Vottunarstofan Tún ehf.
Sustainable Fisheries Scheme

Marine Stewardship Council Fisheries Assessment

ISF Iceland Multi-Species Demersal Fishery

Public Certification Report

1st re-assessment of the combined ISF Iceland saithe, ling, Atlantic wolffish and plaice fishery and the ISF Iceland golden redfish, blue ling and tusk fishery

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

September 2019

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Assessment Team Members & Staff:

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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)
DLS	Data Limited Stock
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 demersal fisheries for seven species (saithe, ling, Atlantic wolffish, plaice, golden redfish, blue ling and tusk) and six different fishing methods (bottom trawl, *Nephrops* trawl, Danish seine, longline handline and gillnet,) within the Icelandic Exclusive Economic Zone (EEZ), North-east Atlantic, and ICES division 5.a.2 against the Marine Stewardship Council's (MSC) Principles and Criteria for Sustainable Fishing.

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 Principles and Criteria for Sustainable Fishing. 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 and staff:

- Rod Cappell: Team leader and expert responsible for Principle 3 issues;
- Paul A.H. Medley: Expert assessor co-responsible for Principle 1 issues;
- Robert O´Boyle: Expert assessor co-responsible for Principle 1 issues;
- Jo Gascoigne: Expert assessor co-responsible for Principle 2 issues;
- Gudrun Gaudian: Expert assessor co-responsible for Principle 2 issues;
- Louise le Roux: Assessment Secretary on behalf of Vottunarstofan Tún.

1.3 Outline of the Assessment

Full assessment of the ISF Iceland multi-species demersal fishery was initiated in September 2018 and covers seven species (saithe, ling, Atlantic wolffish, plaice, golden redfish, blue ling and tusk) and six different fishing methods (bottom trawl, *Nephrops* trawl, Danish seine, longline handline and gillnet). 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. Nine conditions and two 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 internal and Client review in February of 2019, a Peer Review Draft Report in April, Public Comment Draft Report in June and Final Report in early August.

1.4 Main Strengths and Weaknesses of the Assessed Fishery

Strengths:

- Robust stock assessments, reporting and recording of catches
- No discards permitted in the fishery
- Comprehensive management regime with good industry involvement in governance

Weaknesses:

- HCRs need to be better defined for some target species (wolffish, plaice and blue ling)
- By-catch of seabird and marine mammals in the gillnet and longline fisheries requires better monitoring and management.

1.5 Overall Conclusion

The ISF Iceland multi-species demersal 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		**Atlantic Wolffish**	**Blue Ling**	**Golden Redfish**	**Ling**	**Plaice**	**Saithe**	**Tusk**
Principle 1 – Target Species		80.0	83.3	82.5	88.3	80.0	86.7	88.3
Principle 2 Ecosystem*	Bottom trawl TB	86.3	86.3	86.3	86.3	86.3	86.3	86.3
	Nephrops trawl TN	86.3	86.3	86.3	86.3	86.3	86.3	86.3
	Danish seine SD	87.3	87.3	87.3	87.3	87.3	87.3	87.3
	Longline LL	82.0	82.0	82.0	82.0	82.0	82.0	82.0
	Handline LH	87.3	87.0	87.3	87.3	87.0	87.3	87.3
	Gillnet GN	81.0	80.7	81.0	81.0	81.0	81.0	81.0
Principle 3 – Management System		87.7	87.7	87.7	87.7	87.7	87.7	87.7
* Note: variation in P2 scores of the same gear type results from varied scores for 2.1 dependent upon the catch profile of the gears in relation to the species concerned.								

1.6 Determination, Conditions and Recommendations

The assessment team recommends that the fisheries continue to be granted certification against the MSC Fisheries Standard as a well-managed and sustainable fishery.

This determination is made provided the following conditions set are sufficiently addressed in a plan of action submitted by the Client (see also section 6 and Appendix 1.3).

No.	***Units of Assessment***	***Condition***	***Performance Indicator***	***Related to previous condition? (Y/N/NA)***
1	Atlantic wolffish – All gears	Well-defined HCRS should be in place	1.2.2	Y
2	Plaice – All gears	Well-defined HCRS should be in place	1.2.2	Y
3	Blue Ling – All gears	Well-defined HCRS should be in place	1.2.2	Y
4	Gillnet	Secondary species above biologically based levels or ensure UoA does not hinder recovery	2.2.1	Y
5	Gillnet & Longline	A partial strategy is in place to ensure secondary species are above biologically based levels and/or ensure UoA does not hinder recovery, which is subject to regular review for alternative measures.	2.2.2	Y
6	Gillnet & Longline	Information is adequate to assess the risk posed by UoA fisheries to secondary species	2.2.3	Y
7	Gillnet & Longline	UoAs are highly likely to not hinder recovery	2.3.1	Y

		of ETP species.		
8	Gillnet & Longline	A strategy is in place to manage impacts of UoAs on ETP species	2.3.2	Y
9	Gillnet & Longline	Information is adequate to assess the UoA related mortality and impact on ETP species and support a strategy to manage impacts on ETP species.	2.3.3	Y

Furthermore, two **recommendations** are made for the fishery:

Recommendation 1:

PIs 2.1.2 and 2.1.3 – Longline and handline

It is recommended that the bait used and the source of that bait be better documented in the longline and handline fisheries to ensure that only stock identified as sustainable be used as a source of bait.

Recommendation 2:

PI 2.4.2 – All gears

The client is encouraged to contribute to the success of the Joint Committee for the improved handling of Marine Resources (an approximate translation from the Icelandic) and to continue the implementation of the newly introduced project to interview fishers as part of habitat mapping.

2 Authorship and Peer Reviewers

2.1 Team Members and Assessment Secretary

Rod Cappell – Team Leader, primarily responsible for Principle 3 and RBF

Rod Cappell is a Director of Poseidon Aquatic Resources Management Ltd. and holds post-graduate degrees in Marine Resource Development and Environmental Economics. He has over 20 years´ experience in the fisheries and aquaculture sectors, working throughout Europe, Africa, the Middle East and Asia for public and private sector clients.
Rod has 9 years´ experience in MSC assessment as a team leader and P3 expert. He is experienced in the use of the Risk Based Framework and in version 2.0 of the MSC standard. Rod was part of assessment teams, often as team leader, for 12 now certified fisheries and has undertaken numerous other assessments and pre-assessments of fisheries in the UK, Europe and further afield. Current assessments include the West Greenland offshore Greenland Halibut fishery and a number of re-assessments. Rod is also involved with Fishery Improvement Plans in Europe and China.

Vottunarstofan Tún confirms that Rod Cappell meets the fishery team leader qualification and competency criteria specified in Annex PC1, Table PC1, in particular:

- has a university degree in marine biology and in marine resource development and protection;
- has over five years´ experience in the fisheries sector related to the tasks under his responsibility;
- has passed MSC team leader training;
- meets the qualifications and has the competencies specified in section 2 of Table PC1, taking into account MSC´s 2018 clarification of requirement (b);
- has undertaken 2 MSC fishery assessments or surveillance site visits as team member in the last 5 years;
- has the experience in applying different types of interviewing and facilitation techniques and the ability to effectively communicate with the client and other stakeholders.

Furthermore, Rod has the qualifications and competencies required for serving as an assessor as outlined in Annex PC3, Table PC3.

Vottunarstofan Tún confirms that Rod Cappell has no conflicts of interest in relation to the ISF Iceland multi-species demersal fishery.

Dr Paul A.H. Medley – Team Member co-responsible for Principle 1 issues and Principle 2 issues of component 2.1

Dr Paul Medley is an independent fisheries consultant, based in the UK. His expertise includes mathematical modelling of fisheries and ecological systems, techniques for multispecies stock assessment and external review of stock assessment methodologies. He has been an invited expert for a number of stock assessment working group meetings. He has a wide practical experience in marine biology, including design and implementation of surveys and fisheries experiments. This includes addressing wider environmental issues of ecological management, including maintenance of marine biodiversity. He has taken part in several MSC fishery assessments and has worked with MSC on new methodology developments. Dr. Medley has a university degree (Ph.D.) in fisheries science, he has over five years ́ experience in the fisheries sector related to the tasks under his responsibility and has passed MSC team leader training.

Vottunarstofan Tún confirms that Dr. Medley 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/member training;
- has undertaken 2 MSC fishery assessments or surveillance site visits as team member in the last 5 years;
- has the experience in applying different types of interviewing and facilitation techniques and the ability to effectively communicate with the client and other stakeholders.

Furthermore, Dr. Medley has the qualifications and competencies required for serving as an assessor as outlined in Annex PC3, Table PC3.

Vottunarstofan Tún confirms that Dr. Paul Medley has no conflicts of interest in relation to the ISF Iceland multi-species demersal fishery.

Robert O´Boyle – Team Member co-responsible for Principle 1 issues and Principle 2 issues of component 2.1

Robert O'Boyle received his B.Sc. and M.Sc. from McGill and Guelph Universities in 1972 and 1975 respectively. He was with Canada's Department of Fisheries and Oceans (DFO) at the Bedford Institute of Oceanography (BIO) in Dartmouth, Nova Scotia during 1977 - 2007. During this time, he conducted assessments and associated research on the region's fish resources (e.g. herring, capelin, cod, haddock, pollock, flatfishes, sharks) as well as developed analytical tools required to undertake these assessments. He was responsible for the research programs and assessment-related activities of over 80 scientific and support staff. He subsequently coordinated the regional science peer review and advisory process for fisheries and ocean uses and as Associate Director of Science, managed science programs at the regional and national level. He has been involved in a number of national and international reviews, ranging from resource assessment and management to science programs. He is currently president of Beta Scientific Consulting Inc. (betasci.ca) which provides technical review, analyses and assessment of ocean resources and their management. Projects have included analyses and assessments of groundfish species (e.g. cod, haddock, flatfish), forage fish (e.g. herring and menhaden), deepwater fish (e.g. cusk) and endangered species (e.g. leatherback turtle). He has been and is currently the principle one or two expert in over 40 MSC certifications in the Northwest and Northeast Atlantic, Arctic, and Pacific oceans for a range of species - from large (swordfish & tuna) to small pelagics (herring & sardine) and groundfish (cod, haddock, pollock, saithe, hake, flatfish). He was involved in the CR2 standard Calibration Workshops, has completed the MSC training for CR1.3 and 2.0 and is a member of MSC Peer Review College. He has been the chair and / or reviewer of numerous stock assessments and has prepared special reports on ocean management issues for government, industry and NGO groups. He was a member of the Scientific and Statistical Committee of the New England Fisheries Management Council during 2008-2016 and as such reviewed technical analyses including stock assessments and management procedures. He pursues research related to resource and ocean management and assessment and has published over 100 primary papers, special publications and technical reports. Recent projects include the impact of climate change on New England groundfish assessments, the trophic dynamics of the Eastern Scotian Shelf ecosystem, the impact of fish migrations on assessed fishery selectivity patterns, risk analysis in data poor assessments and the interaction of cod and grey seals in the Northwest Atlantic.

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

- has a university degree (MSc) in biology;
- has over five years´ experience in the fisheries sector related to the tasks under his responsibility;

- has passed MSC team member training;
- has undertaken 2 MSC fishery assessments or surveillance site visits as team member in the last 5 years;
- has the experience in applying different types of interviewing and facilitation techniques and the ability to effectively communicate with the client and other stakeholders.

Furthermore, Robert has the qualifications and competencies required for serving as an assessor as outlined in Annex PC3, Table PC3.

Vottunarstofan Tún confirms that Robert O´Boyle has no conflicts of interest in relation to the ISF Iceland multi-species demersal fishery.

Dr Jo Gascoigne – Team Member co-responsible for Principle 2 issues of components 2.2-2.5

Dr Jo Gascoigne has a degree in Zoology from Cambridge University in the UK, and a PhD in marine conservation biology from the Virginia Institute of Marine Science (VIMS) in the US, based around modelling and experimental studies on the population dynamics of exploited marine populations, particularly shellfish. She worked as a postdoctoral researcher and Research Lecturer at Bangor University in the UK for four years, before becoming an independent consultant. Dr Gascoigne has conducted dozens of research projects, reviews and policy reports dealing with issues of sustainability, environmental impact and management practices of numerous fisheries, for private consultancies, government bodies and the EU. She has co-authored over 15 peer reviewed articles on the population dynamics, biology and ecology of marine organisms. In the last 8 years Dr Gascoigne has served as independent expert in dozens of fisheries evaluation, marine ecology and aquaculture projects. She has participated as Team Leader in over 13 MSC full assessments, including three Icelandic fisheries certified in 2014 (Icelandic gillnet lumpfish, ISF Iceland saithe and ISF golden redfish). Furthermore, she has conducted numerous MSC pre-assessment studies. Her assessment experience ranges from crustaceans and molluscs to small pelagics, tuna and demersal fish species.

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

- has a university degree (Ph.D.) in biology;
- has over five years´ experience in the fisheries sector related to the tasks under his responsibility;
- has passed MSC team member training;
- has undertaken 2 MSC fishery assessments or surveillance site visits as team member in the last 5 years;
- has the experience in applying different types of interviewing and facilitation techniques and the ability to effectively communicate with the client and other stakeholders.

Furthermore, Jo Gascoigne has the qualifications and competencies required for serving as an assessor as outlined in Annex PC3, Table PC3.

Vottunarstofan Tún confirms that Jo Gascoigne has no conflicts of interest in relation to the ISF Iceland multi-species demersal fishery.

Dr Gudrun Gaudian – Team Member co-responsible for Principle 2 issues of components 2.2-2.5

Dr Gudrun Gaudian is an experienced marine ecologist and taxonomist, including coastal and marine surveys, EIA's for coastal infrastructure development and tourism, and research projects in tropical and temperate seas. Work experience also includes coastal and marine management issues, such as identifying sustainable coastal development projects, as well as addressing conservation issues, including selection and planning of marine parks and reserves, sustainable utilisation of natural resources and community based management programmes. Projects have been undertaken in temperate, polar and tropical marine regions. Since 2010 Dr Gaudian has been working in fisheries certification, applying the Marine Stewardship Council standard for sustainable fisheries, primarily as Principle 2 assessor, both as Team Leader and Team Member. Other relevant work carried out includes pre-assessments, peer reviews and MSC workshops. Furthermore, Dr Gaudian holds an LLM degree in Environmental Law and Management, giving a deeper understanding of law and policy dealing with such relevant issues as the Common Fisheries Policy, water and waste management, and international environmental law including EU environmental policy.

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

- has a university degree (Ph.D.) in biology;
- has over five years´ experience in the fisheries sector related to the tasks under his responsibility;
- has passed MSC team member training;
- has undertaken 2 MSC fishery assessments or surveillance site visits as team member in the last 5 years;
- has the experience in applying different types of interviewing and facilitation techniques and the ability to effectively communicate with the client and other stakeholders.

Furthermore, Gudrun Gaudian has the qualifications and competencies required for serving as an assessor as outlined in Annex PC3, Table PC3.

Vottunarstofan Tún confirms that Gudrun Gaudian has no conflicts of interest in relation to the ISF Iceland multi-species demersal 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 this fishery. However, having established the availability of information and reference points, the team decided to not use the RBF approach, based on the availability of new data for main secondary species (historical trends in population size, see Principle 2 section for details) which results in these species conforming to the requirements of FCRG Table 3 (i.e. empirical stock status reference points are available). 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, from which Dr Don Bowen and Dr Lisa Borges were subsequently appointed peer reviewers of this assessment report:

Don Bowen
Dr William Don Bowen is a Ph.D. graduate of the University of British Columbia, Vancouver, British Columbia, Canada. He retired from the Department of Fisheries and Oceans in May 2016 after 37 years with the Department. Prior to his retirement, he was a research scientist at the Bedford Institute of Oceanography, Department of Fisheries and Oceans (DFO) and an Adjunct Professor of Biology at Dalhousie University, Halifax, Nova Scotia for 31 years. He is currently an Emeritus Research Scientist at the Bedford Institute of Oceanography and continues his adjunct position at Dalhousie University. He has conducted research mainly on the ecology and population dynamics of North Atlantic seals. His professional interests also include mammalian life histories, population assessment, ecological interactions with fisheries, conservation, and ecosystem change. From 1985 to 1989, he managed fish and marine mammal stock assessments and ecological research on the Scotian Shelf for the DFO. He has published 240 scientific papers, including 170 journal articles and book chapters, and has edited two books. He has served on the USA recovery team of the Hawaiian

monk seal, and as chair of the UK Special Committee on Seals. He has broad national (Natural Science and Engineering Research Council, DFO) and international (US National Academy, US National Science Foundation, US Center for Independent Experts, US National Marine Fisheries Service, UK Natural Environment Research Council, North Pacific Research Board) experience as a science advisor and served as member of the Board and Editor of Marine Mammal Science for five years. For nine years he chaired the National Marine Mammal Peer Review Committee of DFO, the body responsible for providing science advice to the Minister of Fisheries. He has considerable experience as an MSC assessor (Alaska pollock, Pacific cod, Flatfishes) in the Bering Sea and Gulf of Alaska and has been an MSC peer reviewer of Cornish Hake, US West Coast groundfish trawl fisheries, Icelandic Blue Whiting, Orange Roughy, and West Greenland Halibut.

Lisa Borges

Dr Lisa Borges has been a fishery scientist for the last 18 years and now runs her own consultancy firm. Lisa has a BSc in Marine Biology & Fisheries from the University of the Algarve (Portugal), an MSc in Fisheries from the University of Porto (Portugal), and a PhD on discards from demersal fisheries from the National University of Ireland. She has worked for three national fisheries research institutes, which include IPIMAR (Portugal), the Marine Institute (Ireland), and IMARES (The Netherlands). Lisa has extensive knowledge and experience of assessing the environmental impact of fisheries, with a particular focus on discards and bycatch. She also has knowledge and experience of fisheries management policies, including harvest control rules, management plans and discard policy development. Lisa developed conservation policies for Atlantic fish stocks when she worked for the European Commission in Belgium. Lisa has experience in both pelagic and demersal stock assessments, and is familiar with MSC assessment procedures, having participated as a principle 1 and 2 expert on several assessments over the last four years.

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 Atlantic wolffish (*Anarhichas lupus*), blue ling (*Molva dipterygia*), golden redfish (*Sebastes norvegicus*), ling (*Molva molva*), plaice (*Pleuronectes platessa*), saithe (*Pollachius virens*) and tusk (*Brosme brosme*), caught by bottom trawl, Nephrops trawl, Danish seine, gillnet, handline and longline from the Icelandic stock (ICES Division 5.a) by vessels (Icelandic, Faroese, Norwegian and Greenlandic) licenced to operate within the Icelandic EEZ.

For clarity, the 42 UoAs are described by species (in alphabetical order) and gear in a consistent order throughout the report.

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 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 1: Unit(s) of Assessment and proposed Unit(s) of Certification

Units of Assessment (42)	
Fish stock	The following seven (7) target species in ICES subarea 5.a: Atlantic wolffish *(Anarhichas lupus)* Blue ling *(Molva dipterygia)* Golden redfish *(Sebastes norvegicus)* Ling *(Molva molva)* Plaice *(Pleuronectes platessa)* Saithe *(Pollachius virens)* Tusk (*Brosme brosme*)
Location of Fishery	FAO Statistical Area 27 / ICES 5.a; Icelandic Exclusive Economic Zone
Management	Ministry of Industries and Innovation (MII)
Fishing Methods	The following six (6) gears are assessed for each of the seven species: Bottom Trawl (TB)
	Nephrops Trawl (TN)
	Danish Seine (SD)
	Long line (LL)
	Handline (LH)
	Gillnet (GN)
Fishery Practices	All registered vessels (Icelandic, Faroese, Norwegian and Greenlandic) that carry valid permits for fishing within the Icelandic Exclusive Economic Zone issued by the Icelandic Directorate of Fisheries.
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 (42)	
Fish stock	The following seven (7) target species in ICES subarea 5.a: Atlantic wolffish *(Anarhichas lupus)* Blue ling *(Molva dipterygia)* Golden redfish *(Sebastes norvegicus)* Ling *(Molva molva)*

	Plaice *(Pleuronectes platessa)* Saithe *(Pollachius virens)* Tusk (Brosme brosme)
Location of Fishery	FAO Statistical Area 27 / ICES 5.a; Icelandic Exclusive Economic Zone
Management	Ministry of Industries and Innovation
Fishing Methods	The following six (6) gears are assessed for each of the seven species: Bottom Trawl (TB)
	Nephrops Trawl (TN)
	Danish Seine (SD)
	Long line (LL)
	Handline (LH)
	Gillnet (GN)
Fishery Practices	All registered vessels (Icelandic, Faroese, Norwegian and Greenlandic) that carry valid permits for fishing within the Icelandic Exclusive Economic Zone issued by the Icelandic Directorate of Fisheries.
Eligible Fishers	Any new entry to the group of registered vessels catching these species in other MSC certified fisheries within Icelandic jurisdiction.

The UoAs are the same multi-gear fisheries as other MSC certified fisheries, including anglerfish, cod, Greenland halibut, haddock and lemon sole. 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.

Although several out-of-scope species are affected by the fisheries (see section 0) 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 0).

The ISF Iceland multi-species demersal fishery is within scope of the MSC standard. The CAB confirmed the following:

- The fishery does not target amphibians, birds, reptiles, or mammals and do not use poisons or explosives.
- The fishery is subject to Icelandic jurisdiction and are 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 an introduced species-based fishery (ISBF).
- There is no inseparable or practically inseparable (IPI) species caught in the fishery. As outlined in section 5.5 of the PCR for the golden redfish fishery, there are other *Sebastes* species caught in the same grounds as this one, but fishery practices are in place to minimize mixing.
- The CAB reviewed any available information to determine the unit of assessment required (see below).
- The fishery has not failed an assessment within the last two years.
- The client has issued a letter to confirm willingness to share certificate (see below).

- The fishery may have elements overlapping with other fisheries within the Icelandic EEZ that have undergone full MSC assessment. These fisheries are:
    - ISF Iceland cod;
    - ISF Iceland haddock;
    - Icelandic gillnet lumpfish (withdrawn at the time of the PRDR);
    - ISF Norwegian & Icelandic herring trawl & seine;
    - ISF Iceland capelin;
    - ISF Iceland mackerel (suspended at the time of the PRDR);
    - ISF Iceland anglerfish;
    - ISF Greenland halibut;
    - Iceland North East Atlantic blue whiting;
    - ISF Iceland northern shrimp - inshore & offshore;
    - ISF Lemon sole.

The client is Iceland Sustainable Fisheries ehf (ISF). The purpose of this company is to obtain certification of fishing gears and fish stocks exploited around Iceland and to regulate their utilisation. The company's shareholders are Icelandic fishing, fish processing and trading/exporting companies. ISF has issued a statement outlining its policy on arrangements for certificate sharing.

Statement of ISF´s Policy on Certificate Sharing Arrangements for:
ISF Iceland saithe, ling, Atlantic wolffish and plaice fishery
ISF Iceland golden redfish, blue ling and tusk fishery

Iceland Sustainable Fisheries (ISF) ehf. confirms its willingness to share the expected MSC re-certification of the above two fisheries, under the banner of a single fishery name and certificate, ISF Iceland multi-species demersal fisheries.

Atlantic wolffish, blue ling, golden redfish,ling , plaice, saithe and tusk from the specified Units of Certification will be eligible for marketing with reference to the certificate, provided the fish is caught, supplied and/or sold through Iceland Sustainable Fisheries ehf., its individual shareholders, and/or its authenticated certificate sharers.

Any Icelandic holders of permits, issued by the Icelandic Directorate of Fisheries, for the fishing of Atlantic wolffish, blue ling, golden redfish,ling , plaice, saithe and tusk, and/or Icelandic processors and/or Icelandic traders of those species of fish derived from the above fisheries, 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

The fishery is made up of 42 Units of Certification, as outlined in the table below.

