers from the DF and the MFRI*." Has compliance with the eLog system been reviewed? I admit that I would be pleasantly surprised if marine mammals and seabirds were being recorded in anything approaching a systematic manner. 1-2% observer coverage is also of very limited value in terms of quantifying or even detecting rare events.

Team Reply: *The e-Log system is mandatory, however recording of marine mammals and seabird bycatch is voluntary.*

10) P.80. It is stated: "*Shortly after presenting the recommendations to the Ministry, representatives of the Institute enter into dialogue with the fishing industry regarding the status of the stocks and the nature of the recommendations. The Ministry also consults with the industry before setting the final TACs.*" It would be useful to have more details about how this works – how is industry consulted, through which fora, how is representation ensured, etc?

Team Reply: *This is further elaborated upon within the rationale tables as follows 3.1.2 SI b "Hence, the management system includes consultation processes that regularly seek and accept relevant information, including local knowledge, and demonstrates consideration of the information obtained. SG 80 is met. The authorities normally explain to user groups how information is used or not used, formally or indirect informal communication. However, environmental NGOs find such explanation often lacking, according to interviews at the site visit. SG 100 is not met. "*

11) P.85, Table 4-3. There is a broken hyperlink (*Error! Reference source not found*). Otherwise, I just wanted to say that this is the first time I have found this table completed in any assessment I have peer reviewed – well done!

Team Reply: *Corrected*

12) P. 88, Table 5-1. "*Lemon sole are caught by a large number of vessels, most of them Icelandic ones that are part of* ***the UoC.***" Are there vessels from other nations operating in the fishery? A clarification would be useful because it is unclear (to me at least) from Table 1 (P.13 – "*The Units of Assessment include all vessels, operating bottom trawl, Nephrops trawl and Danish seine in Icelandic waters*.") if non-Icelandic vessels may be part of **the UoA**? I think this is the case, and I think these other vessels are accounted for in the traceability section, but it would be useful to review Table 5-1 just to make sure that the description for lemon sole caught by non-Icelandic vessels and divided in to fish that are part of the UoC and fish that are not within the UoC is as good as can be. For example, the 'Risk of mixing … during storage, transport or handling' section has a paragraph that starts "*In the event that eligible vessels are landing lemon sole in foreign ports, there is a possibility that certified and non-certified fish could be simultaneously handled*" and another that starts "*The possibility may arise that lemon sole from vessels within the UoC and lemon sole from foreign vessels outside the UoC may simultaneously be handled at auctions*". These sentences could be describing the same situations but presumably they are different – it is not clear exactly how?

Team Reply: *As stated in section 5.3 "Potential certification will include fish caught by all registered Icelandic vessels with valid permit to operate within the Icelandic EEZ". Therefore, it is clear that non-Icelandic vessel would not be part of the UoA. Furthermore, the Client has, in an addendum to the original statement on certificate sharing, confirmed that application for MSC certification of the lemon sole fishery only applies to Icelandic vessels and that foreign vessels are not considered eligible. Table 3.1 has been amended to clarify this. Similarly table 5.1 has been amended regarding the point made to clarify the same.*

13) P. 89. It appears I might be wrong that non-Icelandic vessels may be part of the UoA. Section 5.3 here starts with "*Potential certification will include fish caught by all registered Icelandic vessels with valid permit to operate within the Icelandic EEZ*." This adds a little to my

confusion over what is and isn't within the UoA (noting Table 1 text in comment 12), above) – please review.

Team Reply: *The team believes is clear that only Icelandic vessel will be involved in the certification. Thus, there is not need of any revision. See also our reply to comment 12 above.*

14) Just a very few typos.
    - P. 14: lemone sole fishery
    - P.17: It si important
    - P.34: Table 3-4b [should be 3-5b]
    - P.35: is shown in Table . Data
    - P.52: whales and dolphins are considered uner ETP.
    - P.73: to ensure bottom trawling do[es] not affect
    - P. 77: to be about 1.5 [g]Cm^{-2} yr^{-1}.