Species and areas	***Gear type***					
	A	***B***	***C***	***D***	***E***	***F***
	Bottom trawl	***Nephrops trawl***	***Danish seine***	***Gillnet***	***Longline***	***Handline***
Saithe ICES Va	1A Saithe bottom trawl	1B Saithe Nephrops trawl	1C Saithe Danish seine	1D Saithe gillnet	1E Saithe longline	1F Saithe handline
Ling ICES Va	2A Ling bottom trawl	2B Ling Nephrops trawl	2C Ling Danish seine	2D Ling gillnet	2E Ling longline	2F Ling handline
Atlantic wolffish ICES Va	3A Atlantic wolffish bottom trawl	3B Atlantic wolffish Nephrops trawl	3C Atlantic wolffish Danish seine	3D Atlantic wolffish gillnet	3E Atlantic wolffish longline	3F Atlantic wolffish handline
Plaice ICES Va	4A Plaice bottom trawl	4B Plaice Nephrops trawl	4C Plaice Danish seine	4D Plaice gillnet	4E Plaice longline	4F Plaice handline
Golden redfish ICES Va; also *Vb, XIVb1 and XIVb2*	5A Golden redfish bottom trawl	5B Golden redfish Nephrops trawl	5C Golden redfish Danish seine	5D Golden redfish gillnet	5E Golden redfish longline	5F Golden redfish handline
Blue ling ICES Va	6A Blue ling bottom trawl	6B Blue ling Nephrops trawl	6C Blue ling Danish seine	6D Blue ling gillnet	6E Blue ling longline	6F Blue ling handline
Tusk ICES Va	7A Tusk bottom trawl	7B Tusk Nephrops trawl	7C Tusk Danish seine	7D Tusk gillnet	7E Tusk longline	7F Tusk handline

Operators eligible to supply the client members with fish from the certified Units of Certification include all registered Icelandic fishing vessels, as well as vessels registered in Norway, the Faroe Islands and Greenland, licensed by Icelandic Directorate of Fisheries for fishing within the Icelandic EEZ under the terms of bi- or multi-lateral agreements of Iceland and the three respective countries.

Other eligible fishers include any new entry to the group of registered Icelandic, Norwegian, Faroese and Greenlandic vessels targeting the saithe, ling, Atlantic wolfish, plaice, golden redfish, blue ling and tusk stocks and/or that are incidentally catching saithe, ling, Atlantic wolfish, plaice, golden redfish, blue ling and tusk in other MSC certified fisheries within the Icelandic EEZs.

3.1.3 Total Allowable Catch (TAC) and Catch Data

Table 2: Catch data of saithe, ling, Atlantic wolffish, plaice, golden redfish, blue ling and tusk in the ***ISF Iceland Multi-species demersal*** *fishery. Source: Landings from www.fiskistofa.is[1]. Landings are reported by quota year, which is 1st of September to 31st of August.*

Species/gear	Total green weight (t) catch by UoC (2017/18)	Total green weight catch by UoC (2016/17)	Species/gear	Total green weight (t) catch by UoC (2017/18)	Total green weight (t) catch by UoC (2016/17)
Atlantic Wolffish			**Blue ling**		
Demersal otter trawl	1662	1582	Demersal otter trawl	326	490
Gillnet	5	6	Gillnet	2	2
Handline	16	6	Handline	0	0
Danish seine	2145	1273	Danish seine	13	5
Longline	5588	4550	Longline	165	86
Nephrops trawl	85	75	*Nephrops* trawl	43	52
Golden redfish			**Ling**		
Demersal otter trawl	47314	44503	Demersal otter trawl	1538	1674
Gillnet	82	92	Gillnet	370	567
Handline	122	117	Handline	7	19
Danish seine	586	346	Danish seine	172	175
Longline	1208	1233	Longline	4384	4330
Nephrops trawl	2214	1787	*Nephrops* trawl	537	532
Plaice			**Saithe**		
Demersal otter trawl	2247	1886	Demersal otter trawl	54330	40700
Gillnet	182	143	Gillnet	1318	1447
Handline	7	0	Handline	1059	1062
Danish seine	5602	4142	Danish seine	1047	807
Longline	136	146	Longline	653	693
Nephrops trawl	3	2	*Nephrops* trawl	413	416
Tusk					
Demersal otter trawl	65	58			
Gillnet	4	4			
Handline	4	3			
Danish seine	0	0			
Longline	2123	1630			
Nephrops trawl	1	1			

[1] http://www.fiskistofa.is/veidar/aflaupplysingar/bradabirgdatolur/

3.2 Overview of the fishery

3.2.1 Icelandic demersal fisheries

Demersal fisheries have a long history in Iceland, but the first mechanised trawler arrived in Iceland 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.

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.

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. Many of the smaller 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 target cod or shrimp in distant waters.

3.2.2 UoA Fishing methods

The six fishing gears used by the UoAs have all been assessed under existing MSC certificates and are described briefly below with links to further information provided.

Bottom trawls (TB) are designed and rigged to have bottom contact during fishing. In the groundfish fisheries, the minimum mesh size is 135 mm. Shrimp trawls are not included in this gear. They are towed across the bottom at speeds ranging from 1 to 7 knots (0.5-3.5 m/s), frequently between 3 and 5 knots. Duration of a tow mainly depends on the expected density of fish (whether fish is aggregated or not) the shape of the bottom and the slope in the fishing area, from a few (10-15 minutes) up to 10-12 hours, commonly 3-5 hours. http://www.fao.org/fishery/geartype/205/en.

Nephrops trawls (TN) operate in the same manner as bottom trawls (above), but with a smaller mesh (79-99mm) compared to whitefish trawls and selectivity devices are required in some fishing areas. The shrimp-targeted fishery (with a minimum mesh size of 35mm and use of sorting grids) is not included in this assessment.

Danish seine (SD). Seines are usually set from a boat to surround a certain area and are hauled either from the shore (beach seines) or from the boat itself (boat seines). For more details on this method: http://www.fao.org/fishery/geartype/102/en

Longline (LL) were developed from handlines. Longline may be as long as 20 km and have up to 16,000 hooks. The longline is usually left near the bottom for one to four hours. Longline can be used on rough ground and has the benefit versus many other gears that the fish are usually alive when the line is hauled in the boat.

Handlines (LH) Hooks and lines are gear where the fish is attracted by a natural or artificial bait (lures) placed on a hook fixed to the end of a line or snood, on which they get caught. Hooks or metallic points (jigs) are also used to catch fish by ripping them when they pass in its range of movement. Hook and line units may be used singly or in large numbers.

Gillnets (GN) and entangling nets are strings of single, double or triple netting walls, vertical, near by the surface, in midwater on the bottom, in which fish will gill, entangle or enmesh. When 'gillnet' is referred to in this assessment, it means cod gillnets only. The most common gillnets used in cod fisheries have a 14 to 20 cm mesh size, the former being the minimum allowed in most grounds (www.fisheries.is). Other versions of bottom gillnets used in Icelandic fisheries require larger mesh sizes and other regulated specifications based on target species (anglerfish and lumpfish).

Gillnets and entangling nets have floats on the upper line (headrope) and, in general, weights on the ground-line (footrope). Gillnets or entangling nets consist in single or, less commonly, double (both are known as "gillnets", strictly speaking) or triple netting (known as "trammel net") mounted together on the same frame ropes. Several types of nets may be combined in one gear (for example, combined gillnets-trammel nets). These nets can be used either alone or, as is more usual, in large numbers placed in line ('fleets' of nets). The gear can set, anchored to the bottom or left drifting, free or connected with the vessel. (See further at FAO).

3.3 Principle One: Target Species Background

3.3.1 Reference points

Fishing mortality (F) and spawning stock biomass (SSB) reference points (RPs) are used, through harvest control rules, to inform MII's management of the seven Principle 1 stocks. These have been developed by ICES and MFRI over a number of years and not all stocks use the complete suite of RPs.

The first set of RPs is associated with the ICES precautionary approach (PA) and is intended to ensure that F does not reduce SSB to a critically low level (B_{lim}), interpreted here as the point at which there is an appreciable risk of impairing reproductive capacity (MSC point of recruitment impairment: PRI). Below a specified biomass (B_{PA} or $B_{trigger}$), fishing mortality is reduced such that SSB has a high probability (95%) of remaining above B_{lim}. Similarly, if F is above F_{lim}, it is reduced to F_{PA} to ensure that F is below F_{lim} with high probability (95%) and that harvesting is sustainable. B_{lim} and F_{lim} are used in the evaluation of the harvest strategies to judge whether or not the latter are precautionary. B_{lim} is often based upon the lowest observed SSB (termed B_{loss}) with B_{PA} derived from B_{lim} based on the precision of the assessment e.g. $B_{PA} = B_{lim}*e^{1.645*0.2}$, where it is assumed that the log-normal standard deviation of biomass estimates is 0.2. Depending upon the circumstances, the reverse is also done with B_{lim} based upon B_{PA}, again based on the precision of the assessment e.g. $B_{lim} = B_{PA} / e^{1.645*0.2}$.

ICES has provided advice to MII based on the precautionary approach since the late 1990s. More recently, reference points associated with MSY (Maximum Sustainable Yield) approach have been added to the ICES advice, the evolution of which is described by Lassen et al (2014). In the MSY set of RPs, the overarching objective is to ensure that F does not reduce SSB below that expected to produce Maximum Sustainable Yield (MSY). F_{MSY} is considered the target fishing mortality. For most stocks, the fishing mortality target (F_{MGT}) in the management plan has been set at or close to F_{MSY}. Many of the Icelandic managed stocks use an equivalent exploitation or harvest rate (HR), rather than instantaneous fishing mortality rate, to inform management. In these cases, the limit, precautionary and target HRs are estimated.

While B_{MSY} is not explicitly used in the ICES MSY approach, it is a notional value around which SSB fluctuates when $F = F_{MSY}$ or $H = HR_{MSY}$. There is often considerable variation in SSB associated with F_{MSY}. In policy, $B_{trigger}$ is considered the lower bound of fluctuations around B_{MSY}; thus when SSB drops below $B_{trigger}$, fishing mortality is reduced such that SSB can increase back to its notional target (Figure 1). Thus, whereas the PA reference points are used to ensure that the stock does not approach critically low SSB, the MSY reference points are used to ensure that stock does not vary significantly from the SSB expected at F_{MSY}. ICES (2018) indicates that determination of $B_{trigger}$ requires contemporary data with fishing at F_{MSY} to identify the range of biomass expected when stocks are fished at this fishing mortality. If the observations on biomass fluctuation are insufficient to estimate $B_{trigger}$, this RP is normally set at B_{PA} (when this reference point is available and there is no sound basis for using a different value). When sufficient observations of SSB associated with fishing at F_{MSY} are available, $B_{trigger}$ is to be re-estimated to correspond to the lower bound of the range of stock sizes associated with MSY. In the longer term, it is expected that F_{MSY} may be lower than $F_{PA,}$ while $B_{trigger}$ may be higher than B_{PA}.

It is important to note that many current estimates of $B_{trigger}$ are more related to B_{lim} than they are to B_{MSY}. For this reason, MSC Interpretation (MSC, 2017) on scoring stock status against B_{MSY} for ICES-advised stocks notes that $B_{trigger}$ should not be interpreted as a target reference point equal in intent and outcome to B_{MSY}. Teams are encouraged to consider proxy indicators and reference points associated with B_{MSY}. MSC (2017) recommends that to achieve an assumed status of B_{MSY}, fishing mortality should have been at or below F_{MSY} for at least one generation time from a starting biomass close to B_{PA} and two generation times from a starting biomass close to B_{lim}. These times to recover to B_{MSY} are dependent on the starting biomass. An 80 score may also be met when stock size is very substantially higher than B_{PA}, for instance greater than 2 * B_{PA}, irrespective of the above F proxies.

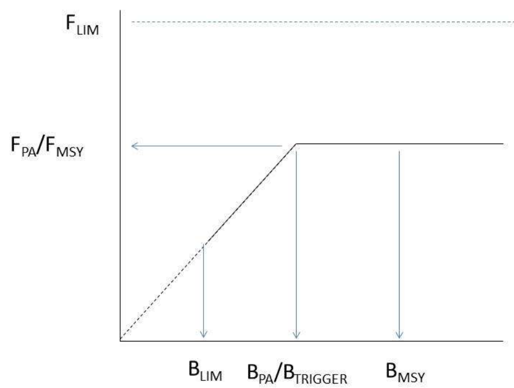

Figure 1 Relationship amongst the PA and MSY-related reference points of ICES; based on ICES (2018).

The reference points used in management of the seven Principle 1 stocks (Table 3) have developed over time, with the most recent ones for tusk, ling, golden redfish and saithe based upon the latest benchmark/HCR reviews (see Stock Assessment section). In the case of saithe, the RPs developed during the HCR review were subsequently updated by NWWG (2016). The Atlantic wolffish and plaice F_{MSY} proxy fishing mortality reference points have been in place since 2011, while that for Blue ling was established by ICES in 2016.

Table 3 Biomass and Fishing Mortality reference points of the seven Principle 1 stocks; values in parentheses interpreted and used by Tun assessment team in scoring.

	Atlantic Wolffish	Blue Ling	Golden Redfish	Ling	Plaice	Saithe	Tusk
B_{LIM}	(17 kt)	(592 t)	160 kt (lowest SSB)	7.09 kt=B_{PA}/1.4		44 kt = B_{PA}/1.4	4.46 kt=B_{PA}/1.4
B_{PA}	(24 kt)	(743.6 t)	220 kt (B_{LIM}xexp(0.2x1.645))	9.93 kt (B_{LOSS})		61 kt (B_{LOSS})	6.24 kt (B_{LOSS})
$B_{TRIGGER}$			220 kt = B_{PA}	9.93 kt = B_{PA}		65 kt (lower 5th ptle of SSB at HR_{MSY})	6.24 kt=B_{PA}
B_{MGT}			220 kt = B_{PA}	9.93 kt = B_{PA}		65 kt	6.24 kt = B_{PA}
B_{MSY}	(29 kt)	(1072 t)	400 (250-550) kt	31.2 (14.33-58.17) kt		130 (60-270) kt	15.2 (8.93-22.61) kt
F_{LIM}			0.226	0.7 (HR=0.56)		0.46	0.41 (HR=0.27)
F_{PA}			0.163 (F_{LIM}/exp(1.645x0.2)	0.41 (HR=0.35)		0.34 (F_{LIM}/exp(1.645x0.19)	0.27 (HR=0.2)
F_{MGT}	0.3 (F_{MAX})	1.75	0.097 (F_{MSY})	HR=0.18	0.22 ($F_{0.1}$)	HR=0.20	HR=0.13
F_{MSY}	(0.30)	1.75 $F_{MSY\ PROXY}$	0.097	0.284 (HR=0.24)	(0.30)	0.28 (HR=0.2)	0.23 (HR=0.17)

3.3.1.1 Atlantic Wolffish

The only reference point used in the management of the Atlantic wolffish fishery is a target fishery mortality (0.30) for 90 cm+ individuals, which is F_{MAX} from a size-based Yield-Per-Recruit (YPR) analysis and which corresponds to F_{age15} = 0.23 (Figure 2). This is interpreted by MFRI as an F_{MSY}

proxy. MFRI (2018h) states that natural mortality (M=0.10) is relatively low and thus the use of F_{max} as an F_{MSY} proxy is expected to provide a precautionary harvest strategy.

The suitability of F_{max} as an F_{MSY} proxy requires consideration. The shape of the YPR relationship is highly dependent upon the parameters used in the model, often resulting in difficulty in locating a reasonable fishing mortality at a maximal yield-per-recruit. YPR assumes no declining SR relationship. For this reason, alternate F_{MSY} proxies, such as $F_{0.1}$ and $F_{40\%SPR,}$ are often preferred (e.g. Restrepo et al, 1998). Mace (1994), in an examination of the appropriateness of various biological reference points, determined that, across a range of growth and natural mortality assumptions, F_{MAX} was generally larger than F_{MSY} except in populations in which strong density-dependent stock-recruitment dynamics (i.e. Ricker-type SR relationship) were present. For populations in which Beverton and Holt SR dynamics are present (similar to the Hockey-Stick SR function assumed in many Icelandic stocks), F_{max} will generally be above F_{MSY}, this difference decreasing with decreasing natural mortality and increasing SR steepness. At low natural mortality (0.1) and steepness greater than 0.7, conditions relevant to Atlantic wolffish, F_{max} was only slightly higher than F_{MSY} . Tun (2017b) considered that F_{max} was consistent with maintaining the stock above B_{MSY} based upon the historical trend in fishing mortality, the catch rate time series and the time series of harvestable biomass but recommended consideration of $F_{0.1}$ as a more suitable F_{MSY} proxy. The current team concurs with this assessment.

As noted earlier, no biomass-based reference points are used in the management of the fishery. Tun (2017b) noted that the stock has for a long time been a valuable catch for the Icelandic fleet as well as for the English and German fleets when they conducted their fisheries around Iceland until the end of the 1970s. The catch has been in the general range of 10-15 kt annually for the last 30 years. Since the 1980s, catch rates have been stable with biomass in general constant or increasing, and since 2000 has fluctuated around 30 kt. The harvest strategy in place is limiting catches in recent years and fishing mortality has been declining since 2005. Tun (2017b) concluded that it was possible to assume that the level of biomass observed in the last 15 years was consistent with B_{MSY}. The Tun assessment team generally agreed with this evaluation, coorborated by the observations below.

The lowest biomass in the time series is often used by ICES as a proxy for B_{LIM} if there is no evidence of recruitment impairment at this biomass, which is clearly the case here (see Stock Status section). 1.4*B_{LIM} is often used as a proxy for B_{PA}, which implies a PRI and B_{PA} of 17 kt and 23.8 kt respectively. The Yield Per Recruit (YPR) analysis provided in the 2018 assessment (Figure 2) indicates that at the F_{MSY} proxy (0.3), 0.75 gm of yield per age one recruit are expected. Over the last generation (T_{GEN}=16.5) of year-classes entering the stock, age one recruitment has averaged 11.5 million individuals (see Stock Status section), implying an MSY proxy catch of 11.5 * 0.75 = 8.6 kt with an associated notional estimate of B_{MSY} of 8.63 /0.3 = 28.8 kt., close to the 30 kt stated by Tun (2017b). The stock is currently undergoing preparations for a benchmark review during which biomass and fishing mortality reference points will be developed for a full HCR (see Harvest Strategy section).

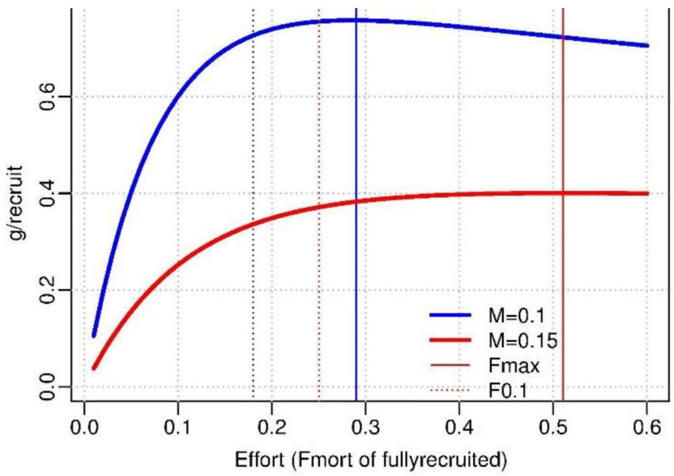

Figure 2 Age-based Yield Per Recruit analysis used to provide F_{MAX} fishing mortality target for Atlantic Wolffish; two relationships indicated (M=0.1 and 0.15) with that for M=0.1 used (vertical blue line); the fishery is managed using F on length 90 cm+ from which the target F is 0.3; at M = 0.1 and target F = 0.3, YPR = 0.75 g/age one recruit; from MFRI (2018h).

3.3.1.2 Blue Ling

As with Atlantic wolffish and plaice, the only reference point used by MII to manage the blue ling fishery is a target fishery mortality proxy. This has been used in the ICES framework for category 3 stocks as the basis of harvest advice since 2013 (ICES, 2012). This target reference point was confirmed by ICES as a proxy of F_{MSY} in 2016 (ICES, 2016). As there is no analytical assessment, relative fishing mortality (termed F_{proxy}) is estimated as combined catch from ICES areas 5.a and 14 divided by 40 cm+ biomass from the Icelandic autumn trawl survey. The F_{proxy} target (1.75) is estimated as the mean relative fishing mortality during 2002-2009 when fishing pressure was relatively constant and SSB was steadily increasing, implying that the harvest rate was considered sustainable (Figure 3). During this reference period, the survey index ranged 933 – 2037 t with a median of 1072 t, which is interpreted here as a notional survey index target, I_{MSY}.

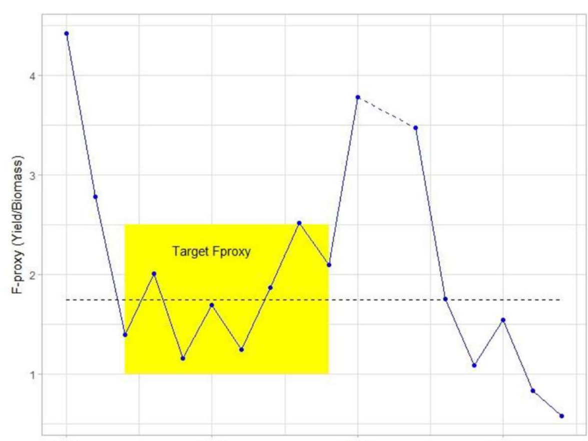

Figure 3 Change in relative fishing mortality (Yield/Survey biomass 40 cm+); yellow box highlights reference period used by ICES as basis for advice; blue dotted line is target F_{proxy} (1.75; mean of 2002–2009); from WGDEEP (2018)

No other reference points are used to inform MII management of the fishery. However, WGDEEP (2016) undertook analyses of potential limit and precautionary reference points based upon ICES (2013; 2016). Specifically, it had been shown that the F_{proxy} control rule, which includes a F_{proxy} target, a trigger point similar to $B_{trigger}$ and a catch buffer, performs considerably better than the DLS 3.2 rule, which includes neither a target nor trigger point (see Harvest Strategy section). Consistent with the findings of WKLIFE3, WGDEEP(2016) recommended use of the following limit and precautionary reference points based upon the autumn survey (IS-SMH) index (Figure 4):

- F_{MSY} proxy: 1.75 as previously established
- I_{lim}: lowest value (574.5 t in 2000) of IS-SMH biomass index
- $I_{PA}/I_{trigger}$: WKLIFE3 had suggested setting I_{PA} at 1.2*I_{lim}; WGDEEP (2016) considered it more appropriate to use information on uncertainty in the survey, therefore setting I_{PA} as the 95% quantile of I_{lim} using the mean CV (0.138) for the whole time series, $I_{PA} = 574.5 * e^{1.65*0.138} = 721.8$ t

ICES (2018) allows updates to I_{lim} and I_{PA} of 592 t and 743.6 t respectively. Note that 2*B_{PA} = 1443.6 t is above median I_{MSY} but well within its variation. 2*BPA was not used as a proxy for B_{MSY} for the MSC scoring, but the median of the 2001-2010 biomass proxy (one generation time) was used instead; during which period the fishing mortality was varying around the F_{MSY} proxy and therefore more indicative of a suitable B_{MSY} proxy. If average survey biomass (1072 t) during the target reference point period is reflective of stock conditions consistent with F_{MSY}, I_{lim} is 55% of this biomass index, consistent with the MSC guidance on the PRI. While these limit and precautionary reference points have not been used to inform management, Tun (2017a) used them in the determination of stock status which is also done here.

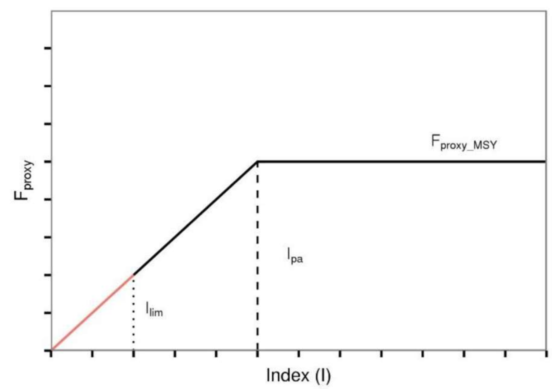

Figure 4 WGDEEP(2016) conceptualisation of F_{PROXY} advisory rule tested by WKLIFE3 (2013); F_{proxy} MSY is target harvest rate; I_{LIM} is lowest value from index and I_{PA} is set as 95% quantile of I_{LIM} assuming mean uncertainty (CV) of the Index; from WGDEEP (2016)

3.3.1.3 Golden Redfish

The biomass and fishing mortality reference points, reported by Tun (2014a), were confirmed during the 2014 Golden Redfish HCR review (ICES, 2014). To summarize, the target fishing mortality rate (F_{MGT} = 0.097) was based upon F_{max} on ages 9-19 of a YPR analysis and is thus an F_{MSY} proxy. The HCR simulations did not employ a stock-recruitment relationship, but randomly sampled recruitment from the observations. It was noted that this F_{MSY} proxy is well above the F_{max}, $F_{0.1}$ and $F_{35\%}$ estimates from the stock assessment Gadget model. However, the Gadget model assumes that the largest individuals of recruiting year-classes are removed by the fishery, reducing the mean weight of the survivors, leading to lower estimated F_{max} and other RPs than obtained from standard age-based models such as YPR. ICES (2014) supported the higher fishing mortality target as an F_{MSY} proxy due to the faster growth of golden redfish, compared to other redfish (e.g. beaked redfish *S. mentella*). The comments made above on the Atlantic wolffish F_{MSY} proxy = F_{max} are also pertinent here although in this case, the peer review explicitly considered the merits of F_{max} versus the alternates and chose the former, with which the assessment of Tun (2014a) concurred. For the purposes of scoring stock status, SSB associated with fishing mortality = 0.097 will be considered that consistent with harvesting at F_{MSY}. Median SSB associated with this fishing mortality is about 400 kt (lower and upper 95% quantiles of about 250-550 kt respectively; Figure 5).

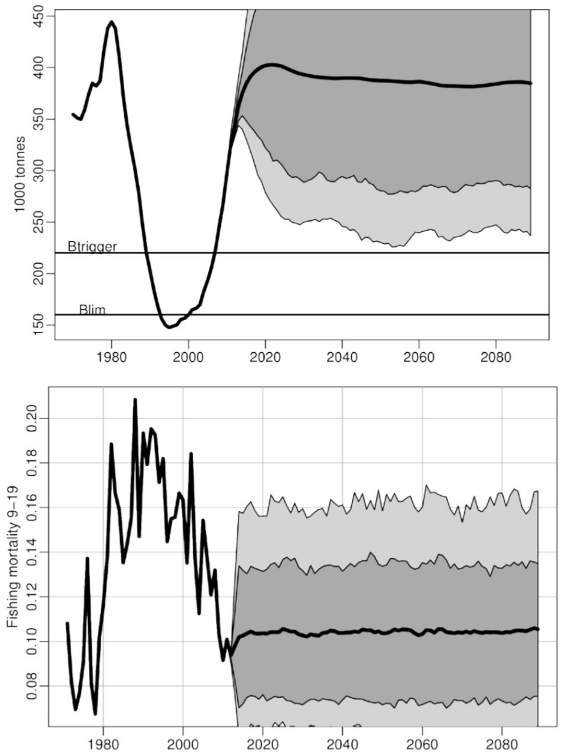

Figure 5 Long-term projected SSB (top panel) and fishing mortality (bottom panel) of golden redfish exploited at $F_{9\text{-}19}$ = 0.097; light grey area indicates fifth and 95th quantile and dark area 16th and 84th quantile; from ICES (2014).

B_{lim} was based upon examination of the stock – recruitment relationship (Figure 6). B_{loss} (160 kt) was chosen as the basis of B_{lim}, while B_{PA} = $B_{trigger}$ (220 kt) were based upon $B_{lim}*e^{1.645*0.2}$. Note that $2*B_{PA}$ = 440 kt is higher than median B_{MSY} but well within its variation. The stochastic simulations undertaken to test the HCR indicate that it leads to very low probability of SSB going below $B_{trigger}$ and B_{lim}.

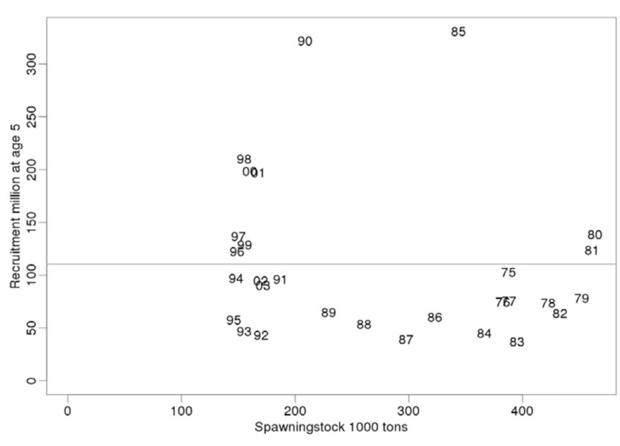

Figure 6 Spawning stock biomass-recruitment relationship for Golden Redfish; numbers indicate year-class years; from ICES (2014)

3.3.1.4 Ling

The long-term simulations undertaken during the 2017 ling HCR review (ICES, 2017b) determined that the harvest rate (HR) associated with the MSY was 0.24 with median SSB being 31.20 kt (95% quantiles: 14.32 - 58.16 kt; Figure 7). As with tusk, the review noted that the marginal gains in yield were small even at harvest rates as low as 0.13. Also, reductions in the HR would substantially increase SSB, and thus catch rates, providing economic benefits. For this reason, the target harvest rate (HR_{MGT}=0.18) was set below HR_{MSY}. However, for the purposes of scoring stock status, SSB associated with HR= 0.24 will be considered that consistent with harvesting at F_{MSY}.

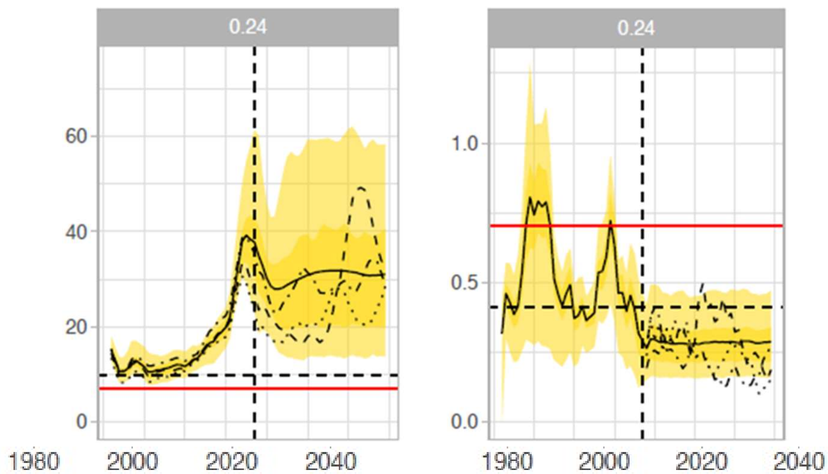

Figure 7 Long-term projected SSB (left panel) and fishing mortality (right panel) of ling exploited at HR=0.24; vertical dashed line is for 2018; red and black dashed horizontal lines represent the limit and pa reference points for SSB and F respectively; light yellow area indicates 5th and 95th quantile and dark area 16th and 84th quantile; from ICES (2017).

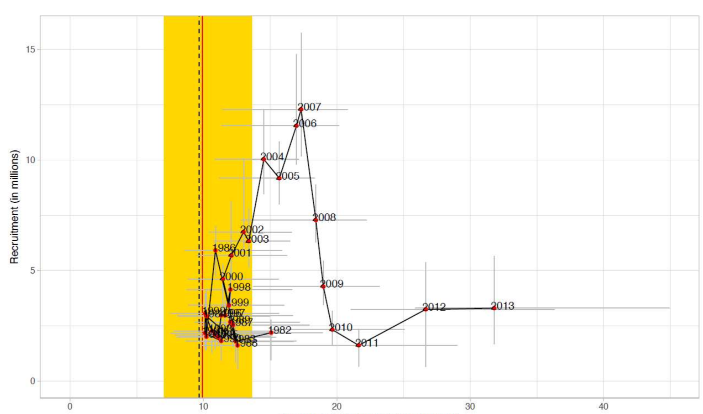

Figure 8 Spawning stock biomass -recruitment relationship for Ling in 5a; uncertainty in recruitment (age 3) and SSB indicated with 90% quantile intervals (grey bars); red points indicate median estimates and black solid line the chronological order; yellow vertical bar represents distribution of B_{loss}, based upon bootstrap simulations; from ICES (2017).

B_{lim} was considered based upon examination of the stock – recruitment (SR) relationship (Figure 8), which indicated a relatively narrow dynamic range of SSB and no evidence of impaired recruitment at lower SSB. There was a series of strong year-classes during the mid-2000s, but this was followed by a series of relatively weak year-classes when biomass was relatively high. Thus, B_{lim} could not be directly estimated. ICES guidelines for this situation are to use the lowest observed biomass (B_{loss} = 9.93 kt) as candidates for either B_{lim} or B_{PA}, depending upon the perception of historical fishing mortality. It was considered that fishing pressure on ling has been low since the mid-1990s. For this reason, B_{PA} was based upon B_{loss} while B_{lim} (7.09 kt) based upon $B_{PA}/e^{1.645*0.2}$. Note that $2*B_{PA}$ = 19.86 kt which, while below median B_{MSY}, is well within its variation. Using the MSC default PRI of ½ B_{MSY} = 20% B_0, if the lower boundary of B_{MSY} is 14.32 kt, the PRI would be expected to be 7.16 kt, similar to the B_{lim} estimated by ICES (2017). It is worthwhile to note that the hockey-stick SR relationship used in the simulations assumed a linear decline in recruitment, to SSB=0 from that produced at B_{PA} (9.93 kt). This implies that recruitment produced at B_{lim} (7.09 kt) would be in the order of 70% of that produced at B_{PA}.

3.3.1.5 Plaice

As with Atlantic Wolffish and Blue Ling, the only reference point used by MII in the management of the plaice fishery is a target fishery mortality (0.22), which is $F_{0.1}$ from a Yield-Per-Recruit (YPR) analysis and has been interpreted by MFRI as an F_{MSY} proxy.

The suitability of $F_{0.1}$ as an F_{MSY} proxy requires consideration. Restrepo et al (1998) notes that $F_{0.1}$ is commonly interpreted as a conservative or cautious proxy for F_{MSY} although this is dependent upon the productivity dynamics of the stock and selectivity. Mace (1994) determined that across a range of growth and natural mortality assumptions and in populations in which Beverton and Holt SR dynamics are present (similar to the Hockey-Stick SR function assumed in many Icelandic stocks), , $F_{0.1}$ was below F_{MSY} when SR steepness is 0.7 or greater, this difference increasing with increasing steepness. This supports the determination that $F_{0.1}$ is likely less than F_{MSY}, keeping in mind that SR steepness in flatfish stocks is generally greater than 0.7 (Myers et al, 1999).This is consistent with the determination of Tun (2017b) which considered that fishing mortality had been at or below F_{MSY} since at least 2001 which, based on the current evaluation of stock status (see below), implies that F_{MSY} is in the order of 0.30.

Recruitment has been relatively stable since the early 1990s while fishing mortality has declined from above to below 0.30 since 2004. Harvestable biomass reached a minimum of 25 kt in 2001 and has steadily increased since then, ranging 32 – 47 kt. Given that fishing mortality has been at or below the real F_{MSY} since 2004, when harvestable biomass was above the lowest biomass observed (B_{2001}=25 kt), it is highly likely that after almost two generations of MSY level harvesting, that recent biomass (46.7 kt) is in the range of B_{MSY}. As noted earlier, no biomass-based reference points are used in the management of the fishery. As with wolffish, the stock is currently undergoing preparations for a benchmark review during which biomass and fishing mortality reference points will be developed for a full HCR (see Harvest Strategy section).

3.3.1.6 Saithe

The biomass and fishing mortality reference points reported by Tun (2014b) were evaluated during the 2013 Saithe HCR review (Hjörleifsson and Björnsson, 2013). Fishing mortality was expressed as a harvest rate (HR: defined as the ratio of the catch and biomass of ages 4+). The long-term simulations, which assumed a hockey stick stock-recruitment relationship determined that HR=0.22 produced MSY, but it was decided to include a precautionary buffer by assuming HR_{MSY} = 0.20 and to set the harvest rate target (HR_{MGT}) at this value. This should ensure that biomass would remain above B_{loss} (B_{2010} = 61 kt) with 95% probability. Fishing mortality associated with HR=0.2 is 0.28. Median SSB associated with HR=0.2 is about 130 kt (lower and upper 95% quantiles of about 65-275 kt respectively; Figure 9). $B_{trigger}$ was set at 65 kt, the lower limit of variation in biomass associated with HR=0.2.

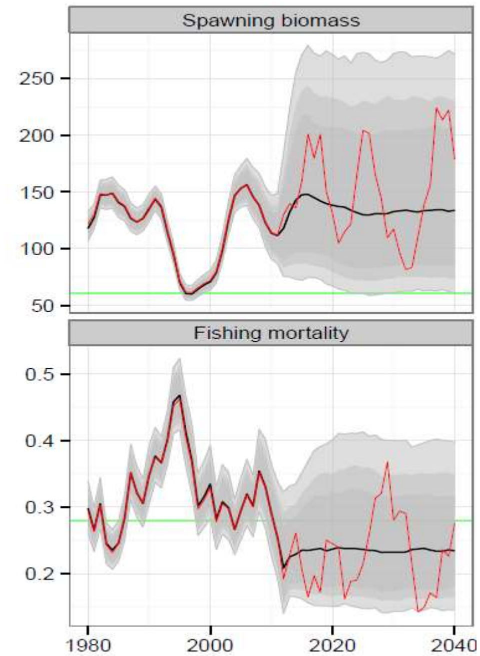

Figure 9 Long-term projected SSB (top panel) and fishing mortality (bottom panel) of saithe exploited at HR = 0.20; green lines for SSB and F are B_{PA} and F_{MSY} respectively; grey shading indicates the 90%, 80% and 50% range; median in black; from Hjörleifsson and Björnsson (2013)

There was considerable discussion on the appropriate value of B_{lim} during the 2013 review. Given the low long-term fishing mortalities and the lack of evidence of impaired recruitment in the stock assessment, derivation of candidate values for B_{lim} was not obvious. Estimates of SR steepness from an assumed Beverton and Holt stock-recruitment suggested that B_{lim} was less than 33% of B_{loss}. If replacement fishing mortalities were to be used as a criterion for setting B_{lim}, this reference point for the Arctic, Faroes and Icelandic saithe stocks would be approximately 75 kt, 40 kt and 35 kt respectively - about 0.88, 0.72 and 0.57 of the then observed Bloss for these stocks. Although there was a strong belief that B_{lim} was likely lower than B_{loss}, B_{lim} was set at the lowest observed biomass (B_{loss}=61 kt) and used until 2016. Precautionary reference points were also not defined during the 2013 HCR review.

At the request of the ICES ACOM, the NWWG (2016) reviewed the RPs and both added precautionary reference points and changed B_{lim}. According to ICES guidelines on precautionary reference points, B_{PA} was set at 61 kt based on B_{loss}, and B_{lim} was redefined as 44 kt based upon B_{PA}/1.4 (ICES, 2016b). Note that 2*B_{PA} = 122 kt which, while below median B_{MSY}, is well within its variation. Based upon the hockey stick stock-recruitment relationship used during the 2013 HCR review (Figure 10), this implies that recruitment produced at B_{lim} (44 kt) would be in the order of 66% of that produced at $B_{trigger}$ (SR steepness h=0.66). $B_{trigger}$ remained at 65 kt.

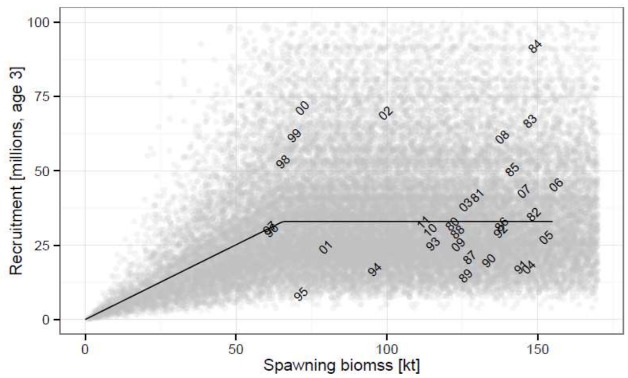

Figure 10 Historical stock-recruitment pairs and simulated values based on the hockey stick model; numerical values refer to year-classes; inflexion point is at 65 kt; from Hjörleifsson and Björnsson (2013)

3.3.1.7 Tusk

The long-term simulations undertaken during the 2017 tusk HCR review (ICES, 2017) determined that the harvest rate (HR) associated with MSY was 0.17 with median spawning stock biomass (SSB) being 15.22 kt (lower and upper 95% quantiles of 8.93 and 22.61 kt respectively; Figure 11). The review noted that the marginal gains in yield were small above harvest rates of 0.10. Further, as the fishery targets towards immature fish, slight reductions in HR would substantially increase SSB, and thus catch rates, providing economic benefits. For this reason, the target harvest rate (HR_{MGT}=0.13) was set below HR_{MSY}. For the purposes of scoring stock status here, the SSB associated with HR= 0.17 will be considered because this is more consistent with harvesting at F_{MSY}.

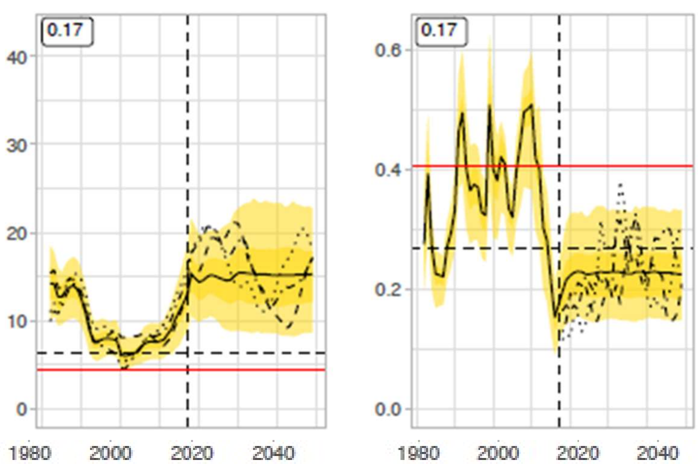

Figure 11 Long-term projected SSB (left panel) and fishing mortality (right panel) of tusk exploited at HR=0.17; vertical dashed line is for 2018; red and black-dashed horizontal lines represent the limit and precautionary reference points for SSB and F respectively; light yellow area indicates 5th and 95th quantile and dark area 16th and 84th quantile; from ICES (2017).

B_{lim} was established based upon examination of the stock–recruitment (S-R) relationship (Figure 12), which indicated a relatively narrow dynamic range of SSB and no evidence of impaired recruitment at the lower SSB. A number of moderate to strong year-classes entered the population during 2000-2006 when SSB was at a time-series low, but recruitment during 2008-2012 was relatively poor when SSB had not significantly changed. Thus, B_{lim} could not be directly estimated. ICES guidelines for this situation are to use to lowest observed biomass (B_{loss} = 6.24 kt) as candidates for either B_{lim}

or $B_{PA,}$ depending upon the perception of historical fishing mortality. It was considered that historical fishing pressure on tusk has been low and that there are large areas of the stock's distribution where Tusk is available but not fished (i.e. off southeast Iceland). For this reason, B_{PA} was based upon B_{loss} while B_{lim} (4.46 kt) based upon $B_{PA}/e^{1.645*0.2}$. Note that $2*B_{PA}$ = 12.48 kt which, while below median B_{MSY}, is well within its variation. Using the MSC default PRI of ½ B_{MSY} = 20% B_0, if the lower boundary of B_{MSY} is 8.93 kt, the PRI would be expected to be 4.47 kt, similar to the B_{lim} estimated by ICES (2017a). It is worthwhile to note that the hockey-stick SR relationship used in the simulations assumed linear decline in recruitment to SSB=0, from that produced at B_{PA} (6.24 kt). This implies that recruitment produced at B_{LIM} (4.46 kt) would be in the order of 70% of that produced at B_{PA} (steepness of the SR relationship, h =0.7).

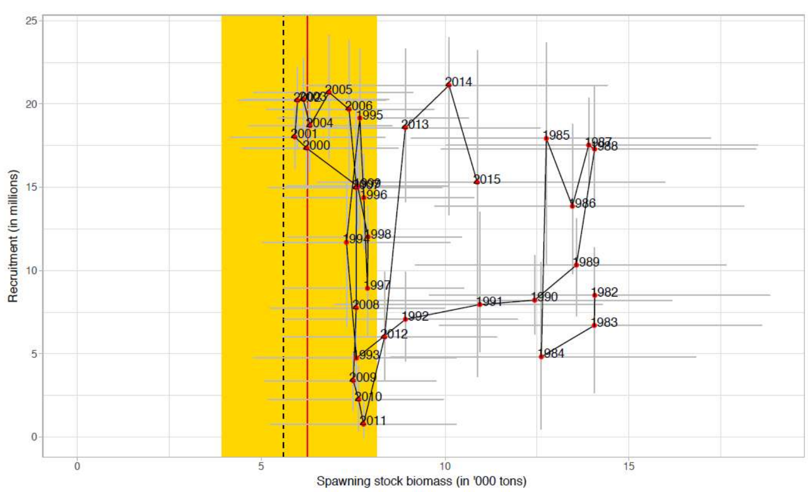

Figure 12 Spawning stock biomass-recruitment relationship for tusk in ICES area 5a; uncertainty in recruitment (age 3) and SSB indicated with 90% quantile intervals (grey bars); red points indicate median estimates and black solid line the chronological order; yellow vertical bar represents distribution of B_{loss}, based upon bootstrap simulations; from ICES (2017).

3.3.2 Stock Status

3.3.2.1 Atlantic Wolffish

Tun (2017b) based its scoring of stock status on the 2016 assessment of the Atlantic Wolffish stock. Since then, two annual assessments have been conducted, the results of the most recent (2018) reported below.

Since 1980, catch has first increased from about 8 kt to between 12 – 18 kt during the 1990s to mid-2000s, before declining to about 7.5 kt in recent years (Figure 13). Fishing mortality has been continually declining since the early 2000s and since 2005 has dropped from above to below the F_{MSY} proxy of F_{max} (0.30) and has been below this proxy since 2013 or about 0.4 generations (T_{GEN}=6.5+(1/0.1)=16.5 years). The 2014-2017 median fishing mortality is 0.26, below the proxy with 70% probability (assuming a relatively high CV of 30%). Based on comparisons of landings and observer data, discard rates in the Icelandic longline fishery for Atlantic wolffish are estimated to be very low (<1% in either numbers or weight).

Harvestable biomass has generally increased since at least 1980 (2.3 generations) and has continually increased since 1994 (1.5 generations) even during a period when fishing mortality was apparently above the F_{MSY} proxy (0.30). This has been attributed to strong recruitment during the 1990s, while fishing mortality was declining. However, as fishing mortality continued to decline, to be at or below F_{MSY} since 2013 (0.4 generations), recruitment also declined but has fluctuated without trend since the early 2000s; age one recruitment has averaged about 11.5 million individuals over the past 17 years, about one generation time. Recruitment has been largely driven by environmental factors (Tun, 2017b). On balance, biomass is currently relatively high and likely within the range of biomass consistent with B_{MSY}. Assuming a CV of current biomass in the order of 30%, higher than assumed on other Icelandic stocks, the probability of B_{2018} being greater than the notional estimate of PRI (17 kt) is 93.5%.

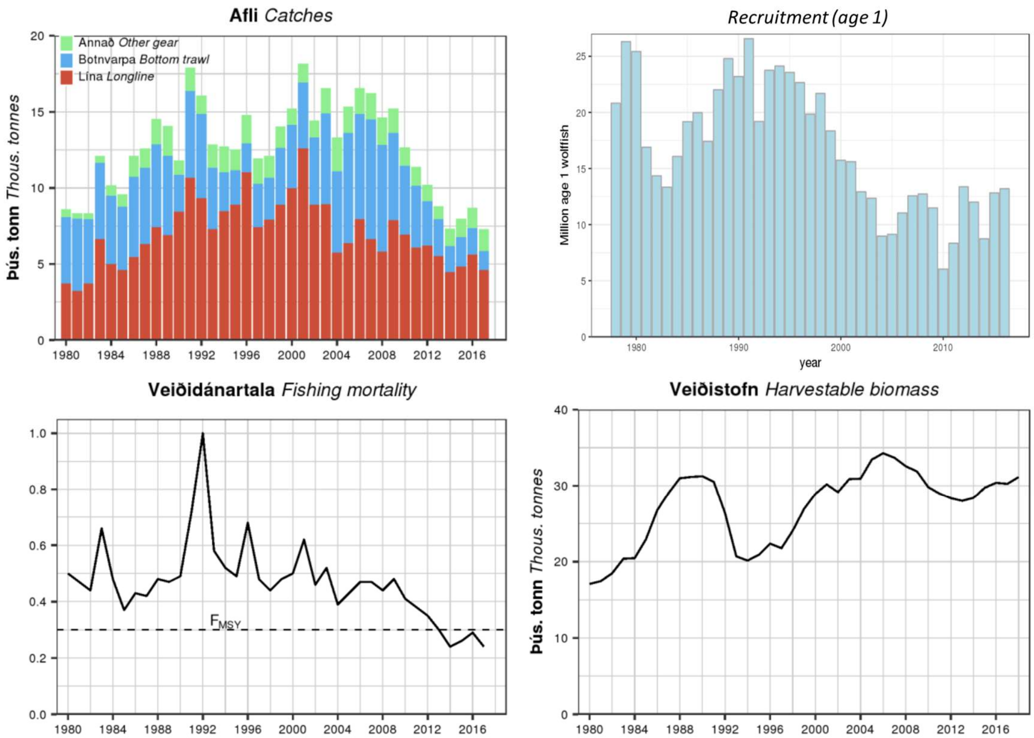

Figure 13 Catch, recruitment (age 5), harvestable biomass and fishing mortality of Atlantic wolffish in Division 5a during 1980 - 2017; catch, fishing mortality and harvestable biomass from MFRI (2018c); recruitment from MFRI (2018h)

3.3.2.2 Blue Ling

Tun (2017a) based its scoring of stock status on the 2016 assessment of the Blue Ling stock. Since then, two annual assessments have been conducted, the results of the most recent (2018) reported below.