Team Reply: *All corrected.*

Appendix 3: Stakeholder Submissions

Appendix 3.1: Stakeholder Submissions Regarding Conditions

Appendix 3.1.1: A statement by the Marine and Freshwater Research Institute

Icelandic Sustainable Fisheries
Grandagarður 16
101 Reykjavík

MARINE & FRESHWATER RESEARCH INSTITUTE

Reykjavík, 09.08.2017
Tilv. 2017-0275 - 21.09.01 /SKÖ
GÞ/mþ

Re: Consultations on fish stocks in Icelandic waters subject to MSC certification

In recent months the Icelandic Sustainable Fisheries plc. (ISF) representatives and experts at the Marine and Freshwater Research Institute (MFRI), Reykjavik have consulted on fish stocks exploited in Icelandic waters that have been subject to different stages of MSC certification.

The species that have been consulted on include anglerfish, tusk and blue ling. The MFRI, as the principal organization in Iceland responsible for research and advice on sustainable harvest of fish stocks in Icelandic waters, has provided information on various aspects of the most recent assessments of the stocks in question, including explaining the type of analytical methods used, evaluation of parameters, stock status and development. Also one has consulted on the fishing operations and environmental aspects related to fishing activities, as far as it concerns matters related to the responsibilities of the MFRI.

The MFRI welcomes future cooperation with ISF in this area, including annual consultations on the development of the above fish stocks and other stock in Icelandic waters when and if relevant in this context.

On behalf of Marine and Freshwater Research Institute,

Guðmundur Thordarson
Head of Demersal Division

Hafrannsóknastofnun | Kt. 470616-0830 | Skúlagötu 4 | 101 Reykjavík
Sími: 575 2000 | Fax: 575 2001 | hafogvatn@hafogvatn.is

Appendix 3.1.2: A statement from the Ministry of Industries and Innovation

Icelandic Sustainable Fisheries ehf.
Grandagarði 16
101 Reykjavík

ATVINNUVEGA- OG
NÝSKÖPUNARRÁÐUNEYTIÐ

Ministry of Industries and Innovation

Skúlagötu 4 101 Reykjavík Iceland
tel.: +(354) 545 9700 postur@anr.is
anr.is

Reykjavík July 23, 2018
Reference: ANR18070211/11.02.11

Icelandic authorities emphasize responsible and sustainable utilization of marine resources. Stock assessment as well as advice on total allowable catch (TAC) is received from the Icelandic Marine Research Institute (MRI) and from International Council for the Exploration of the Sea (ICES). Icelandic authorities have since 2007 followed the policy to base fisheries management in Icelandic waters on the application of long term management plans (LTMP) and have developed harvest control rules (HCR) for several species of major importance, which have been evaluated by ICES.

Since 2013, the Minister of Fisheries and agriculture has, in deciding total allowable catch, followed the advice of the MRI 100% for all the stocks that the institute gives advice for.

Iceland Sustainable Fisheries (ISF) is responsible for maintaining and obtaining sustainability certifications according to the Marine Stewardship Council (MSC standard) for Icelandic fisheries. ISF have been in good cooperation with the Ministry of fisheries and agriculture in recent years.

On behalf of the Minister of Fisheries and Agriculture

Annas Jón Sigmundsson

Arnór Snæbjörnsson

Appendix 4: Surveillance Frequency

Table A4.1 : *Surveillance level rationale*

Year	*Surveillance activity*	*Number of auditors*	*Rationale*
1 (2019)	Off-site	2 auditors	Information on the early development of a harvest control rule and on progress on conditions regarding habitats can be evaluated by information provided remotely. Any new information is usually available online and the MFRI and DF can easily be contacted for remote meetings if needed. The CAB concludes that an off-site surveillance is therefore sufficient.
2 (2020)	On-site	2 auditors	Although most relevant documents can be obtained online or electronically, an on-site audit for year 2 is considered to provide more detailed information on the harvest control rule development and the action plan for vulnerable habitats.
3 (2021)	Off-site	2 auditors	See above. Information is readily available online, stakeholder cooperation is good, they are easy to contact via e-mail or phone and can be reached for remote meetings. Off-site surveillance would therefore suffice for this fishery.
4 (2022)	On-site	2 auditors	As year 4 marks the starts of re-assessment and on-site surveillance should be conducted in parallel. Although most of relevant documents can be obtained online or electronically, face-to-face meetings would provide more detailed status of the fishery before re-assessment.