Catch has been highly variable being in excess of 6 kt in the early 1980s, dropping below 2 kt until 2007 (except for a peak in 1993), rising to above 7 kt in 2010 before dropping to 0.64 kt in 2017 (Figure 14). Relative fishing mortality (F_{proxy}) has varied about the proxy F_{MSY} target (1.75) since 2000 and has been below the target since 2014. F_{proxy} in 2018 was 0.58. This represents 1.8 generations (T_{GEN} = 10+1/0.1 = 10 years) of fluctuation about the target.

There is no available information on discarding of blue ling in ICES areas 5.a and 14. Being a relatively valuable species and not being subjected to TAC constraints before 2013/2014 fishing year nor a minimum landing size, there should be little incentive to discard blue ling in 5.a (WGDEEP, 2018).

The survey biomass index was at a time series low (592 t) in 2000, rose to a peak of 2037 t in 2009 and has since dropped to 1088 t in 2018, just above the notional I_{MSY} (1072 t). The survey biomass index has been fluctuating about the notional I_{MSY} target since 2002 and above this since 2006 or 1.3 generations. Assuming a CV of current survey biomass in the order of 14% (see above), the probability of B_{2018} being greater than the PRI (592 kt) is 100%. The juvenile index of the survey indicates average recruitment in the 2000s, a large peak in 2008 and poor recruitment since then, although there has been a modest increase in recent years.

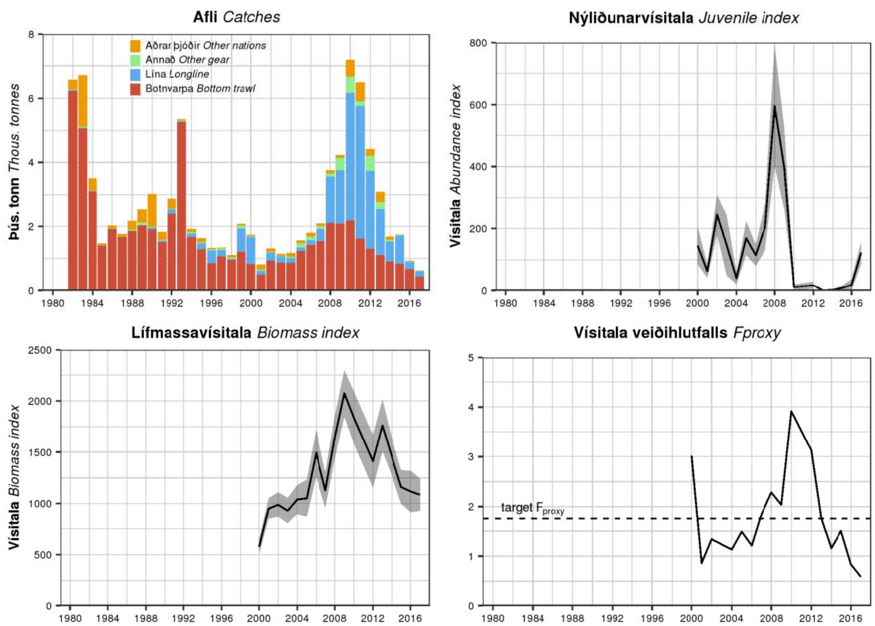

Figure 14 Catch, juvenile index, biomass index and F_{proxy} of blue ling in Subarea 14 and Division 5.a (East Greenland and Iceland grounds) during 1980 - 2017; from MFRI (2018g).

3.3.2.3 Golden Redfish

Tun (2014a) based its scoring of stock status on the 2013 assessment of the golden redfish stock. Since then, five annual assessments have been conducted, the results of the most recent (2018) reported below.

Catches ranged 70 – 130 kt prior to 1990, fluctuated about 40 kt until 2010 after which they modestly increased to about 50 kt more recently (Figure 15). Fishing mortality was well above F_{MGT} = F_{MSY} proxy (0.097) for much of the time series but decreased during the 2000s and has fluctuated just above the target since about 2010. F_{2017} was 0.12. It is important to note that there was a change in perception of historical fishing mortality and SSB in the 2018 assessment due to an error in the analysis which was only detected in the most recent assessment (see Stock Assessment section). Whereas historical estimates of fishing mortality were considered to be at or close to the F_{MGT} target, they are now estimated to have been above this (Figure 15b).

Discarding is banned by law in the Icelandic demersal fishery. Measures in the Icelandic management system such as converting quota share from one species to another are used by the Icelandic fleet to a large extent, and thought to discourage discards in the mixed fisheries (WGDEEP, 2018).

Typical of many redfish stocks, long periods of poor recruitment (age 5) have been punctuated with strong year-classes although there was an overall improvement in recruitment during the 2000s. The combination of a decrease in fishing mortality and improved recruitment led to SSB increasing from about B_{lim} in about 2000 to a high well above $B_{trigger}$ in 2015 before modestly declining. B_{2018} was 296 kt which is at the lower range of SSB expected at F_{MSY}. In the HCR simulations, ICES (2014) assumed assessment error in SSB at CV=0.30. This implies that the probability of SSB_{2018} being above B_{lim} (160 kt) is 93.7%.

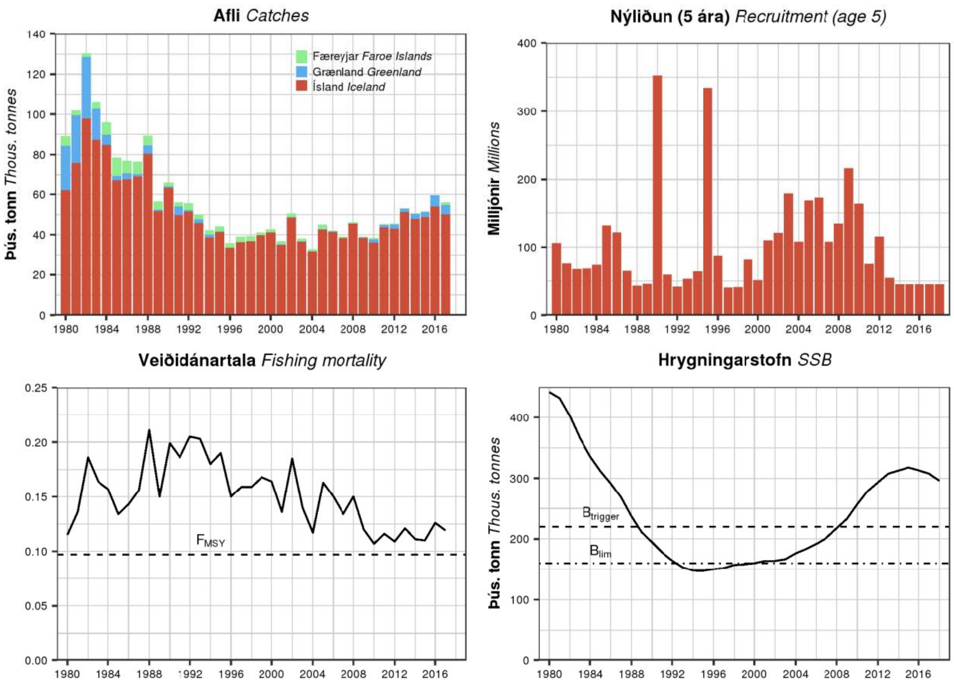

Figure 15a Catch, recruitment (age 5), spawning stock biomass and fishing mortality of golden redfish in subareas 5, 6, 12, and 14 during 1980 - 2017; from MFRI (2018d).

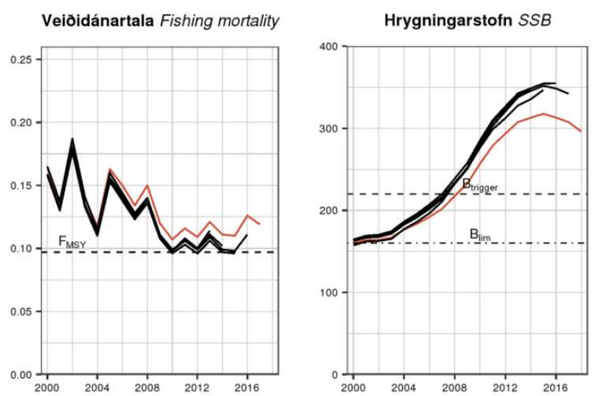

Figure 15b. Retrospective analysis of spawning stock biomass (SSB) and fishing mortality (ages 9-19) of 2014-2018 assessments; from MFRI (2018d)

3.3.2.4 Ling

Tun (2015) based its scoring of stock status on the 2014 assessment of the ling stock. Since then, four annual assessments have been conducted, the results of the most recent (2018) reported below.

Prior to the mid-2000s, catch ranged 3-6 kt annually. Catch then rose to a time series high by 2014 before dropping to just under 9 kt by 2017 (Figure 16). Throughout the time series, harvest rates have fluctuated between 0.25 and 0.6, being consistently above the management target (HR_{MGT}=0.18). Since 2009, harvest rates have declined to HR_{2017}= 0.24 which is the MSY harvest rate.

As with tusk, based on comparisons of landings and observer data, discard rates in the Icelandic longline fishery for ling are estimated very low (<1% in either numbers or weight; WGDEEP, 2018).

Spawning stock biomass (SSB) was relatively low in the mid-1990s, dropping just below B_{PA} (9.93 kt) in 1992 and has consistently increased since then, particularly since 2012 as the strong year-classes of the mid-late 2000s entered to mature part of the population. More recently, SSB has modestly declined, due to weak recruitment, being 34.2 kt in 2018, within the range of SSB expected at HR_{MSY} (0.24), just above the median SSB (31.2 kt) expected at this harvest rate and well above 2*B_{PA} (19.9 kt). SSB has been in the vicinity of 2*B_{PA} since 2005, being above this since 2010 (0.84 generations; T_{GEN} = 6.5+1/0.15 = 13.2 years). ICES (2017) reports that bootstrap estimates of coefficients of variation (CV) in SSB have on average been 0.15 and have increased to 0.25 in more recent years. These imply that the probability of SSB_{2018} being above B_{lim} (7.09 kt) is 99.9%.

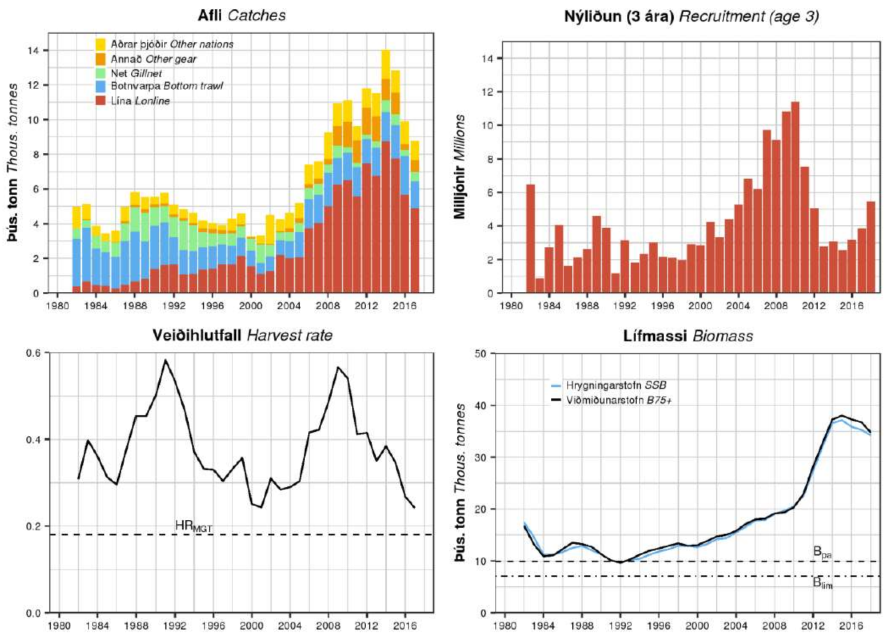

Figure 16 Catch, recruitment (age 3), spawning stock biomass, reference biomass (75 cm+) and harvest rate (HR_{MGT}=0.18) of ling in Division 5a during 1980 - 2017; from MFRI (2018b)

3.3.2.5 Plaice

Tun (2017b) based its scoring of stock status on the 2016 assessment of the plaice stock. Since then, two annual assessments have been conducted, the results of the most recent (2018) reported below.

Catch ranged 11 – 15 kt during the 1980s-1990s and declined to about 5 kt in 2000-2001. Thereafter, catch has modestly increased being 6.4 kt in 2017 (Figure 17). For much of the time series, fishing mortality was above the fishing mortality target of $F_{0.1}$ but declined below this reference point in 2010 where it has remained. F_{2017}=0.20. Assuming that F_{MSY} is in the order of 0.3, fishing mortality had been at or below F_{MSY} since 2004, or 1.83 generations (T_{GEN}=1.5+1/0.15=8.2 years; Tun, 2017b).

Based on comparisons of landings and observer data, discard rates in the Icelandic longline fishery for Atlantic wolffish are estimated very low (<1% in either numbers or weight).

Harvestable biomass was at a time series low in 2000 and has steadily increased since then, reaching a time series high of 46.7 kt in 2018. This increase in biomass is attributable to the long-term decline in fishing mortality as recruitment (age 3) has been stable since the early 1990s. As noted above, given that fishing mortality has been at or below the real F_{MSY} since 2004, when harvestable biomass was above the lowest biomass observed (B_{2001}=25 kt), it is highly likely that after almost two generations of MSY level harvesting that recent biomass is in the range of B_{MSY}.

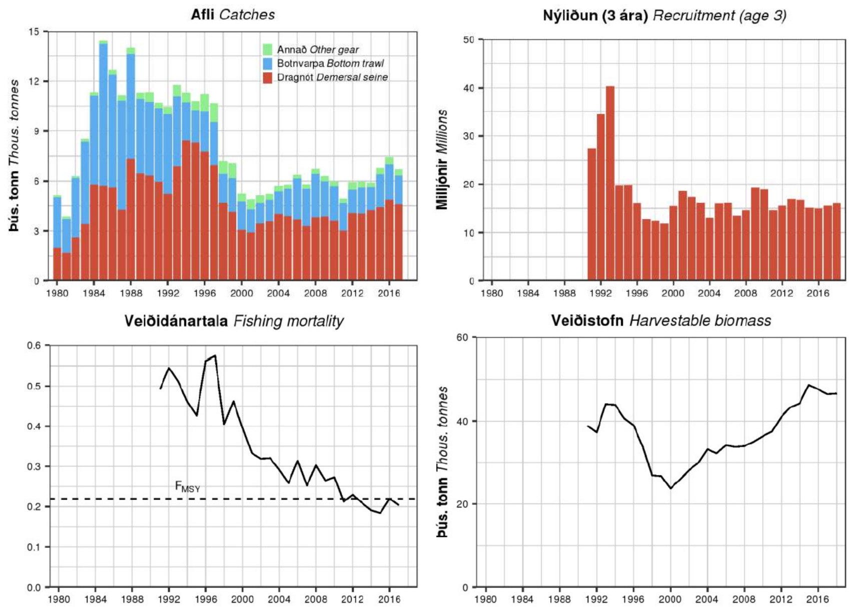

Figure 17 Catch, recruitment (age 3), harvestable biomass and fishing mortality of plaice in Division 5.a during 1980 - 2017; reference points as per Stock Status section; from MFRI (2018f)

3.3.2.6 Saithe

Tun (2014b) based its scoring of stock status on the 2013 assessment of the Saithe stock. Since then, five annual assessments have been conducted, the results of the most recent (2018) reported below.

During the late1980s-early 1990s, catch rose to as high as 100 kt, before declining to a time series low of 30 kt in the late 1990s. Since then, catch first increased to just above 70 kt before declining to more recent levels in the order of 50 kt (Figure 18). For much of the time series, harvest rates have fluctuated around HR_{MGT} = HR_{MSY} = 0.2 although they rose above 0.3 in about 1994. Since 2014, the harvest rate has been below the target (HR_{2017} = 0.121) for 0.45 generations (T_{GEN}= 6.2+0.2=11.2 years).

Attempts have been made at estimating Saithe discarding in the Icelandic fisheries since 2001 (Palsson et al. 2008) based on a method using length measurements taken by observers on-board and measurements taken of landed fish. Discarding of saithe is hardly detectable as compared to haddock, for example, which has been around 8% of landings in numbers.

Recruitment (age 3) has fluctuated considerably over time without a long-term trend but has been well above the average in the past decade (except 2018). Stock biomass was in the order of 140-150 kt during the 1980s, declined to just below $B_{trigger}$ (65 kt) in the mid-1990s and has steadily increased since then. B_{2018} was 232.9 kt which is well above median SSB associated with HR_{MSY} (130 kt), and significantly above B_{lim} (44 kt). It has been in the vicinity of 2*B_{PA} (122 kt) since 2002 and above this since 2003 (1.42 generations; T_{GEN}=6.2+1/0.2=11.2 years).

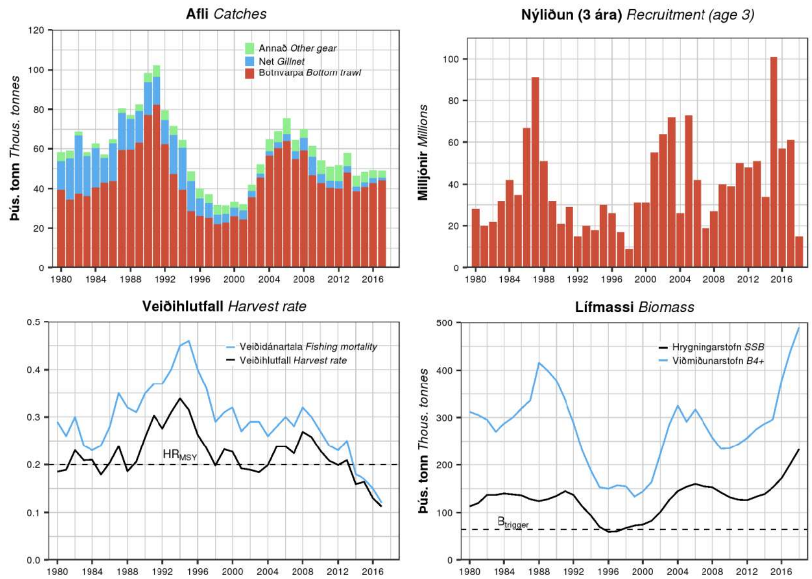

Figure 18 Catch, recruitment (age 3), spawning stock biomass, reference biomass (age 4+), fishing mortality and harvest rate (HR_{MSY}=0.20) of saithe in Division 5.a during 1980 - 2017; reference points as per Stock Status section; from MFRI (2018e)

3.3.2.7 Tusk

Tun (2017a) based its scoring of stock status on the 2016 assessment of the tusk stock. Since then, two annual assessments have been conducted, the results of the most recent (2018) reported below.

Prior to 2010, catch ranged 5 – 9 kt annually, with the harvest rate being consistently above the current management target (HR_{MGT}=0.13; Figure 19). Since then, declining TACs significantly reduced harvest rates, which dropped below HR_{MSY} and HR_{MGT} in 2015 and 2016 respectively. In 2017, the harvest rate was 0.088.

Discarding is banned by law in the Icelandic demersal fishery. Based on comparisons of landings and observer data, discard rates in the Icelandic longline fishery for tusk are estimated very low (<1% in either numbers or weight). Measures in the Icelandic management system such as converting quota share from one species to another are used by the Icelandic fleet to a large extent, and thought to discourage discards in the mixed fisheries (WGDEEP, 2018).

Spawning stock biomass (SSB) was at a time-series high in the early 1980s but declined to a time series low by 2001 but remained above B_{PA} (6.24 kt). Due to a string of strong year-classes in the 2000s, SSB increased, particularly since 2012 in response to the decline in harvest rates, notwithstanding a series of weaker year-classes recently entering the population. SSB in 2018 was 14.02 kt, well within the range of SSB expected at HR_{MSY} (0.17) and above 2*B_{PA} (12.5 kt). SSB has been in the vicinity of 2*B_{PA} since 2013, being above this since 2017 (0.11 generations; T_{GEN} = 11.5+1/0.15 = 18.2 years). ICES (2017) reports that bootstrap estimates of coefficients of variation (CV) in SSB prior to 2010 were slightly above 0.2 and have increased to 0.25 in more recent years. These imply that the probability of SSB_{2018} being above B_{lim} (4.46 kt) is 99.7%.

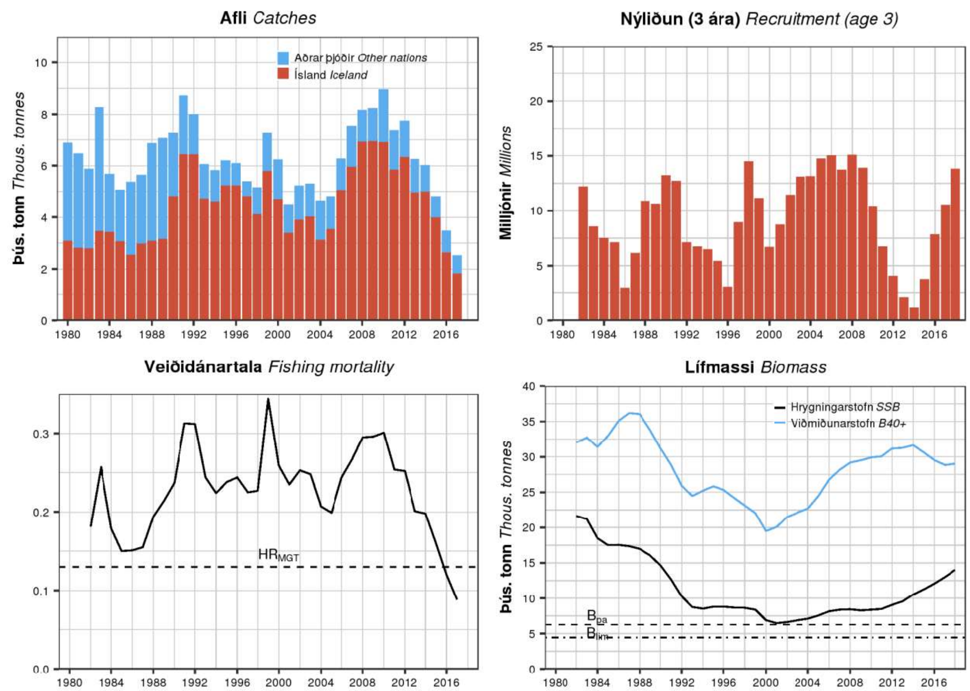

Figure 19 Catch, recruitment (age 3), spawning stock biomass, reference biomass (40 cm+) and harvest rate (HR_{MGT}=0.13) of tusk in ICES Subarea 14 and Division 5a during 1980 - 2017; from MFRI (2018a)

3.3.3 Harvest Strategy

3.3.3.1 History and Objectives

The overarching objective of the Icelandic fisheries management system implemented by MII is to ensure responsible fisheries that sustain fish stocks and a healthy marine ecosystem (MFRI, 2017; Tun, 2014a; 2014b; 2015). The management strategies for the seven principle species are to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term (https://www.government.is/news/article/2018/05/15/). MII generally achieves this objective through use of the ICES approach to fisheries management, the evolution of which is described by Lassen et al. (2014). The ICES approach includes three elements consistent with the broad international policy norms of the precautionary approach, MSY, and an ecosystem approach, while also responding to the specific needs of the management bodies requesting advice (ICES, 2018a).

A precautionary approach (PA) has been recognised as an important basis for fisheries management in all the jurisdictions advised by ICES, including Iceland, since at least the 1990s. The MSY approach is a more recent development. The World Summit for Sustainable Development (WSSD, Johannesburg; UN, 2002) stated that "To achieve sustainable fisheries, the following actions are required at all levels: maintain or restore stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015." Many of the competent management authorities advised by ICES, such as MII in Iceland, have based their implementation on this interpretation - fishing mortality should be reduced to F_{MSY} where possible.

The harvest strategies (HS) of the seven Principle one species are as follows:

- Tusk and ling: the HS has been based upon F_{MSY} or its proxy (since 2010/11 and 2012/13 for Tusk and Ling respectively). In accordance with the general aims of the management strategy for tusk and ling, the HCR was formally adopted by Icelandic authorities in June 2017 for the consecutive period of five fishing years, starting from the 2017/18 fishing year.

- Golden redfish: ICES advice for golden redfish to MII has been provided since 1987, but for S. *mentella* and S. *norvegicus* combined until 2010 (see Tun, 2014a for pre-1987 management). In accordance with the general aims of the management strategy for golden redfish, the HCR was formally adopted by Icelandic and Greenlandic authorities in 2014 for the consecutive period of five years, starting in 2015..
- Saithe: ICES advice to MII has been based on F_{MSY} since in 2010/11. In accordance with the general aims of the management strategy for saithe, the HCR was formally adopted by Icelandic authorities in April 2013 for the consecutive period of five fishing years, starting from the 2013/14 fishing year.
- Blue ling: Since 2013, the Icelandic blue ling stock has been managed by MII informed by the ICES Data Limited Species (DLS) approach which is consistent with F_{MSY} management. This is considered a management plan which MII follows. A formal Icelandic management plan with a full HCR has not yet been adopted.
- Wolffish and plaice: MII has managed these stocks, with advice from MFRI based upon the F_{MSY} proxies since 2007 rather than the ICES MSY approach. These are considered management plans which MII follows. Formal Icelandic management plans which include the full HCRs currently under development will be implemented before the 2020/2021 fishing year (MFRI, pers. comm.)

The long-term conceptual objectives of the Icelandic multispecies fisheries are operationalized through harvest control rules (HCR) which prescribe how fishing mortality is modified in response to changes in stock status. For tusk, ling, golden redfish, saithe and blue ling, these rules have been developed based upon significant efforts within the ICES scientific process and when full HCRs (which include both MSY and PA reference points) are agreed to, they have been included (except for blue ling) in formal Icelandic management plans. The HCRs for tusk, ling and golden redfish were developed through management strategy evaluation (MSE) simulations (WKICEMSE, 2017; WKREDMP, 2014), while that for blue ling is part of the ICES DLS initiative (DLS, 2012; ICES, 2016; WKFRAME, 2012; WKLIFE, 2012a; 2012b; 2013; 2014). During the site visit, MFRI indicated that evaluations of the HCRs are now on a five-year schedule and will be conducted within ICES as part of the benchmark reviews (see Stock Assessment section). As per this five-year schedule, the next reviews for tusk and ling will be conducted in time for the 2022/2023 fishing year (MFRI, pers. comm.). The next review for golden redfish will be in 2020. The 2013 saithe HCR has been rolled over into 2018 and will be reviewed in 2019. Full harvest control rules for Atlantic wolffish and plaice are currently being developed and will be reviewed within ICES as part of the benchmark meetings, likely in 2019 or 2020. During the site visit, MFRI indicated that blue ling will continue within the ICES DLS process (Table 4). MFRI was indicated that between reviews, if issues with the HCRs are identified, activities will be undertaken to resolve these, including update of the HCR.

Table 4 Review and Implementation of Harvest Control Rules used in management of seven Principle 1 fisheries

Species	Tusk	Ling	Atlantic Wolffish	Golden Redfish	Saithe	Plaice	Blue Ling
2013					HCR Eval		
2014				WKREDMP			
2015							
2016							DLS
2017	WKICEMSE	WKICEMSE					
2018			Under review		Rolled-over	Under review	
2019					under review		
2020				HCR review			

3.3.3.2 Harvest Control Rules

Tusk and Ling: The 2017 HCR reviews (ICES, 2017a; 2017b; 2017c) took place subsequent to the initial MSC assessment (Tun, 2015; 2017a). The details of the stock assessment (GADGET model), reference points and the harvest control rule were all considered in an MSE in which the operating model (flexible stock simulator within GADGET) generates "true" future populations in simulations which are based upon the population structure assumed in the annual stock assessment. Uncertainties in parameters estimated in the historical assessment (exploitation pattern, population numbers, growth, and maturity) were used in long-term stock projections based on 10 bootstrap samples of each relevant stock assessment parameter. Recruitment was projected using a time-series block bootstrap (blocks of six consecutive years with a randomly drawn starting year) of the assessed recruitment during 1982–2016. These simulations were used to characterize the uncertainties in the biomass and fishing mortality reference points used in the HCR. Assessment error in the reference biomass (used to estimate the TAC) was assigned a CV = 0.2, based on the estimated error in the stock assessments. Catch was assumed to be known without error.

One of the key data uncertainties explored in the tusk HCR was the practice of excluding tusk catch in the Greenland area of subarea 14, which historically has represented 1% of the total catch but in 2015 and 2016 represented 10-15% of the total catch. A sensitivity analysis in which the catch from this area was included in the stock assessment, indicated a minor upward revision in the estimated stock biomass (1%–4% throughout the years) and a downwards revision of the estimated harvest rate (0%–3% in most years, although with an increase in 2015 and 2016). It was concluded that the tusk HCR was robust to the potential bias in these catch data. On the other hand, the treatment of the survey and catch data in ICES Subarea 14 in the annual assessment was an issue that required further exploration. This is not an issue in the ling HCR as the stock is only resident in ICES Division 5.a.

For both Tusk and Ling, the agreed HCR states that the TAC for the fishing year Y/Y+1 (1 September of year Y to 31 August of year Y+1) is calculated as:

When SSB_Y is equal or above $B_{trigger}$

$TAC_{Y/Y+1} = HR_{MGT} * B_{REF,Y}$

When SSB_Y is below $B_{TRIGGER}$

$TAC_{Y/Y+1} = HR_{MGT} * (SSB_Y/B_{trigger}) * B_{REF,Y}$

Where, for Tusk, the spawning–stock biomass $B_{trigger}$ is defined as 6.24 kt, the reference biomass ($B_{REF,Y}$) as the biomass of Tusk 40+ cm and the target harvest rate (HR_{MGT}) is set to.13. For Ling, the spawning–stock biomass $B_{trigger}$ is defined as 9.93 kt, the reference biomass ($B_{REF,Y}$) as the biomass of Ling 75+ cm and the target harvest rate (HR_{MGT}) is set to 0.18.

In Iceland, there is a preference for characterizing fishing pressure in terms of harvest rate (HR) rather than equivalent fishing mortality (F). The choice of either 40+cm (tusk) and 75+cm (ling) biomass rather than SSB as the reference biomass is because this fish length is just below the selectivity of the fishery; when the fleet starts fishing the advised catches, taking into account the delay between the end of the assessment and the start of the fishing year, the fish will have grown and thus the $B_{REF,Y}$ refers to tusk or ling slightly larger than either 40cm+ or 75+cm and hence corresponds with the harvestable biomass. Fishing pressure reference points are thus calculated as harvest rates on biomass of 40+cm or 75+cm (equivalent F also estimated). Also, as the precautionary reference points, B_{lim} and B_{PA} ($B_{trigger}$) are calculated based on SSB as of 1st January, it is more appropriate that SSB be used in the comparisons to these RPs in the HCR.

For both tusk and ling, the MSE determined that, due to the relatively narrow dynamic range of SSB, B_{lim} could not be directly estimated and thus, as per ICES guidelines, it was based upon B_{PA} which in turn was based upon B_{loss}. Both estimates of B_{lim} (4.46 kt for tusk and 7.09 kt for ling) are consistent with the point of recruitment impairment (see Stock Status section above). The tusk and ling MSEs developed analytical estimates of the MSY harvest rate (with associated biomass). The tusk simulations determined a flat-topped equilibrium catch curve and although HR_{MGT} (0.13) is set below HR_{MSY} (0.17), the resulting average long-term catch at HR_{MGT} is only 4% below that corresponding to HR_{MSY}. Similarly, the ling simulations indicated that although the HR_{MGT} (0.18) is below HR_{MSY} (0.24), the equilibrium yield is less than 2% lower. In both cases, setting a lower than MSY harvest rate reference point in the HCR increases equilibrium biomass and thus catch rates at the cost of little yield. The tusk and ling HCRs were deemed by ICES to be precautionary, leading to less than 5% probability of SSB < B_{lim} in all years and conforming to the ICES MSY approach.

Golden Redfish: The 2014 HCR review (WKRED, 2012) was considered during the initial MSC assessment (Tun, 2014a). The review was undertaken in a similar fashion as the tusk and ling reviews. In this case, an examination of the recruitment time-series indicated no autocorrelation and thus in the stochastic simulations, recruitment was drawn randomly from the observed recruitment (no time blocks). Assessment error was modelled as autocorrelated lognormal error (rho=0.9 and CV=0.3), representing substantial error with long periods of over and underestimation. Catch was assumed to be known without error.

Sensitivity analyses were conducted covering the impact of including the East Greenland German fall survey and assuming poor recruitment over an extended (five year) period. In both cases, the impact on the performance of the HCR was significant. Consequently, the East Greenland German fall survey is now included in the stock assessment. Regarding recruitment, a major feature of the stock (as with many redfish stocks) is periods of poor-moderate year-classes punctuated with very strong year-classes. This presents challenges to the design of a harvest strategy to ensure long-term sustainability. For this reason, ICES (2014) recommended that the HCR be reviewed five years after implementation, which was accepted. It also recommended the HCR be amended to include management action if SSB fell below B_{lim} to safeguard the stock in very unusual circumstances, although this has not yet been adopted. The simulations indicated that, applying the HCR assuming past levels of recruitment, the stock can recover from B_{lim} (160 kt) to B_{MSY} (400 kt) in about 20 years, less than one generation (T_{GEN}=31.25 years).

The agreed HCR for golden redfish states that the TAC for the fishing year Y/Y+1 (1 September of year Y to 31 August of year Y+1) is calculated as:

When SSB_Y is equal or above $B_{trigger}$

$$TAC_{Y/Y+1} = F_{MGT} * SSB_Y$$

When SSB_Y is below $B_{trigger}$

$$TAC_{Y/Y+1} = F_{MGT} * SSB_Y / B_{trigger}$$

Where SSB_Y is the spawning stock biomass in year Y, $F_{MGT} = 0.097$ and $B_{trigger} = 220$ kt.

Based upon examination of the stock – recruitment relationship, B_{loss} (160 kt) was chosen as the basis of B_{lim}, which is consistent with the point of recruitment impairment (see Stock Status section). The golden redfish review did not develop analytical estimates of the MSY fishing mortality but rather based this upon F_{max} from a Yield Per Recruit analysis. F_{max} has been recognized as a poor proxy for F_{MSY} although in this case, the review explicitly considered its merits as a target fishing mortality (see Stock Status section). This will likely be revisited during the 2020 review. The golden redfish HCR was deemed by ICES to be precautionary, leading to less than 5% probability of SSB < B_{lim} in all years and conforming to the ICES MSY and PA approaches (ICES, 2014).

Saithe: The 2013 HCR review (Hjörleifsson and Björnsson, 2013) was considered during the initial MSC assessment (Tun, 2014b). While the GADGET model was not used, the structure of the simulations was similar to those described above – historical assessment to quantify model uncertainties with long-term stochastic projections under a range of error assumptions to evaluate the performance of the proposed HCR. In this case, rather than bootstrapping, Markov Chain Monte Carlo (MCMC) simulation was used to characterize the uncertainties. Several variants of a hockey-stick stock-recruitment relationship were explored in the simulations as was variation in stock and catch weights at age. Based upon analyses of historical assessment performance, assessment error of saithe age 4+ biomass was set at CV=0.2 with an autocorrelation of 0.45. The sensitivity to different fishery selectivity patterns was also evaluated.

The performance of four HCR options was evaluated with a variant of the proposed rule (3) which constraints the inter-annual variability in harvest advice (catch stabilizer) adopted. The agreed HCR states that the TAC for the fishing year Y/Y+1 (September 1 of year Y to August 31 of year Y+1) is calculated as:

When SSB_Y is equal or above $B_{trigger}$

$$TAC_{Y/Y+1} = (0.5 * HR_{MGT} * B_{4,Y}) + (0.5 * TAC_{Y-1/Y})$$

When SSB_Y is below $B_{trigger}$

$$TAC_{Y/Y+1} = SSB_Y/B_{trigger} * \{((1 - 0.5 * SSB_Y/B_{trigger}) * HR_{MGT} * B_{4,Y}) + (0.5 * TAC_{Y-1/Y})\}$$

Where $B_{4,Y}$ is the biomass of saithe aged 4 and older in year Y, $B_{trigger}$ = 65 kt and HR_{MGT} = HR_{MSY} = 0.2

The upcoming fishing year's TAC is an average of an estimated TAC based upon age 4+ biomass from the most recent assessment and the current fishing year's TAC, thus stabilizing catch between years.

The B_{lim} used to test the precautionary nature of the HCR was set at B_{loss} (61 kt), marginally lower than $B_{trigger}$ (65 kt). As noted in the stock status section, NWWG (2016) subsequently changed B_{lim} to 44 kt while leaving $B_{trigger}$ at 65 kt. These changes have no significant impact on the HCR as the 2013 review indicated that with $B_{trigger}$ = 65 kt and HR_{MGT} = 0.2, there is less than 5% probability that SSB will drop below 61 kt. This implies an even lower probability at 44 kt, the new B_{lim} which is consistent with the point of recruitment impairment (see Stock Status section). The saithe review developed analytical estimates of the MSY harvest rate (with associated biomass). The simulations determined a flat-topped equilibrium catch curve and HR_{MGT} (0.20) is set just below HR_{MSY} (0.22) which provides a small precautionary buffer.

Blue Ling: The HCR, which has been used since 2013, is based upon the ICES data limited species (DLS) approach, was considered in the initial MSC assessment (Tun, 2017a). By 2012, it had become evident that the assessment and provision of advice for stocks with either limited knowledge on their biology or the lack of data on their exploitation was problematical. The challenge is how to give equivalent advice when SSB trigger and/or fishing mortality target reference points cannot be computed, or where there is no stock forecast from which to derive a TAC at a given fishing mortality. ICES thus initiated the WKLIFE series of workshops to identify methods to estimate exploitation rates based upon limited data and options for estimating F_{MSY} proxies using life history and exploitation characteristics. The WKLIFE process has continued until the present (WKLIFE VIII in 2018), exploring and refining the harvest strategy and control rules for data limited species.

DLS (2012) outlines the ICES approach to all DLS stocks, advised catch being a function of a proxy fishing mortality target, an index of recent stock biomass, with account for the risk to reproductive impairment and information uncertainty. Computer simulation studies were conducted to explore the performance of HCR options (WKLIFE, 2012a; 2012b; 2013). WKLIFE (2013) determined that the DLS approach for the Category 3 stocks (those with reliable survey indices) that are moderately exploited and where recruitment has changed little in recent years stabilises SSB in the short term (~5 years). However, beyond 5 years, the stock status, especially for those that are overexploited, becomes a concern. The 2014 review of the DLS strategies (WKLIFE, 2014) was the most comprehensive to that time, including data-limited assessment methods, simulation-tested HCRs, length-based and MSY-based exploitation proxies for Category 3 stocks. All category 3 HCRs tested experienced increasing biological risk over time and a need to include a target reference point to move stock status towards conditions consistent with MSY.

The blue ling HCR is based upon the Category 3 DLS approach modified based upon the WKLIFE process (ICES, 2016a). The HCR states that the TAC for the fishing year Y/Y+1 (September 1 of year Y to August 31 of year Y+1) is calculated as:

> $TAC_{Y/Y+1}$ = MSY F_{proxy} * $Index_Y$ * PA_{buffer}
>
> Where MSY F_{proxy} is the target fishing mortality (1.75), $Index_Y$ is Icelandic autumn survey biomass index for year Y and PA_{buffer} is a precautionary buffer to account for uncertainty in the PRI (0.8)

If $TAC_{Y+1/Y}$ is 20% greater or less than the current catch, then an uncertainty cap of 20% change in $TAC_{Y+1/Y}$ is applied to address noise in the index and its potential influence on the catch advice. In 2017, the uncertainty cap was not applied but the PA_{BUFFER} was (MFRI, 2018h).

There is no formal consideration of a limit reference point in the HCR as well as no analogy to $B_{trigger}$ which reduces exploitation as B_{lim} is approached. WGDEEP (2016) recommended use of limit and precautionary reference points based upon the Icelandic autumn survey index although this modification to the HCR has not been adopted. Due the data limitations, F_{MSY} and associated biomass has not been analytically determined. Rather, the MSY F_{proxy} target (1.75) was confirmed by ICES (2016) as a proxy for F_{MSY} (see Stock Status section).

Atlantic Wolffish and Plaice: The HCRs that MII uses to set Atlantic Wolffish and Plaice TACs were considered in the initial assessment (Tun, 2017b). They are not based upon a formal MSE based review either by MFRI or ICES. The HCRs for Atlantic wolffish and plaice states that the TAC for the fishing year Y/Y+1 (September 1 of year Y to August 31 of year Y+1) is calculated as:

> $TAC_{Y/Y+1}$ = MSY F_{proxy} * HB_Y
>
> Where MSY F_{proxy} is the target fishing mortality and HB_Y is the harvestable biomass in year Y

There is as yet no formal consideration of a limit reference point in the HCRs as well as no analogy to $B_{trigger}$ which reduces exploitation as B_{lim} is approached. In both cases, the MSY F_{proxy} is based upon a yield-per-recruit analysis; in the case of Atlantic wolffish being F_{max} (0.3) and for plaice being $F_{0.1}$ (0.22). While the previous MSC assessment accepted these as F_{MSY} proxies, support for this is stronger for plaice than for Atlantic wolffish (see Stock Status section). As noted above, full HCRs for both species are currently under development.

3.3.3.3 Management Tools

The tools used by MII to regulate the seven fisheries are similar. Quotas, expressed as an annual Total Allowable Catch (TAC), are the primary tools used to control fishing effort and thus fishing mortality. In most fisheries (e.g. Blue Ling), catch outside of Iceland has been an insignificant part of the total. In the case of Tusk, during 2016 – 2017, catch in the Greenland part of Subarea 14 increased from around the 1% historical level to about 15%. During the 2017 benchmark, it was not considered appropriate to include catches from the Greenland part of Subarea 14 in the assessment before conducting additional exploration as there are doubts about the catch information and whether the tusk in the area constitute a single population. In the management strategy evaluation (MSE) a sensitivity analysis, where the catches from this area were included in the stock assessment, showed a minor upward revision in the estimated stock biomass (1%–4% throughout the years) and a downwards revision of the estimated harvest rate (0%–3% in most years, although with an increase in 2015 and 2016). It is hence expected that conclusions from HCR evaluations are robust to not accounting for these catch data. It is recognized that If the recent higher levels of catch in the Greenland area of Subarea 14 continue, the treatment of catch data may need to be reconsidered in future assessments and management (ICES Advice USK 2018). In the case of Golden Redfish, there are explicitly defined TACs for the Icelandic and Greenland components of the fishery which has been the case since 2007. Overall, there is explicit consideration of non-Icelandic catch and its regulation with consideration of adjustments to the HCR during its review cycle as and when deemed necessary.With some minor exceptions, it is required by law to land all catches; discarding is banned. Consequently, no minimum landing size is in force.

A system of transferable boat quotas was introduced in 1984. The quotas were based on the Marine Research Institute's TAC recommendations, taking some socio-economic factors into account. Until 1990, the quota year corresponded to the calendar year but since then the fishing year is 1st September – 31st August. This was done to meet the needs of the fishing industry. In 1990, an individual transferable quota (ITQ) system was established which allowed the free transfer of quota between boats on either a temporary (one-year leasing) or permanent (permanent selling) basis. This system has resulted in boats having diverse species portfolios, with companies often concentrating/specializing on particular group of species. The system allows for some, but limited, flexibility with regards to converting a quota share of one species into another within a boat, allowance of landings of fish under a certain size without it counting fully in weight towards the quota, and allowance of transfer of unfished quota between management years. The objective of these measures is to minimize discarding, which is effectively banned for commercial species. Since 2006/2007, all boats have operated under the TAC system (WGDEEP, 2018).

To prevent fishing of small fish, various measures, such as a mesh size regulation and closures of fishing areas, are in place. A system of instant area closures is also in place for many species. The aim of the system is to minimize fishing on juveniles. For instance, for tusk, an area is closed temporarily (for two weeks) for fishing if on-board inspections (not 100% coverage) reveal that more than 25% of the catch is composed of fish less than 55 cm in length. Since tusk is often bycatch in other fisheries, this rule only applies when the tusk catch is more than 30% of the total catch in a set/haul. Because of repeated instant area closures off the south and southeast coast of Iceland in 2003, four areas were closed permanently for longline fisheries in order to protect juvenile tusk. Similar areas are in use for the other species.

3.3.3.4 Alternative Measures

A new requirement of the MSC standard (CR v2.0), is the evaluation of measures to avoid the capture of unwanted target catch i.e. measures to minimize discards.

Data on discards is available from observers, for which there is about 1% coverage of the Icelandic multispecies fishery (see section 3.4.3.3; MFRI pers. comm. during site visit). While the information is limited, it indicates that discards are very low, being less than 1% of the catch for each species. As noted above, discards are banned, and measures are in place which mitigate against discarding. There was a multi-agency regulatory review which was completed in 2018 with the intent of simplifying the regulatory package, which may have further implications for the management of discarding and illustrates consideration of the efficacy of such measures.

3.3.3.5 Linkage between Components of Harvest Strategy

An important consideration of the harvest strategies is to evaluate whether or not their components are working together. This is evaluated through a comparison of the scientific advice (MFRI for Atlantic wolffish and plaice and ICES for the other species), the TAC set by MII and total landings recorded by MII (Table 5). Prior to 2008/2009, some of the stock boundaries changed significantly (e.g. tusk and ling which were for whole Northeast Atlantic). Further, there have been significant changes (e.g. adoption of formal management plans) over the past decade which is thus the focus of this comparison.

Since 2013/2014, TACs have been set according to the advice, which was not necessarily the case previously. There have been instances in which landings have exceeded the TAC, this particularly being the case for tusk, golden redfish and Atlantic wolffish. During the site visit, this situation was clarified. Although landings have sometimes exceeded the TAC, this must be considered within the context of the multispecies fisheries, in which opportunities to reduce the catch of a single species relative to other species can be limited. TAC overages to address foreign catch and inter-species trades are recognized and addressed by the management system. For instance, small amounts of catch in some areas (e.g. Greenland area of subarea 14) are not counted against TACs, as is also catch from special research fishing. A fisherman is allowed to catch in excess of their quota in the present fishing year, which is subtracted from the next year's quota, to an upper limit of 5%. Fishers are also allowed to exceed quotas in one groundfish species through changing or transferring their quota for some other groundfish species. Species exchange ratios are used in these trades. There is an upper limit of 5% of the total value of the groundfish quotas for the fishing year for all transfers and an upper limit of 1.5% of the total value of the groundfish quotas for transfers into quotas for one species. While the efficacy of this system appears good, during 2014/15-2016/17, quota transfers were the main explanation for the catches in excess of allocated quotas of golden redfish; it is not clear how effective this mechanism would be if the quota were exceeded over several consecutive years, as has been the case with golden redfish. This would be a more significant issue for smaller stocks close to sustainable harvest limits.

Overall, TACs have been successful in managing landings, generally reducing these from high levels in the mid-late 2000s to the recent low levels in 2017/18. It should be noted that stock assessments evaluate performance comparing the fishing mortality (and SSB) against reference which is independent of the TAC allocation. Therefore, the harvest strategy may be able to achieve objectives even if TACs are routinely exceeded. While there appear to be issues in some stocks (i.e. Golden Redfish), during this period harvest rates have generally been reduced from above to either close to (ling) or below (tusk, Atlantic wolffish, saithe, plaice and blue ling) target fishing mortality rates (see Stock Status section).