Table A4.2: *Timing of surveillance audit*

Year	*Anniversary date of certificate*	*Proposed date of surveillance audit*	*Rationale*
1	December 2019	December 2019	Surveillance audit conducted at the anniversary of the certificate.
2	December 2020	December 2020	Surveillance audit conducted at the anniversary of the certificate.
3	December 2021	December 2021	Surveillance audit conducted at the anniversary of the certificate.
4	December 2022	December 2022	Surveillance audit conducted at the anniversary of the certificate.

Table A4.3: *Fishery Surveillance Program*

Surveillance Level	*Year 1*	*Year 2*	*Year 3*	*Year 4*
Level 4	Off-site surveillance audit	On-site surveillance audit	Off-site surveillance audit	On-site surveillance audit & re-certification site visit

Table A4.4: *Table G13 in FCR 2.0 for assessing the information available to determine surveillance level.*

	Ability to verify remotely is low	*Ability to verify remotely is high*	*CAB evaluation*
Client and stakeholder input	Electronic forms of communication and other mechanisms to engage with clients and stakeholders (such as video conferencing, phone conferencing, email, phone) are absent, limited or inefficient and ineffective in providing the information required for an audit in the particular circumstances of the fishery.	There are ample opportunities and mechanisms to engage with clients and stakeholders including electronic forms of communication, such as videoconferencing phone conferencing, email, phone. The mechanisms are effective in the particular circumstances of the fishery.	Electronic forms of communication are widely available throughout Iceland. Ability to verify remotely: High
Fishery reports, government documents, stock assessment reports and/or other relevant reports	Fishery reports and other types of reports required for the surveillance, and to demonstrate fishery performance in relation to any relevant conditions and on-going performance against the MSC's standard are not available publicly and cannot be transmitted electronically. There is no remote access to the information and there are none, or very limited other sources available to triangulate and confirm status of the fishery with respect to the MSC standard.	Fishery reports and other documented evidence that can be used to demonstrate progress against conditions and other issue relevant to the MSC Principles and criteria can be easily and transparently checked remotely, due to such information being available publically, such as being available on a website or having been widely distributed and made publically available to several stakeholders. The reports can be transmitted electronically and veracity easily confirmed.	All document relating Icelandic fisheries advice, research and management are available online or can be obtained electronically. Both the MFRI and the Directorate of Fisheries publish relevant documents online. Ability to verify remotely: High
Information appropriate to determination	Information from electronic monitoring of position, observer data, logbooks, fisher interviews, dockside monitoring etc. is required for audits but cannot be easily transmitted to a remote auditor in a form that can be easily interpreted.	Where Information from electronic monitoring of position, observer data, logbooks, fisher interviews, dockside monitoring etc. is required to verify performance against MSC standard, this information is available to be transmitted electronically to auditors in a form that can be easily interpreted.	The Directorate of Fisheries publishes data on landings/electronic logbooks online in real time. Information on infringements are also published online, in addition to annual reports. Ability to verify remotely: High

Transparency of the management system	Level of transparency of information by management is low such that information about performance of the fishery is generally not easily and widely available.	There is a high level of transparency in management, such that information on the fishery is widely and publicly available or known to the wider group of stakeholders. Any information provided on the fishery can be easily verified	Information on fisheries is transparent and widely available online and public. Information provided by the fishery can easily be verified by checking online sources or through direct contact with relevant officials. Ability to verify remotely: High
Vessels, gear or other physical aspect of the fishery	There are milestones and conditions that require inspection of vessels or other physical aspects of the fishery during the audit and there are no reliable mechanisms for verifying these aspects of the fishery from a remote location.	There are no milestones that require investigation of physical aspects of the fishery or if there are, there are reliable mechanisms to enable verification of developments with respect to that milestone from a remote location.	Milestones in the fishery do not require investigation of physical aspects of the fishery and can be verified by documentation or remote meetings. Ability to verify remotely: High

Appendix 5: Objections Process