Table 5 Comparison of the 2010/2011 – 2017/2018 Advice (ICES or MFRI), TAC, Landings (Iceland) and Landings (Total) for seven principle 1 species; italics indicate Landings (Total) > TAC; data from MFRI (2018a-h)

Fishing Year	Tusk				Ling				Golden Redfish			
	Advice	TAC	Landings (Iceland)	Landings (Total)	Advice	TAC	Landings (Iceland)	Landings (Total)	Advice	TAC	Landings (Iceland)	Landings (Total)
2010/2011	6000	6000	6223	*7768*	7500	7500	9327	*10095*	30000	37500	39432	*45271*
2011/2012	6900	7000	5981	*7401*	8800	9000	10074	*11133*	40000	40000	44514	*45597*
2012/2013	6700	6400	5549	*6833*	12000	11500	11196	*12445*	45000	45000	46549	*53201*
2013/2014	6300	5900	4847	5881	14000	13500	11717	13400	52000	52000	52451	50676
2014/2015	4000	3700	4135	*4958*	14300	13800	11112	12423	48000	45600	48349	*51601*
2015/2016	3440	3000	3221	*4121*	16200	15000	9773	11229	51000	48500	54818	*59648*
2016/2017	3780	3380	1689	2418	9343	8143	7291	*8426*	52800	47205	48532	*56017*
2017/2018	4370	3770			8598	7598			50800	45450		

Fishing Year	Saithe				Blue Ling			
	Advice	TAC	Landings (Iceland)	Landings (Total)	Advice	TAC	Landings (Iceland)	Landings (Total)
2010/2011	40000	50000	51600	*52300*	-	-	6464	6992
2011/2012	45000	52000	49700	50400	4000	-	4238	5037
2012/2013	49000	50000	51300	*52200*	3100	-	2996	3199
2013/2014	57000	57000	54300	55000	2400	2400	1653	1754
2014/2015	58000	58000	52100	52600	3100	3100	1898	1939
2015/2016	55000	55000	48900	49200	2550	2550	1734	1824
2016/2017	55000	55000	48800	49100	2040	2040	925	932
2017/2018	60237	60237			1956	1956		

Fishing Year	Atlantic Wolffish				Plaice			
	Advice	TAC	Landings (Iceland)	Landings (Total)	Advice	TAC	Landings (Iceland)	Landings (Total)
2010/2011	8500	12000	12122	*12122*	6500	6500	4843	4843
2011/2012	7500	10500	10607	*10607*	6500	6500	5822	5822
2012/2013	7500	8500	8953	*8953*	6500	6500	5932	5932
2013/2014	7500	7500	7531	*7531*	6500	6500	6030	6030
2014/2015	7500	7500	7862	*7862*	7000	7000	6237	6237
2015/2016	8200	8200	8982	*8982*	6500	6500	7619	*7619*
2016/2017	8811	8811	7545	7545	7330	7330	6369	6369
2017/2018	8540	8540			7103	7103		

3.3.4 Information and Monitoring

3.3.4.1 Stock Structure

As is usual with fish stocks, stock structure reflects available scientific information alongside pragmatic approach to define management units. Generally, all stocks are managed by MII based on ICES areas. These areas demark relatively homogeneous ecosystems and fish stocks might be expected to lie within these areas. However, they are approximations dividing areas with continuous habitat change. Nevertheless, these areas provide the basis not only for determining stock management units, but also a basis for jurisdiction, application of controls and data reporting by vessels. It therefore makes sense to align stock management units as much as possible with ICES area boundaries. Information on all ICES stock structures is available in each Stock Annex published under the relevant working group report.

For demersal species, seabed depth is an important factor. Iceland shelf (<500m deep) lies within ICES Division 5a, and for most of the stocks this represents the core area and the area of assessment. However, some Principle 1stocks extend outside this area. Ling, plaice, saithe and Atlantic wolffish are managed as single units within Division 5a. Blue ling and tusk include East Greenland (subarea 14) to the west. Golden redfish is the most widely distributed stock and is thought to range across subareas 5, 6, 12 and 14.

Atlantic Wolffish show different growth characteristics and exhibits spawning-site fidelity and migration to feeding grounds of less than 100 miles in Icelandic waters (Jonsson, 1982). Despite the potential of the Atlantic wolffish to exhibit genetic structure (lack of eggs/larval dispersal and adults are relatively sedentary), genetic differences within Icelandic waters is low (Pampoulie et al. 2012) and only weak differences have been detected between Western Greenland and Iceland to the Barents Sea (McCusker and Bentzen, 2010a). As with plaice, this suggests Division 5a is a reasonable definition of a management unit.

Blue Ling stock structure is determined by primarily by its spawning areas. Biological investigations in the early 1980s suggested that at least two adult stock components were found within the north Atlantic, a northern stock in Subarea 14 and Division 5.a with a small component in 5.b (the subject of this assessment), and a southern stock in Subarea 6 and adjacent waters in Division 5.b. supported by differences in length, age, growth and maturity between areas. However, the stock structure remains uncertain within the areas under consideration (WGDEEP, 2016).

Golden Redfish, despite genetic studies suggesting differences between Greenland stock and other areas (Pampoulie et al. 2009), are treated as a single management unit within Greenland (subarea 14) and Iceland (Division 5a) based on evidence of spawning areas. The greater majority (95-98% of the golden redfish landings) are from the Iceland area.

Ling show little genetic variation across ICES areas, but it was believed that sufficiently separate fishing areas should be treated as separate management units due to the exchange of individuals being limited to the extent that it has little effect on the structure and dynamics of each unit (WGDEEP 2007). Iceland (Division 5.a) was considered to be sufficiently isolated to form a separate unit.

Plaice has been treated as a single stock within Iceland waters (Division 5a). Genetic research found relatively low genetic diversity, which may be due to has been suggested to be caused by low population size at the edge of its distributional range with inbreeding (Hoarau et al., 2004). Solmundsson et al. (2005) carried out a tagging study on spawning and feeding grounds revealed several distinct spawning locations maintained by site fidelity but connected by straying individuals. In response, management has closed spawning areas to fishing.

Saithe has been divided into several management units in the Northeast Atlantic based on its spatial distribution and tagging results. A recent analysis of archived tagging data showed that saithe in Icelandic waters rarely migrate out of the Icelandic waters. Genetic studies suggest low differentiation in the NE Atlantic (Saha et al. 2015), but this does not discount Iceland as a management unit. While there is most likely some exchange with other saithe stocks outside Division 5a, it was not considered likely to be a major influence on the outcome of stock assessments, relative to other sources of variability.

Tusk stock structure was suggested by WGDEEP (2007), which used genetic investigations and other information to suggest the four management units, with the current stock defined in Iceland (Division 5a) and East Greenland (subarea 14).

3.3.4.2 Data Collection

The data used for monitoring and assessing all Icelandic stocks consist of landings, catch-at-age composition and indices from standardized bottom trawl surveys.

Technical details of the data and stock assessment are found in the ICES stock annexes, which are published at the end of working group reports. The stock annex is mainly written or updated during each benchmark assessment, which undertakes a review of the stock assessment methodology, making any changes deemed appropriate (blue ling, ling and tusk: WGDEEP 2018; saithe and golden redfish: NWWG 2018). Information Atlantic wolffish and plaice is available in MFRI (2018c) and MFRI (2018f) respectively, although detail is much more limited in these stocks reflecting less publicly available documentation.

The data are primarily obtained from landings reports, vessel register information, log-book, discard and survey databases. Landings of species by each boat and gear are effectively available electronically in real time (end of each landing day). Log-book statistics are generally available in a centralized database about 1 month after the day of fishing operation. Since 2009, an increasing proportion of vessels are using electronic logbooks. The biological sampling programs are based on log books, surveys, landings and at-sea sampling. The protocols for sampling are well defined and based on good statistical principles. Biological sampling provides length, age, maturity and sex data on landings for input to stock assessment.

Mean annual discards is estimated to be around 1% of landings and ICES considers discarding negligible for these stocks. The method used for deriving these estimates assumes that discarding only occurs as high grading and is based on comparing length composition samples taken at sea and from landings (Pálsson 2003). A primary concern has been discarding haddock, which is caught alongside cod but has a much smaller TAC (see also section 3.4.3.3).

Fishery-independent demersal trawl surveys are conducted by MFRI in the spring (SMB) and autumn (SMH). All catches are recorded, and a range of samples are collected, including sex, length and age for the main commercial species, species composition and other ecological measures (e.g. cod and haddock food composition). The surveys provide fishery independent indices of abundance for all species as well as information on size, sex, maturity and age structure of the populations. The surveys have strengths and weaknesses for different species. Blue ling relies on the autumn survey, whereas all other species use the spring survey. The main target species in the autumn survey are Greenland halibut (*Reinhardtius hippoglossoides*) and deep-water redfish (*Sebastes mentella*).

Effort and nominal CPUE data from the Icelandic trawl, longline and other fleets are routinely collected and reported. Due to changes in the fishery (expansion into new areas, fleet behaviour, etc.) and technical innovations, CPUE is not considered a reliable index of abundance for any stock.

Habitat and other ecosystem information collection is being expanded under a habitat mapping project (see below). Other standard oceanographic information is also available (such as sea water temperature, currents, chlorophyll density etc.), although this is not necessarily directly used in stock assessments. Information on vessels and the fleet operations is relatively complete. All vessels are registered, and the majority of vessels have VMS. Although observer coverage is low, there are observer data which are sufficient to provide some detailed monitoring of fleet activities.

3.3.5 Stock Assessment

3.3.5.1 Process and Peer Review

Stock assessments of the seven Principle 1 stocks have been undertaken annually by MFRI since at least 2001. Those of tusk, ling, golden redfish, saithe and blue ling have been undertaken under the auspices of ICES while those of Atlantic wolffish and plaice have been undertaken under the auspices of MFRI alone. In all cases, MFRI scientists compile a preliminary stock assessment which is then considered by an assessment working group (in the case of tusk, ling and blue ling, the ICES WGDEEP working group, golden redfish and saithe, the ICES NWWG working group, and Atlantic wolffish and plaice, the MFRI Demersal working group). During and after each stock assessment ICES working group meeting, audits are conducted by designated members of the working group, based on ICES guidelines, ensuring that the data and methods used are well described, were consistent with the benchmark review, and that the methods had been implemented appropriately. These audits are documented in a Stock Annex of the working group report. Following the ICES working group meeting, its report is considered by ACOM who is ultimately responsible for the ICES advice.

The Atlantic wolffish and plaice assessments are reviewed by a designated group of MFRI scientists (MFRI, pers. comm.). During the site visit, MFRI indicated that an MOU is being arranged with ICES to conduct the future plaice and Atlantic wolffish stock assessment also within ICES.

ICES undertake in-depth reviews, termed ‘benchmarks’, of the data and assessments models based upon requirements, which include external experts. Thus, a stock assessment with a larger set of issues would be the subject of a benchmark assessment, compared to an assessment with fewer issues. The format of these benchmarks is outlined in ICES (2008). Since 2008, the following benchmark assessments have been conducted:

- Tusk: WKDEEP (2010)
- Ling: WKDEEP (2015)
- Golden Redfish: WKRED (2012)
- Saithe: WKROUND (2010)

During the reviews of the Harvest Control Rules (HCR) of tusk (WKICEMSE, 2017), ling (WKICEMSE, 2017), golden redfish (WKREDMP, 2014) and saithe (Hjörleifsson and Björnsson, 2013), the technical details of the stock assessments were also reviewed, which are considered extensions of the benchmark process. During the site visit, it was indicated that evaluations of the HCRs, which are on a five-year schedule, will be conducted within ICES as part of benchmark meetings. Planned benchmark reviews include Atlantic wolffish (2019), golden redfish (2020), saithe (2019), and plaice (2019). Review of the blue ling HCR is part of the on-going ICES Data Limited Species (DLS) WKLIFE process.

Since Tun (2014a; 2014b) assessed the golden redfish and saithe fisheries, other than the annual assessments which update stock status, there have been no significant changes to the data and model used. The same is true since Tun (2017a; 2017b) assessed the blue ling, Atlantic wolffish and plaice fisheries. On the other hand, since Tun (2015) assessed the tusk and ling fisheries, the data and model of these stocks was fully reviewed during the 2017 HCR/benchmark review (WKICEMSE, 2017). While updates have been considered during the surveillance audits, for completeness, an overview of the data, model structure and uncertainties used in the most recent assessments is provided below.

3.3.5.2 Data

All seven assessments consider the stock as one geographical unit without internal spatial structure. Only in the case of saithe is migration considered, this through extra ‘recruits’ estimated for specific ages and years. Quarterly time steps are used in the tusk, ling and Atlantic wolffish assessments, biannual in the golden redfish assessment, and annual in the saithe, plaice and blue ling assessments. Four of the assessments (Atlantic wolffish, saithe, plaice, blue ling) assess the stocks assuming exploitation by one fishing fleet. The tusk, golden redfish and ling assessments assess these stocks assuming two (longline and foreign), three (Iceland, Greenland and Faroes) and four (trawl, longline, gillnet and foreign) fleets respectively. Consequently, the fishery and survey data are processed and input into the assessments as per these assumptions.

In all cases, catch is assumed equal to the landings with no explicit account of discards which are considered to be negligible. In the saithe and plaice assessments, these landings are used in the likelihood assuming a small amount of error (CV=5%) which appears to improve model fits (WKROUND, 2010). In the other assessments, the catch is used in the assessments assuming no error.

As with most assessments, commercial sampling is used to characterize the age/size structure of the fleet-specific catch. In the case of the tusk, ling, Atlantic wolffish and golden redfish, there have been issues with the availability of reliable age data to construct age/length keys (ALK) to convert sampled length frequencies to age compositions on an on-going basis (WKDEEP, 2010; WKDEEP, 2014; WKRED, 2012). The GADGET assessment model (described below) had been developed for multi-species assessment in which the focus is length-based analysis using the available age data. It was decided to use this model for these stocks which allowed separate use of the commercial and survey length frequency and ALKs. In the case of saithe and plaice, the commercial and survey sampling data are processed outside the model to create the catch at-age and survey index at-age tables used as input to the stock assessments. In the case of blue ling, no age data are used, with only the catch at length data included in the assessment.

Due to changes in the fishery (expansion into new areas, fleet behaviour etc.) and technical innovations, commercial catch rate (CPUE) indices are not used although the assessment reports routinely provide synopses of fleet and area-specific trends.

The main index of abundance used in all except the blue ling assessment is supplied by the Icelandic spring (March) survey. In the case of blue ling, given that the spring survey covers only the shallow part of its depth distributional range and exhibits high inter-annual variability, the data of the Icelandic fall (October) survey, which is considered to cover the distributional range of the stock and which provides a relatively precise index of abundance, is used. The only other survey used is that of East Greenland (since 1982) for the golden redfish stock, ICES Division 14b possibly being an important nursery area of the stock.

In all assessments, sex-specific processes are not modelled. Regarding age-specific weight, in all cases, these are based upon a fixed length-weight relationship. Maturity at-length (for the tusk and ling assessments) and at-age (for the saithe and plaice assessments) is based upon Icelandic spring survey observations. Natural mortality (M) is fixed (0.15-0.20 year^{-1} depending on the stock) based upon life history considerations in all assessments, except that of blue ling where it is not explicitly used. Only in the case of golden redfish is an age-based monotonic decline in M (from 0.2 at age 0 to 0.05 at ages 5+) used.

3.3.5.3 Model Structure

Three stock assessment approaches are used in the Icelandic multispecies fishery: GADGET software (tusk, ling, Atlantic wolffish and golden redfish), ADCAM software (saithe and plaice) and DLS Cat 3 (blue ling). Developing out of the MULTISPEC and BORMICON models, GADGET (Begley and Howell, 2004) is the most flexible of the three approaches and is designed as a multi-area, multi-fleet model, capable of including predation and mixed fisheries issues and has been classified as a Minimally Realistic Model (MRM) for ecosystem applications (Plaganyi, 2004). However, it can also be used in a single species context, which is the case here. It simulates, forward through time, the age and length growth and mortality (fishery and natural) processes of each year-class in a stock. As indicated above, its use was stimulated by the availability of length, as opposed to age, information for these stocks. Considerable attention was given during its development to how best to model the progression of age-specific numbers at length through time, ultimately settling on a beta-binomial distribution to provide flexibility in the estimation of the probability of transition between length bins. This is a different treatment from both Multifan-CL (Fournier et al, 1998) and Stock Synthesis (SS: Methot and Wetzel, 2013) which also model year-class age and length-based processes but through variation around age-specific growth models, typically Von Bertalanffy. During the 2014 ling benchmark (WKDEEP, 2014), an external reviewer acknowledged the power of the GADGET algorithm to explicitly model changes in the length distribution which persist into subsequent time periods, something that other models cannot do. Whether such ability is critical for the assessment of ling was unclear. If it were proven that variable growth rates are an important characteristic of the dynamics of this stock or that fishery selectivity alters the length distribution of year-classes by preferentially removing the fast-growing fish, then GADGET would be a superior model to use compared with others like SS. On the other hand, due to the model's complexity, very long-running times are needed, compared to SS, which diminished the capacity to conduct thorough sensitivity analyses of different data and/or model assumptions.

ADCAM (Bjornsson and Magnusson, 2009) is also a forward-projecting stock assessment model but in this case, only the age-specific stock and fishery processed are explicitly considered, similar to many Statistical Catch at Age (SCAA) formulations used both in Europe and elsewhere. One of its key features is the separability of fishing mortality into an age and year effect.

The main processes modelled in the GADGET and ADCAM assessments are indicated in Table 6. Annual recruitment in the GADGET assessments is estimated separately for each year, unconstrained by a stock-recruitment (SR) relationship, which is the case in the saithe and plaice assessments. GADGET estimates the mean length (and associated standard deviation) of this recruitment which is the starting point of the age-specific growth in length over time. In the case of golden redfish, a temporal shift (pre-and post-2000) in this growth is modelled. Starting year numbers at age are estimated with, again their mean length at age estimated (standard deviation input from spring survey). Fishery selectivity is either length-based (logistic model in GADGET) or age-based (non-parametric in ADCAM) with time blocks only employed in the case of Saithe. Survey selectivity is similarly configured although in the case of golden redfish, a double-logistic model is used. These relationships are the result of model investigations during the benchmark review process. Survey catchability is either estimated by length (GADGET) or age (ADCAM) with use of a density-dependent power term for specific length groups in the ling assessment. Overall, the model structures of these assessments are consistent with practice elsewhere.

Table 6 Model processes in stock assessments of Principle 1 Stocks; est=estimated

Stock	Modelling Approach	Recruitment	Initial Stock N	Fishery Selectivity	Survey Selectivity	Survey Catchability
Atlantic Wolffish	GADGET	annual recruits (age 1) est; age 1 mean length & sd from fall survey	all ages est; sd length at age est	length-based logistic	length-based logistic	Q at length est
Blue Ling	DLS Cat 3	Not modelled	Not modelled	Not modelled	Not modelled	Not modelled
Golden Redfish	GADGET	annual recruits (age 5) est; age 5 mean length & sd est separately pre & post 2000	all ages est; sd length at age est	length-based logistic	length-based double logistic	Q at length est
Ling	GADGET	annual recruits (age 2) est; age 2 mean length & sd from fall survey	all ages est; sd length at age based on spring survey	length-based logistic	length-based logistic	Q at length est; power term for 20-50 & 50-60 cm groups
Plaice	ADCAM	annual recruits (age 3) est about SR (Hockey stick) relationship	all ages est	Age-specific non-parametric; no time blocks	age-based non-parametric	Q at age est
Saithe	ADCAM	annual recruits (age 3) est about SR (Hockey stick) relationship	all ages est	Age-specific non-parametric; time blocks (1980-96; 1997-2013; 2014-present)	age-based non-parametric	Q at age est
Tusk	GADGET	annual recruits (age 2) est; age 2 mean length & sd est	all ages est; sd length at age based on spring survey	length-based logistic	length-based logistic	Q at length est

The blue ling assessment is index-based (WGDEEP, 2018) with no explicit modelling of the fishery and stock processes. The WGDEEP has evaluated which of the Icelandic spring and fall surveys to use in the assessment. The Icelandic spring survey covers only the shallower part of the depth and distributional range of blue ling and exhibits high interannual variability. It is thus unknown to what extent the spring index reflect changes in total blue ling biomass, given that it does not cover the depths where the largest abundance of blue ling occurs. The shorter time series autumn survey, which goes to greater depths and is therefore more likely to reflect the true biomass dynamics than the spring survey and overall is a more precise indicator of blue ling stock biomass. Consequently, it was agreed to base the assessment of trends in stock status on the relatively precise Icelandic fall survey biomass > 39 cm in length.

A GADGET model was conducted by WGDEEP (2012) which indicated relatively good fit to the fishery size composition and fall survey data but due to a lack of good aging data, the fit to these data was not good. Also, there were inconsistencies in the growth observed in the fishery and surveys which may be related to fishery selectivity assumptions. It was agreed to base the determination of blue ling stock status on the ICES DLS category 3 approach until such time that issues with the analytical assessment model could be resolved.

3.3.5.4 Uncertainties

The GADGET and ADCAM models predict fishery and survey variables which are used (log-transformed) in the likelihood function with the observations to find the optimal set of parameters. The likelihood components were discussed above. All likelihood components assume normal error. Only observation errors are assumed with no examination of process error. Priors are not used although parameter bounding is used. In the case of the GADGET assessments, iterative re-weighting based upon the variance of the residuals is used to weight the components while in ADCAM, for each component, a standard deviation is estimated which is distributed across ages based upon an input age-specific pattern.

The GADGET optimization procedure is a combination of a wide area search using simulated annealing, a local search using the Hooke and Jeeves algorithm and finally a search close to the maximum likelihood based on the Broyden-Fletcher-Goldfarb-Shanno algorithm (BFGS). This is somewhat analogous to phased optimization used in other approaches (e.g. ADMB).

Parameter and derived variable uncertainty in the tusk and ling GADGET models is characterized through bootstrapping. Similar analyses do not appear to have yet been undertaken for the Atlantic wolffish and golden redfish GADGET models. In the saithe ADCAM model, MCMC has been used although this has not yet been undertaken for the plaice model.

Model fits to the data have overall been good. Working group reports note that some models indicate conflicting trends between likelihood components (e.g. survey index versus composition) which is often observed. Retrospective analyses have been conducted during benchmark reviews and have been generally adequate although model convergence was an issue in the golden redfish model (NWWG, 2018, 2018). Specifically, the 2018 assessment resulted in a 12% downward adjustment in recent stock biomass which was unexpected given that there were not considerable changes to the data. Upon investigation by the working group, it was determined that the model had not converged to the "best solution" in the 2017 and previous recent assessments with the retrospective analysis indicating that the biomass in recent years should have been estimated lower (see Figure 15b in Stock Status section). This issue has been addressed and expected not to be a problem in future assessments. Overall, the peer review process has considered that these analyses (summarized in Table 7) do not mitigate against use of the assessment results as the basis of management advice.

Uncertainties in the blue ling assessment were explored as part of the GADGET modelling by WGDEEP (2012). As noted above, due to these uncertainties, it was agreed to base the determination of stock status on the Icelandic autumn survey which was considered as providing a more reliable index of abundance than the spring survey and GADGET model outputs. Further, the PA_{buffer} and Uncertainty Cap of the DLS HCR are designed to address uncertainties in fishery and stock dynamics (see Harvest Strategy section).

Sensitivity analyses specific to each stock have been conducted, examining a wide array of issues (Table 7). These encompass the uncertainties considered present in these assessments.

Alternate models have been attempted for four of the stocks, these being Atlantic wolffish (ADAPT), golden redfish (TSA and SPM), saithe (XSA, Camera, ADAPT, TSA, SAM) and blue ling (GADGET). In all cases, the fishery and stock trends in the alternate models were comparable to those in the models accepted by the peer review process (e.g. see Tun (2014b; 2017b) for saithe and Atlantic wolffish model comparisons).

Table 7 Model fits and Uncertainties of the Stock Assessments of Principle 1 Stocks; CI = Confidence Interval

Stock	Model Fit	Retrospective Analysis	Sensitivity Analysis
Atlantic Wolffish	Residual analysis indicates no major issues	Some evidence of retrospective pattern but not deemed significant	Alternate models (ADAPT)
Blue Ling	NA	NA	Alternate Models (GADGET)
Golden Redfish	Fit to fishery length good; some issues with fits to survey data described in 2018 NWWG report	Downward revision (12%) in recent years	Alternate models (TSA, SPM); Temporal change in growth rate (led to change in mean recruit at length estimation; inclusion/exclusion of survey series; fishery selectivity time blocks; dataset weighting
Ling	Residual analysis indicates no major issues	Some patterning but within 90% CI	inclusion/exclusion of smallest length group; inclusion/exclusion post-2003 survey data; maturity estimation; age groupings; length group size
Plaice	Residual analysis indicates no major issues	Little systematic bias	Not conducted
Saithe	Residual analysis indicates no major issues	Little systematic bias	Alternate models (XSA, Camera, ADAPT, TSA, SAM); fishery selectivity time blocks;
Tusk	Residual analysis indicates no major issues	Some patterning but within 90% CI	Catch in Area XIV; fishery selectivity; M; dataset weighting

3.4 Principle Two: Ecosystem Background

This is a re-assessment of MSC certified Icelandic fisheries and gears; much of the Ecosystem Background can be read in previous reports. The following sections therefore provide an update on available information in order to follow the rationale of the scoring of the fishery against the relevant performance indicators.

3.4.1 Overview

This overview of the Icelandic ecosystem draws heavily on the ecosystem description of recently MSC certified ISF fisheries (e.g. ISF haddock[2]) and the overview provided in the first certification reports for this multispecies fishery (such as ISF ling[3]). In addition the ecosystem overview provided by ICES (2017d) and MRI periodic reports on the state of the environment through the oceanographic surveys (see https://www.hafogvatn.is/en/research/oceanograpy) and contributing to the ICES ecoregion overview.

The Icelandic ecoregion is considered to be made up of four key subareas (Figure 1) defined by difference in bathymetry, hydrography, and species composition:

1 - Southern shelf: Coastal areas south and west of Iceland (mostly < 500 metres). Mainly a mixture of coastal and Atlantic waters.

2 - Northern shelf: Banks north and east of Iceland (mostly < 500 metres). Mainly a mixture of coastal, Atlantic, and Arctic waters.

3 - Southern deep: Off the shelf south and west of Iceland (mostly > 500 metres). Mainly Atlantic water.

4 - Northern Deep: Off the shelf north and east of Iceland (mostly > 500 metres). Mainly Arctic water.

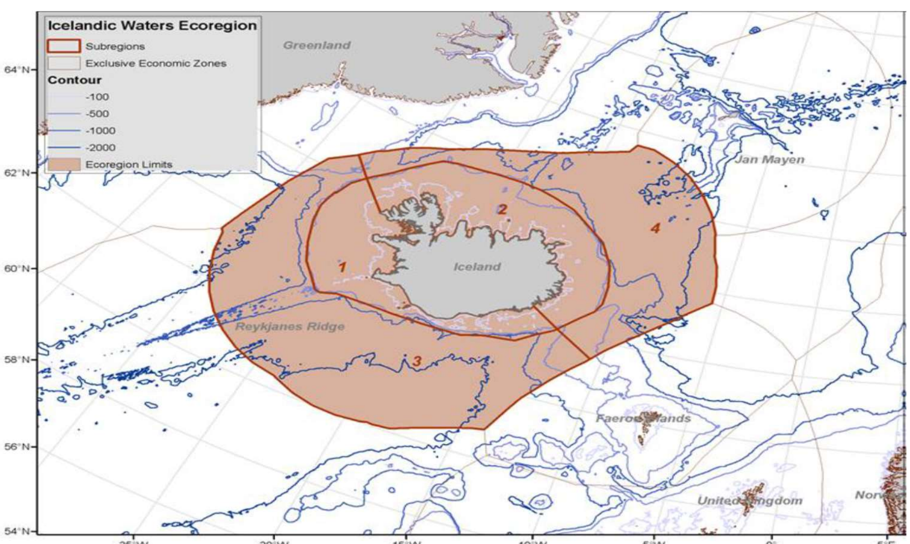

Figure 20 The Icelandic Waters ecoregion, showing EEZs, subareas, and depth contours (Source: ICES 2017d ecoregion overview)

[2] https://fisheries.msc.org/en/fisheries/isf-iceland-haddock/@@assessments

[3] https://fisheries.msc.org/en/fisheries/isf-iceland-saithe-ling-atlantic-wolffish-and-plaice/@@view

Iceland is situated in the central North Atlantic at the junction of the Mid-Atlantic (Reykjanes) Ridge and the Greenland–Scotland Ridge, just south of the Arctic Circle. The Icelandic EEZ encloses a sea area of 758,000 km² of which c. 212,000 km² is less than 500 m deep. The ocean and coastal shelves are heavily influenced by oceanic inputs.

In the Icelandic Waters ecoregion, water masses of different origin mix (Figure 21). Relatively warm and saline Atlantic water enters the area, both in the southwest as a branch of the Irminger Current and in the east from the Norwegian Sea and over the Jan Mayen Ridge (Figure 20). The East Greenland Current carries cold, low salinity water from the Greenland Sea in the north into the Icelandic Waters ecoregion.

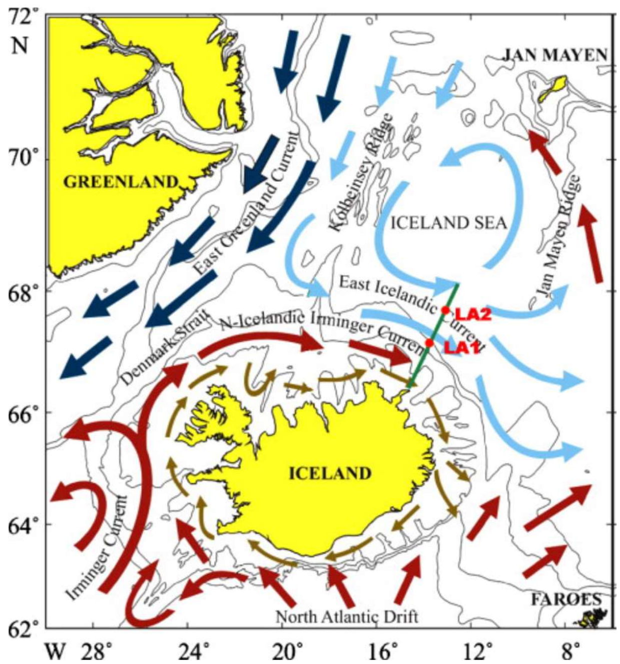

Figure 21 Circulation patterns in the Iceland Sea. (red arrows = Atlantic inflow; brown arrows = closest to the coast of Iceland represent the Icelandic Coastal Current; dark blue arrows = East Greenland Current; light blue arrows = East Icelandic Current). Source: Jonsson 2007

The flow and diversity of the current system is an important feature of the marine ecosystem around Iceland, as it impacts marine productivity. A summary overview of the key signals was provided in ICES 2017 (ecoregion overview), and the issues relevant to this assessment are reproduced here:

- The variable location of the fronts between the colder and fresher waters of Arctic origin and the warmer and more saline waters of Atlantic origin result in variable local conditions, especially on the northern part of the shelf. During the last two decades, the Atlantic water mass has been dominating, in contrast to the Arctic domination in the previous three decades.
- Zooplankton biomass on the northern shelf has fluctuated in the past, cycling on a five- to ten-year periodicity, with a period of generally low biomass from the 1960s to the 1990s.
- Increased temperature in the lower water column on the western and northern part of the Icelandic shelf has resulted in changes in spatial distribution for a number of demersal species. Species like haddock *Melanogrammus aeglefinus*, anglerfish *Lophius piscatorius*, ling *Molva molva,* tusk *Brosme brosme*, dab *Limanda limanda*, and witch *Glyptocephalus cynoglossus* that have previously had Icelandic waters as their northern boundary of distribution and have mainly been recorded in the warm waters south and west of Iceland, are now showing a northward clockwise trend in their distribution along the shelf, and in some cases a distributional shift.

- The main spawning grounds of most of the exploited fish stocks are in the Atlantic water south of the country while nursery grounds are off the north coast.
- Improved management measures for most of the major stocks (cod *Gadus morhua*, haddock, saithe *Pollachius virens*, redfish *Sebastes* sp., herring) have resulted in decreased fishing mortality, close to or at FMSY, and increased SSBs. This has furthermore resulted in decrease in effort and less pressure on the benthic habitats.
- Warming waters has led to a decline in the stock abundance and distribution of many cold-water species, while the previously rare occurrence of warm-water species in the ecoregion has increased in recent years.
- From the mid-2000s, Atlantic mackerel *Scomber scombrus* extended its feeding grounds from the Norwegian Sea to Icelandic Waters ecoregion, while the summer feeding grounds of capelin *Mallotus villosus* moved westwards from Icelandic into Greenland waters. Norwegian spring-spawning herring *Clupea harengus* has, since the early 2000s, reappeared at its traditional feeding grounds east and north of Iceland. These major changes in migration patterns have been linked to prey availability, oceanographic conditions, and stock density.
- The stocks of northern shrimp *Pandalus borealis* collapsed around the year 2000 and the driving factors are thought to be increased predation by gadoids, increasing temperature, and high fishing mortality.
- A recruitment failure of sandeel (Ammodytidae) was recorded in 2005 and 2006, and, with the exception of the 2007 cohort, recruitment has been at a low level since then. Fish stomach content data suggest that the decline in the sandeel population may even have started as early as around year 2000.
- The abundance of minke whales *Balaenoptera acutorostrata* has decreased on the Icelandic shelf in recent years, following changes in prey distribution. Abundance of other species, in particular fin whales *Balaenoptera physalus* and humpback whales *Megaptera novaeangliae*, have increased over the last 20 to 30 years.
- In recent decades, the breeding success of many seabird species has been poor in south and west Iceland, accompanied by declines in their breeding population sizes. These trends may be influenced by changes in density, composition, and spatial distribution of their main fish prey (i.e. sandeel).

3.4.2 Species Allocations & Catch Profiles

A review was conducted through the assessment process of all species that the fishery might have a detrimental 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 the 121 species/stocks identified as potentially having an interaction with the fishery, 32 have been identified as primary species (Table 15). 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 20 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. The remaining 69 species not allocated to primary or ETP are considered secondary species.

The catch profile consists of the sum of the landings for trips in the 5 calendar years 2013-2017 inclusive, where at least 1kg of the Principle 1 species is landed in the trip[4]. This approach is a consistent treatment of the data to determine whether species are main or minor. It excludes landings not associated with Principle 1 stock in each case. It includes all landings where some of the

[4] Discarding of commercial species is not permitted in Iceland and bycatch must be recorded and reported.

Principle 1 species is landed because that species will be certified. Higher cut-off levels would tend to decrease many species as a proportion of the catch (dependent on their association with the Principle 1 species), so this approach is precautionary as it is more likely to identify more species as "main".

The criteria for allocation of species between minor and main follows the methodology in CR2.0 GSA3.4.2.2. Information on potential resilience 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".

For the following tables, the bycatch species name is followed a code indicating whether the species is addressed as primary (PRI), secondary (SEC) or endangered, threatened or protected (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. The tables report the percentage only, where "0.0" indicates presence in the catches, but at less than 0.05% in the catch for the indicated gear, and blank entry implies no observation in the landings. Main species percentages are given in **bold**. Full catch profiles for each of the UoA are provided in a separate spreadsheet.

Table 8 Catch profile for Atlantic Wolffish (Iceland) stock (% of total catch).

Species	Bottom trawl	Nephrops trawl	Danish seine	Longline	Handline	Gillnet
Anglerfish (PRI)	0.1	3.0	0.3	0.0	0.0	0.2
Atlantic bluefin tuna (PRI)	0.0					
Atlantic Cod (PRI)	**43.4**	**25.8**	**44.0**	**65.1**	**90.1**	**87.7**
Atlantic halibut (SEC)	0.0	0.1	0.0	0.0	0.0	0.0
Atlantic pomfret (SEC)				0.0		
Atlantic wolffish (PRI)	1.0	0.9	**5.0**	**6.4**	1.8	0.2
Baird's slickhead (SEC)	0.0			0.0		
Black dogfish (SEC)	0.0			0.0		
Black scabbardfish (SEC)	0.0			0.0		
Blue ling (PRI)	0.2	1.2	0.1	0.3	0.0	0.0
Blue shark (PRI)				0.0		
Blue skate (SEC)	0.0	0.2	0.1	0.1	0.0	0.0
Blue whiting (PRI)	0.0					
Common dab (PRI)	0.0	0.0	1.7	0.0	0.0	0.0
Dealfish (SEC)			0.0	0.0		0.0
Deep water redfish (PRI)	2.4			0.0	0.0	
European eel (SEC)	0.0	0.0		0.0		
European flying squid (SEC)		0.0	0.0			
European hake (SEC)			0.0			
Flounder (SEC)			0.0			0.0
Golden redfish (PRI)	**19.0**	**20.6**	1.8	1.1	0.9	0.5
Greater eelpout (SEC)	0.0			0.0		
Greater forkbeard (SEC)	0.0	0.0		0.0		0.0
Greater silver smelt (PRI)	1.2	0.0		0.0		
Greenland halibut (PRI)	1.8	0.0	0.0	0.1	0.0	0.0
Greenland shark (SEC)	0.0	0.0	0.0	0.0		
Grey gurnard (SEC)	0.0		0.0			

Haddock (PRI)	**8.0**	1.9	**16.0**	**15.0**	1.5	1.3
Harbour seal (ETP)	0.0			0.0		
Herring (PRI)	0.0					
Lemon sole (PRI)	0.2	0.7	4.9	0.0	0.1	0.0
Ling (PRI)	0.8	**10.4**	0.9	**6.0**	0.5	1.7
Long rough dab (PRI)	0.0	0.0	0.1	0.0		0.0
Lumpfish (PRI)	0.0	0.0	0.0	0.0	0.1	0.1
Mackerel (PRI)	0.1	0.0	0.0	0.0	0.0	0.0
Megrim (SEC)	0.1	2.8	0.2	0.0	0.0	0.0
Northern shrimp (PRI)	0.0					
Northern stone crab (SEC)				0.0		
Northern wolffish (SEC)	0.0	0.0	0.0	0.0	0.0	
Norway lobster (PRI)	0.0	**19.2**				
Norway redfish (PRI)	0.1	0.0		0.0	0.0	
Orange roughy (SEC)	0.0					
Other species (SEC)	0.0					
Plaice (PRI)	0.9	0.0	**17.9**	0.2	0.0	1.0
Pollack (SEC)	0.0	0.0	0.0	0.0		0.0
Porbeagle (SEC)	0.0	0.0		0.0		0.0
Portly spider crab (SEC)		0.0		0.0		
Portuguese dogfish (SEC)	0.0					
Rabbit fish (SEC)	0.0	0.0	0.0	0.0		0.0
Roughhead grenadier (SEC)	0.0			0.0		
Roundnose grenadier (SEC)	0.0			0.0		
Sailray (SEC)	0.0	0.0	0.0	0.0		
Saithe (PRI)	**20.0**	**6.7**	4.0	0.7	4.1	**7.1**
Sea cucumber (PRI)			0.0	0.0		
Shagreen ray (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Spiny dogfish (SEC)	0.0	0.0	0.0	0.0		0.0
Spotted wolffish (PRI)	0.3	0.0	0.0	0.9	0.0	0.0
Starry ray (SEC)	0.0	0.0	0.3	0.9	0.0	0.0
Turbot (SEC)	0.0	0.0	0.0	0.0		0.0
Tusk (PRI)	0.0	0.0	0.0	2.9	0.3	0.0
White hake (SEC)	0.0	0.0	0.0	0.0	0.0	
White-Beaked Dolphin (SEC)				0.0		
Whiting (PRI)	0.2	1.5	0.3	0.1	0.1	0.0
Witch (PRI)	0.0	**5.1**	2.5	0.0	0.3	0.0

Table 9 Catch profile for Blue ling (Iceland/Greenland/Faroes) stock.

Species	**Bottom trawl**	**Nephrops trawl**	**Danish seine**	**Longline**	**Handline**	**Gillnet**
Anglerfish (PRI)	0.1	2.6	0.5	0.0		0.7
Atlantic bluefin tuna (PRI)	0.0					
Atlantic Cod (PRI)	**29.0**	**19.9**	**32.4**	**50.4**	**37.6**	**47.1**
Atlantic halibut (SEC)	0.0	0.1	0.0	0.0		0.0
Atlantic rock crabs (SEC)			0.0			
Atlantic wolffish (PRI)	0.8	0.7	0.4	0.7	0.0	0.0
Baird's slickhead (SEC)	0.0			0.0		
Black dogfish (SEC)	0.0			0.0		0.0

Black scabbardfish (SEC)	0.3			0.0		
Blue ling (PRI)	0.6	2.1	1.5	4.4	0.6	0.8
Blue shark (PRI)				0.0		
Blue skate (SEC)	0.0	0.2	0.2	0.1		0.0
Blue whiting (PRI)	0.0					
Common dab (PRI)	0.0	0.0	0.6	0.0		0.0
Dealfish (SEC)				0.0		
Deep water redfish (PRI)	**7.3**			0.0		
European eel (SEC)	0.0	0.0		0.0		
European flying squid (SEC)		0.0	0.0			
Golden redfish (PRI)	**24.8**	**26.6**	**11.4**	**2.6**	1.5	**2.0**
Greater eelpout (SEC)	0.0			0.0		
Greater forkbeard (SEC)	0.0	0.0		0.0		
Greater silver smelt (PRI)	4.5	0.0				
Greenland halibut (PRI)	**6.3**	0.0	0.0	0.5	**13.2**	0.0
Greenland shark (SEC)	0.0			0.0		
Grey gurnard (SEC)	0.0		0.0			
Haddock (PRI)	**5.3**	1.1	**17.9**	**8.8**	0.7	1.1
Herring (PRI)	0.0					
Lemon sole (PRI)	0.1	0.7	3.9	0.0		0.0
Ling (PRI)	0.6	**10.4**	2.0	**17.0**	0.5	4.0
Long rough dab (PRI)	0.0	0.0	0.3	0.0		0.0
Lumpfish (PRI)	0.0	0.0	0.0			0.0
Mackerel (PRI)	0.1	0.0	0.0		**38.2**	
Megrim (SEC)	0.1	3.4	1.7	0.0		0.0
Northern shrimp (PRI)	0.0					
Northern wolffish (SEC)	0.0	0.0	0.0	0.0		
Norway lobster (PRI)	0.0	**16.9**				
Norway pout (SEC)	0.0					
Norway redfish (PRI)	0.3	0.0		0.0		
Orange roughy (SEC)	0.0					
Other species (SEC)	0.0					
Plaice (PRI)	0.3	0.0	**10.2**	0.0		0.6
Pollack (SEC)	0.0	0.0	0.0	0.0		0.0
Porbeagle (SEC)	0.0	0.0				0.0
Portly spider crab (SEC)		0.0				
Portuguese dogfish (SEC)	0.0					
Rabbit fish (SEC)	0.0	0.0		0.0		0.0
Roughhead grenadier (SEC)	0.0			0.0		
Roundnose grenadier (SEC)	0.0			0.0		
Sailray (SEC)	0.0	0.0	0.0	0.0		0.0
Saithe (PRI)	**18.7**	**8.3**	**5.2**	2.0	4.5	**43.2**
Shagreen ray (SEC)	0.0	0.0	0.0	0.1		0.0
Spiny dogfish (SEC)	0.0	0.0	0.0	0.0		0.0
Spotted wolffish (PRI)	0.3	0.0	0.0	1.1	1.1	0.0
Starry ray (SEC)	0.1	0.0	0.2	1.0	1.5	0.1
Turbot (SEC)	0.0	0.0		0.0		

Tusk (PRI)	0.0	0.0	0.0	**10.9**	0.5	0.3
White hake (SEC)	0.0	0.0	0.0	0.1		0.0
Whiting (PRI)	0.2	1.6	1.0	0.2		0.0
Witch (PRI)	0.0	**5.3**	**10.5**	0.0		0.0

Table 10 Catch profile for Golden Redfish (Iceland / Greenland) stock.

Species	**Bottom trawl**	**Nephrops trawl**	**Danish seine**	**Longline**	**Handline**	**Gillnet**
Anglerfish (PRI)	0.1	3.0	0.3	0.0	0.0	0.2
Atlantic bluefin tuna (PRI)	0.0					
Atlantic Cod (PRI)	**42.3**	**25.5**	**42.5**	**69.1**	**73.9**	**77.0**
Atlantic halibut (SEC)	0.0	0.1	0.0	0.0	0.0	0.0
Atlantic pomfret (SEC)				0.0		
Atlantic rock crabs (SEC)			0.0			
Atlantic wolffish (PRI)	0.7	0.9	**2.9**	1.9	0.1	0.0
Baird's slickhead (SEC)	0.0			0.0		
Black dogfish (SEC)	0.0			0.0		0.0
Black scabbardfish (SEC)	0.1			0.0		
Blue ling (PRI)	0.3	1.3	0.1	0.6	0.0	0.1
Blue shark (PRI)				0.0		
Blue skate (SEC)	0.0	0.2	0.1	0.1	0.0	0.0
Blue whiting (PRI)	0.0					
Common dab (PRI)	0.0	0.0	1.1	0.0	0.0	0.0
Dealfish (SEC)			0.0	0.0		0.0
Deep water redfish (PRI)	3.7			0.0	0.0	
European eel (SEC)	0.0	0.0		0.0		
European flying squid (SEC)		0.0	0.0			
European hake (SEC)			0.0		0.0	
Flounder (SEC)			0.0			
Golden redfish (PRI)	**19.9**	**20.7**	**3.3**	1.5	**3.3**	1.2
Greater eelpout (SEC)	0.0			0.0		
Greater forkbeard (SEC)	0.0	0.0		0.0		0.0
Greater silver smelt (PRI)	2.3	0.0			0.0	
Greenland halibut (PRI)	3.4	0.0	0.0	0.2	0.0	0.6
Greenland shark (SEC)	0.0	0.0	0.0	0.0		
Grey gurnard (SEC)	0.0		0.0			
Haddock (PRI)	**6.6**	1.8	**17.4**	**13.3**	0.3	1.3
Harbour seal (ETP)	0.0			0.0	0.0	
Herring (PRI)	0.0					
Lemon sole (PRI)	0.2	0.7	**5.8**	0.0	0.0	0.0
Ling (PRI)	0.7	**10.5**	1.3	**6.6**	0.2	3.1
Long rough dab (PRI)	0.0	0.0	0.1	0.0		0.0
Lumpfish (PRI)	0.0	0.0	0.0	0.0	0.0	0.1
Mackerel (PRI)	0.0	0.0	0.0	0.0	0.0	0.0
Megrim (SEC)	0.1	2.8	0.4	0.0	0.0	0.0
Northern shrimp (PRI)	0.0					
Northern wolffish (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Norway lobster (PRI)	0.0	**19.2**				
Norway pout (SEC)	0.0					
Norway redfish (PRI)	0.2	0.0		0.0	0.0	

Orange roughy (SEC)	0.0					
Other species (SEC)	0.0					
Plaice (PRI)	0.7	0.0	**13.8**	0.1	0.0	0.4
Pollack (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Porbeagle (SEC)	0.0	0.0				0.0
Portly spider crab (SEC)		0.0		0.0		
Portuguese dogfish (SEC)	0.0					
Rabbit fish (SEC)	0.0	0.0	0.0	0.0		0.0
Roughhead grenadier (SEC)	0.0			0.0		
Roundnose grenadier (SEC)	0.0			0.0		
Sailray (SEC)	0.0	0.0	0.0	0.0		0.0
Saithe (PRI)	**18.1**	**6.7**	**5.9**	0.8	**21.9**	**15.9**
Shagreen ray (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Spiny dogfish (SEC)	0.0	0.0	0.0	0.0		0.0
Spotted wolffish (PRI)	0.3	0.0	0.0	1.1	0.0	0.0
Starry ray (SEC)	0.0	0.0	0.2	1.0	0.0	0.0
Turbot (SEC)	0.0	0.0	0.0	0.0		0.0
Tusk (PRI)	0.0	0.0	0.0	3.5	0.2	0.1
Vahl's eelpout (SEC)				0.0		
White hake (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Whiting (PRI)	0.2	1.5	0.4	0.1	0.0	0.0
Witch (PRI)	0.0	**5.1**	4.2	0.0	0.0	0.0

Table 11 Catch profile for Ling (Iceland) stock.

Species	**Bottom trawl**	**Nephrops trawl**	**Danish seine**	**Longline**	**Handline**	**Gillnet**
Anglerfish (PRI)	0.1	3.0	0.3	0.0	0.0	0.2
Atlantic bluefin tuna (PRI)	0.0					
Atlantic Cod (PRI)	**37.4**	**25.5**	**42.8**	**63.9**	**52.6**	**76.7**
Atlantic halibut (SEC)	0.0	0.1	0.0	0.0	0.0	0.0
Atlantic pomfret (SEC)				0.0		
Atlantic wolffish (PRI)	0.9	0.9	**2.4**	**2.7**	0.1	0.0
Baird's slickhead (SEC)	0.0			0.0		
Black dogfish (SEC)	0.0			0.0		0.0
Black scabbardfish (SEC)	0.1			0.0		
Blue ling (PRI)	0.3	1.3	0.1	0.5	0.0	0.1
Blue shark (PRI)				0.0		
Blue skate (SEC)	0.0	0.2	0.1	0.1	0.0	0.0
Blue whiting (PRI)	0.0					
Common dab (PRI)	0.0	0.0	0.9	0.0	0.0	0.0
Dealfish (SEC)			0.0	0.0		
Deep water redfish (PRI)	3.9			0.0	0.0	
European eel (SEC)	0.0	0.0		0.0		
European flying squid (SEC)		0.0	0.0			
European hake (SEC)			0.0			
Golden redfish (PRI)	**22.0**	**20.6**	**3.0**	1.3	**3.3**	0.5
Greater eelpout (SEC)	0.0			0.0		
Greater forkbeard (SEC)	0.0	0.0		0.0		0.0
Greater silver smelt (PRI)	2.4	0.0		0.0	0.0	0.0

Greenland halibut (PRI)	2.2	0.0	0.0	0.1	0.0	0.0
Greenland shark (SEC)	0.0	0.0	0.0	0.0		
Grey gurnard (SEC)	0.0		0.0			
Haddock (PRI)	**7.4**	1.9	**16.9**	**15.4**	0.3	0.9
Herring (PRI)	0.0					
Lemon sole (PRI)	0.2	0.7	**6.4**	0.0	0.1	0.0
Ling (PRI)	0.9	**10.5**	1.8	**9.0**	2.2	4.9
Long rough dab (PRI)	0.0	0.0	0.1	0.0		0.0
Lumpfish (PRI)	0.0	0.0	0.0	0.0		0.0
Mackerel (PRI)	0.1	0.0	0.0	0.0	0.0	0.0
Megrim (SEC)	0.1	2.8	0.5	0.0	0.0	0.0
Northern shrimp (PRI)	0.0					
Northern wolffish (SEC)	0.0	0.0	0.0	0.0		
Norway lobster (PRI)	0.0	**19.2**				
Norway redfish (PRI)	0.2	0.0		0.0		
Orange roughy (SEC)	0.0					
Other species (SEC)	0.0					
Plaice (PRI)	0.8	0.0	**12.7**	0.1	0.0	0.4
Pollack (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Porbeagle (SEC)	0.0	0.0		0.0		0.0
Portly spider crab (SEC)		0.0		0.0		
Portuguese dogfish (SEC)	0.0					
Rabbit fish (SEC)	0.0	0.0	0.0	0.0		0.0
Roughhead grenadier (SEC)	0.0			0.0		
Roundnose grenadier (SEC)	0.0			0.0		
Sailray (SEC)	0.0	0.0	0.0	0.0		0.0
Saithe (PRI)	**20.3**	**6.7**	**7.0**	1.1	**40.3**	**16.1**
Sea cucumber (PRI)				0.0		
Shagreen ray (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Spiny dogfish (SEC)	0.0	0.0	0.0	0.0		0.0
Spotted wolffish (PRI)	0.3	0.0	0.0	0.7	0.0	0.0
Starry ray (SEC)	0.0	0.0	0.2	0.7	0.0	0.0
Turbot (SEC)	0.0	0.0	0.0	0.0		0.0
Tusk (PRI)	0.0	0.0	0.0	4.1	0.7	0.1
White hake (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
White-Beaked Dolphin (SEC)				0.0		
Whiting (PRI)	0.2	1.5	0.4	0.2	0.0	0.0
Witch (PRI)	0.0	**5.1**	4.5	0.0	0.3	0.0

Table 12 Catch profile for Plaice (Iceland) stock.

Species	**Bottom trawl**	**Nephrops trawl**	**Danish seine**	**Longline**	**Handline**	**Gillnet**
Anglerfish (PRI)	0.1	2.5	0.2	0.0	1.5	0.2
Atlantic bluefin tuna (PRI)	0.0					
Atlantic Cod (PRI)	**45.6**	**29.7**	**45.5**	**56.1**	**49.0**	**92.8**
Atlantic halibut (SEC)	0.0	0.1	0.0	0.0	0.0	0.0
Atlantic pomfret (SEC)				0.0		
Atlantic wolffish (PRI)	1.4	0.9	**4.2**	**15.4**	**2.8**	0.1
Baird's slickhead (SEC)	0.0					
Black scabbardfish (SEC)	0.0					

Blue ling (PRI)	0.2	0.7	0.1	0.2		0.0
Blue shark (PRI)				0.0		
Blue skate (SEC)	0.0	0.1	0.1	0.0	0.1	0.0
Blue whiting (PRI)	0.0					
Common dab (PRI)	0.0	0.0	1.8	0.0	0.0	0.0
Dealfish (SEC)			0.0			0.0
Deep water redfish (PRI)	1.9			0.0		
European eel (SEC)	0.0	0.0		0.0		
European flying squid (SEC)			0.0			
European hake (SEC)			0.0			
Flounder (SEC)			0.0			0.0
Golden redfish (PRI)	**16.7**	**20.5**	1.6	0.7	1.2	0.3
Greater eelpout (SEC)	0.0					
Greater forkbeard (SEC)	0.0	0.0		0.0		0.0
Greater silver smelt (PRI)	0.8	0.0				
Greenland halibut (PRI)	1.5	0.0	0.0	0.0		0.0
Greenland shark (SEC)	0.0		0.0	0.0		
Grey gurnard (SEC)			0.0			
Haddock (PRI)	**9.9**	2.4	**16.1**	**18.3**	**8.7**	1.0
Harbour seal (ETP)	0.0			0.0		
Herring (PRI)	0.0					
Lemon sole (PRI)	0.4	1.1	4.4	0.0	3.5	0.0
Ling (PRI)	0.9	**9.1**	0.8	4.4	**5.7**	0.5
Long rough dab (PRI)	0.0	0.0	0.1	0.0		0.0
Lumpfish (PRI)	0.0	0.0	0.0	0.0	**6.8**	0.1
Mackerel (PRI)	0.1	0.0	0.0	0.0		0.0
Megrim (SEC)	0.0	1.9	0.2	0.0	0.0	0.0
Northern shrimp (PRI)	0.0					
Northern wolffish (SEC)	0.0	0.0	0.0	0.0		0.0
Norway lobster (PRI)	0.0	**17.7**				
Norway redfish (PRI)	0.0	0.0		0.0		
Orange roughy (SEC)	0.0					
Other species (SEC)	0.0					
Plaice (PRI)	1.7	0.2	**18.6**	0.7	2.2	1.4
Pollack (SEC)	0.0	0.0	0.0	0.0		0.0
Porbeagle (SEC)	0.0	0.0		0.0		0.0
Portly spider crab (SEC)				0.0		
Rabbit fish (SEC)	0.0		0.0			
Roughhead grenadier (SEC)	0.0			0.0		
Roundnose grenadier (SEC)	0.0					
Sailray (SEC)	0.0		0.0	0.0		
Saithe (PRI)	**18.0**	**5.6**	3.6	0.6	4.2	3.5
Sea cucumber (PRI)			0.0	0.0		
Shagreen ray (SEC)	0.0	0.0	0.0	0.0		0.0
Spiny dogfish (SEC)	0.0	0.0	0.0	0.0		0.0
Spotted wolffish (PRI)	0.3	0.0	0.0	0.6		0.0
Starry ray (SEC)	0.0	0.0	0.3	0.7	0.1	0.0
Turbot (SEC)	0.0	0.0	0.0	0.0		0.0
Tusk (PRI)	0.0	0.0	0.0	2.1	0.0	0.0

White hake (SEC)	0.0	0.0	0.0	0.0		0.0
White-Beaked Dolphin (SEC)				0.0		
Whiting (PRI)	0.2	1.6	0.2	0.1	0.1	0.0
Witch (PRI)	0.0	**5.8**	2.1	0.0	**14.1**	0.0

Table 13 Catch profile for Saithe (Iceland) stock.

Species	**Bottom trawl**	**Nephrops trawl**	**Danish seine**	**Longline**	**Handline**	**Gillnet**
Anglerfish (PRI)	0.1	3.0	0.2	0.0	0.0	0.2
Atlantic bluefin tuna (PRI)	0.0					
Atlantic Cod (PRI)	**43.4**	**25.5**	**50.4**	**68.0**	**77.0**	**79.8**
Atlantic halibut (SEC)	0.0	0.1	0.0	0.0	0.0	0.0
Atlantic wolffish (PRI)	0.7	0.9	**2.9**	1.8	0.0	0.0
Baird's slickhead (SEC)	0.0			0.0		
Black dogfish (SEC)	0.0			0.0		0.0
Black scabbardfish (SEC)	0.1			0.0		
Blue ling (PRI)	0.2	1.3	0.1	0.4	0.0	0.0
Blue shark (PRI)				0.0		
Blue skate (SEC)	0.0	0.2	0.1	0.1	0.0	0.0
Blue whiting (PRI)	0.0					
Common dab (PRI)	0.0	0.0	0.9	0.0	0.0	0.0
Dealfish (SEC)			0.0	0.0		0.0
Deep water redfish (PRI)	3.5			0.0	0.0	
European eel (SEC)	0.0	0.0		0.0		
European flying squid (SEC)		0.0	0.0			
European hake (SEC)			0.0		0.0	
Flounder (SEC)			0.0			0.0
Golden redfish (PRI)	**19.2**	**20.7**	**2.2**	1.5	1.4	0.7
Greater eelpout (SEC)	0.0			0.0		
Greater forkbeard (SEC)	0.0	0.0		0.0		0.0
Greater silver smelt (PRI)	1.9	0.0		0.0	0.0	0.0
Greenland halibut (PRI)	2.6	0.0	0.0	0.1	0.0	0.0
Greenland shark (SEC)	0.0	0.0	0.0	0.0		
Grey gurnard (SEC)	0.0		0.0			
Haddock (PRI)	**7.1**	1.9	**15.5**	**12.1**	0.3	1.1
Harbour seal (ETP)	0.0			0.0	0.0	
Herring (PRI)	0.0					
Lemon sole (PRI)	0.2	0.7	3.9	0.0	0.0	0.0
Ling (PRI)	0.7	**10.5**	1.2	**8.3**	0.1	3.4
Long rough dab (PRI)	0.0	0.0	0.0	0.0		0.0
Lumpfish (PRI)	0.0	0.0	0.0	0.0	0.0	0.1
Mackerel (PRI)	0.1	0.0	0.0	0.0	0.0	0.0
Megrim (SEC)	0.1	2.8	0.3	0.0	0.0	0.0
Northern shrimp (PRI)	0.0					
Northern stone crab (SEC)					0.0	0.0
Northern wolffish (SEC)	0.0	0.0	0.0	0.0		0.0
Norway lobster (PRI)	0.0	**19.2**				
Norway pout (SEC)	0.0					
Norway redfish (PRI)	0.1	0.0		0.0	0.0	
Orange roughy (SEC)	0.0				0.0	

Other species (SEC)	0.0					
Plaice (PRI)	0.7	0.0	**13.1**	0.1	0.0	0.4
Pollack (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Porbeagle (SEC)	0.0	0.0		0.0		0.0
Portly spider crab (SEC)		0.0		0.0		
Portuguese dogfish (SEC)	0.0					
Rabbit fish (SEC)	0.0	0.0	0.0	0.0		0.0
Roughhead grenadier (SEC)	0.0			0.0		
Roundnose grenadier (SEC)	0.0			0.0		
Sailray (SEC)	0.0	0.0	0.0	0.0		0.0
Saithe (PRI)	**18.6**	**6.7**	**6.0**	1.1	**20.9**	**14.2**
Sea cucumber (PRI)				0.0		
Shagreen ray (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Spiny dogfish (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Spotted wolffish (PRI)	0.3	0.0	0.0	1.0	0.0	0.0
Starry ray (SEC)	0.0	0.0	0.1	1.0	0.0	0.0
Turbot (SEC)	0.0	0.0	0.0	0.0		0.0
Tusk (PRI)	0.0	0.0	0.0	4.2	0.1	0.1
White hake (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Whiting (PRI)	0.2	1.5	0.3	0.2	0.0	0.0
Witch (PRI)	0.0	**5.1**	2.7	0.0	0.0	0.0

Table 14 Catch profile for Tusk (Iceland / Greenland) stock.

Species	**Bottom trawl**	**Nephrops trawl**	**Danish seine**	**Longline**	**Handline**	**Gillnet**
Anglerfish (PRI)	0.1	4.2	0.5	0.0	0.0	0.3
Atlantic bluefin tuna (PRI)	0.0					
Atlantic Cod (PRI)	**34.5**	**28.4**	**33.2**	**69.0**	**55.8**	**62.1**
Atlantic halibut (SEC)	0.0	0.0	0.0	0.0	0.0	0.0
Atlantic pomfret (SEC)				0.0		
Atlantic wolffish (PRI)	1.1	1.2	**3.8**	1.9	0.1	0.0
Baird's slickhead (SEC)	0.0			0.0		
Black dogfish (SEC)	0.0			0.0		
Black scabbardfish (SEC)	0.2			0.0		
Blue ling (PRI)	0.5	2.0	1.1	0.7	0.0	0.1
Blue shark (PRI)				0.0		
Blue skate (SEC)	0.0	0.3	0.4	0.1	0.0	0.0
Blue whiting (PRI)	0.0					
Common dab (PRI)	0.0		0.3	0.0		0.0
Dealfish (SEC)				0.0		
Deep water redfish (PRI)	**6.0**			0.0	0.0	
European eel (SEC)	0.0			0.0		
European flying squid (SEC)		0.0	0.0			
Golden redfish (PRI)	**24.8**	**13.1**	**5.8**	1.4	**3.9**	1.0
Greater eelpout (SEC)	0.0			0.0		
Greater forkbeard (SEC)	0.0	0.0		0.0		0.0
Greater silver smelt (PRI)	3.8	0.0		0.0		
Greenland halibut (PRI)	2.5	0.0		0.2	0.2	0.0
Greenland shark (SEC)	0.0	0.0		0.0		

Grey gurnard (SEC)	0.0					
Haddock (PRI)	**5.6**	2.6	**19.4**	**12.8**	0.4	0.9
Harbour seal (ETP)	0.0			0.0		
Lemon sole (PRI)	0.2	0.4	**6.7**	0.0	0.0	0.0
Ling (PRI)	0.9	**8.4**	4.0	**6.8**	1.4	**6.5**
Long rough dab (PRI)	0.0	0.0	0.1	0.0		0.0
Lumpfish (PRI)	0.0		0.0	0.0		0.0
Mackerel (PRI)	0.0	0.0		0.0	0.0	0.0
Megrim (SEC)	0.1	2.2	4.4	0.0		0.0
Northern shrimp (PRI)	0.0					
Northern stone crab (SEC)				0.0		
Northern wolffish (SEC)	0.0	0.0	0.0	0.0		
Norway lobster (PRI)	0.0	**20.1**				
Norway pout (SEC)	0.0					
Norway redfish (PRI)	0.3	0.0		0.0		
Orange roughy (SEC)	0.0					
Other species (SEC)	0.0					
Plaice (PRI)	0.4	0.0	**5.7**	0.1	0.0	0.1
Pollack (SEC)	0.0	0.0		0.0	0.0	0.0
Porbeagle (SEC)	0.0			0.0		0.0
Portly spider crab (SEC)				0.0		
Portuguese dogfish (SEC)	0.0					
Rabbit fish (SEC)	0.0			0.0		0.0
Roughhead grenadier (SEC)	0.0			0.0		
Roundnose grenadier (SEC)	0.0			0.0		
Sailray (SEC)	0.0	0.0	0.0	0.0		0.0
Saithe (PRI)	**18.3**	**11.0**	**5.3**	0.8	**36.1**	**28.4**
Shagreen ray (SEC)	0.0	0.0	0.0	0.0	0.0	
Spiny dogfish (SEC)	0.0	0.0	0.0	0.0		0.1
Spotted wolffish (PRI)	0.3	0.0	0.1	1.1	0.0	0.0
Starry ray (SEC)	0.0	0.0	0.2	1.1	0.0	0.0
Turbot (SEC)	0.0	0.0		0.0		0.0
Tusk (PRI)	0.1	0.1	0.0	3.8	1.9	0.4
Vahl's eelpout (SEC)				0.0		
White hake (SEC)	0.0	0.0		0.0	0.0	0.0
White-Beaked Dolphin (SEC)				0.0		
Whiting (PRI)	0.2	2.0	1.2	0.1	0.0	0.0
Witch (PRI)	0.1	4.1	**7.7**	0.0		0.0

3.4.3 Primary Species

The primary species consist of managed stocks (Table 15). In all cases there is some 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 8-Table 14). This consists of the landings of all species associated with the Principle 1 stocks during the period 2013-2017 inclusive. The status of each primary species is summarised in Table 17 below. Bait species are not included because they are handled in the scoring separately. This primarily because species purchased as bait cannot be guaranteed to be in future from any particular stock making it difficult to propose stock-specific scores.

Table 15: Primary species list, including English, scientific and Icelandic names, and level of resilience. Bait species.

English Name	***Species***	***Icelandic Name***	***Type***	***Resilience***
Anglerfish / Monkfish	Lophius piscatorius	Skötuselur	Fish	High
Atlantic bluefin tuna	Thunnus thynnus	Túnfiskur	Fish	Low
Atlantic Cod	Gadus morhua	Þorskur	Fish	High
Atlantic wolffish	Anarhichas lupus	Steinbítur	Fish	Low
Blue ling	Molva dypterygia	Blálanga	Fish	Low
Blue Shark	*Prionace glauca*	Bláháfur	Shark	Low
Blue whiting	Micromesistius poutassou	Kolmunni	Fish	High
Capelin	Mallotus villosus	Loðna	Fish	High
Common dab	Limanda limanda	Sandkoli	Fish	High
Cusk / Tusk	Brosme brosme	Keila	Fish	High
Deepwater redfish (Icelandic Slope)	Sebastes mentella	Djúpkarfi	Fish	Low
Golden redfish	Sebastes marinus	Gullkarfi	Fish	Low
Greater silver smelt	Argentina silus	Gulllax / Stóri gulllax	Fish	High
Greenland halibut	Reinhardtius hippoglossoides	Grálúða	Fish	Low
Haddock	Melanogrammus aeglefinus	Ýsa	Fish	High
Herring	Clupea harengus	Síld	Fish	High
Lemon sole	Microstomus kitt	Þykkvalúra / Sólkoli	Fish	High
Ling	Molva molva	Langa	Fish	High
Long rough dab	Hippoglossoides platessoides	Skrápflúra	Fish	High
Lumpfish	Cyclopterus lumpus	Grásleppuhrogn / Rauðmagi / Grásleppa	Fish	High
Mackerel	Scomber scombrus	Makríll	Fish	High
Northern shrimp	Pandalus borealis	Rækja	Crustacean	Low
Norway lobster	Nephrops norvegicus	Humar / Leturhumar	Crustacean	Low
Norway redfish	Sebastes viviparus	Litli karfi	Fish	Low
Plaice	Pleuronectes platessa	Skarkoli	Fish	High
Saithe	Pollachius virens	Ufsi	Fish	High
Sea cucumber	Holothuroidea	Sæbjúga	Holothurian	High
Spotted wolffish	Anarhichas minor	Hlýri	Fish	Low
Witch	Glyptocephalus cynoglossus	Langlúra	Fish	High

English Name	*Species*	*Icelandic Name*	*Type*	*Resilience*
Whiting	*Merlangius merlangus*	Lýsa	Fish	High

3.4.3.1 Outcome Status

The status of each primary species stock was determined from available information either from ICES or MFRI (Table 17). Status was determined based on the PRI and scoring guideposts for scoring issue 2.1.1.a and 2.1.1.b. The status determinations were linked to scores under scoring issue a or b depending on whether they were main or minor species for each UoA (Table 16).

Table 16 The interpretation of scoring 2.1.1.b SG100 is that it is effectively has the same requirement (except for the "demonstrably effective strategy") as 2.1.1.a SG80. That is, a minor species demonstrably above its PRI or with evidence that the fishery is not hindering any recovery will meet 2.1.1.b SG100. Note that the "not hindering recovery" evaluation takes into account all MSC UoAs to meet 2.1.1.a SG80.

Code	Meaning	2.1.1.a Score	2.1.1.b Score
B<PRI	Stock size is not likely to be greater than the PRI and UoAs are collectively hindering recovery.	Fail	
B>PRI	Stock size is likely to be greater than the PRI	SG60	
B>>PRI	Stock size is highly likely to be greater than the PRI	SG80	SG100
B>=MSY	There is a high degree of certainty that the stock is above its PRI and is fluctuating around a level consistent with MSY.	SG100	SG100
NH expected	Stock size may be below the PRI, but there are measures are in place for the UoA that are expected to ensure that it does not hinder recovery and rebuilding.	SG60	
NH evidence	Stock size may be below the PRI, but 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.	SG80	SG100

Table 17 Primary species status for 2018. MSC score indicates which scoring guidepost is met in scoring issue 2.1.1.a. and 2.1.1.b. (see Table 16)

Species/ Stock	**MSC Score**	**Justification**	**Reference**
Atlantic Wolffish (Iceland)	$B>=B_{MSY}$	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	MFRI Advice CAA 2018

		increased since then. The stock assessment indicates a decreasing trend in fishing mortality since the late 1990s when levels greatly exceeded F_{MSY}, and has recently fallen below F_{MSY}. Based on proxy estimates of B_{MSY} using F_{MSY}, there was a 92% probability is above 50%B_{MSY} (PRI), so there is a high degree of certainty (>90% probability) that the stock is above PRI. In addition, the stock has been around the biomass associated with F_{MSY} for more than 15 years, so the stock is likely to be fluctuating around B_{MSY}, meeting 2.1.1.a SG100.	
Blue ling (North East Atlantic)	$B>=B_{MSY}$	ICES considers that the stock biomass is above candidate target and limit biomass reference points. Overall, there are indications that fishing mortality has been decreasing in the last six years, but recruitment is expected to be low over the next few years due to a low juvenile abundance index recorded since 2010 and biomass has been declining since 2010. The fishing mortality measure is estimated to have been below the F_{MSY} proxy in the last five years. Therefore, there is a high degree of certainty the stock is above its PRI. Although the stock is probably at MSY level, the risk of it being below PRI cannot currently be determined accurately, so 2.1.1.a SG100 is not met (see GSA 2.2.4).	ICES Advice BLI 2018
Blue shark (North Atlantic)	$B>=B_{MSY}$	For the North Atlantic stock, the 2015 assessments covered a range of results, but all estimated that the stock was not overfished (SSB_{2013}/SSB_{MSY}=1.35 to 3.45) and that overfishing was not occurring (F_{2013}/F_{MSY}=0.04 to 0.75). This indicates that there is a high degree of certainty that the stock is above its PRI and fluctuating above the MSY level, which meets 2.1.1.a SG100.	ICCAT 2015
Blue whiting (North East Atlantic)	$B>=B_{MSY}$	Fishing mortality (F) has increased from a historical low in 2011 to above F_{MSY} in 2014 (but below F_{lim}). Fishing mortality has since declined but is above the target F_{MSY}. Spawning-stock biomass (SSB) increased from 2010 to 2016, but has decreased since 2017. It has been above the MSY $B_{trigger}$ since the late 1990s. Recruitments in 2017 and 2018 are estimated to be low, following a period of high recruitments. If	ICES Advice WHB 2018

		fishing is not successfully decreased to the target level, the stock is likely to decline below MSY. However, currently with the stock well above $B_{trigger}$ and its PRI with a high degree of certainty, and is likely to be around its MSY level, which meets 2.1.1.a SG100.	
Atlantic bluefin tuna (Eastern Atlantic / Mediterranean)	B>>PRI	The perception of the Eastern Atlantic bluefin stock status derived from the 2017 updated assessment suggested that fishing mortality for both younger and older fish have declined during the recent years, while SSB has increased. $F_{2012-2014}$ 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 $F_{0.1}$, and ICCAT indicate that the stock has likely recovered. Because it is now highly likely that the stock is above its PRI, 2.1.1.a SG80 is met. However, B_{MSY} has not been determined, so whether the stock has recovered to the MSY is uncertain, and therefore 2.1.1.a SG100 is not met.	ICCAT 2017
Capelin (Iceland / Faroes / E. Greenland)	B>>PRI	The ICES assessment indicates a spawning-stock biomass of 364 000 t at the time of spawning in March 2018, which corresponds to 95% probability of the SSB being above B_{lim} (150000 t). The 2018 recommended catch limit was zero tonnes. Recruitment has been low since 2001. While there is a high degree of certainty that the stock is above B_{lim}, meeting 2.1.1.a SG80. However, whether this is consistent with MSY is unclear, so 2.1.1.a SG100 is not met.	ICES Advice CAP 2018
Atlantic cod (Iceland)	$B>=B_{MSY}$	ICES reports that the spawning-stock biomass (SSB) of Icelandic cod is increasing and is higher than has been observed over the last four decades. Fishing mortality (F) has declined significantly in the last decade and is presently at a historical low. Year classes are estimated to have been relatively stable since 1988. With SSB well above the PRI and at or above a level consistent with MSY, Icelandic cod meets 2.1.1.a SG100.	ICES Advice COD 2018
Common dab (Iceland)	B>PRI	The Iceland spring demersal survey biomass index for dab has remained low since 2004, as compared to the years 1985-	MFRI Advice DAB 2018

		2003. Most reports suggest maturity is reach at 2-3 years old, compared to the main catch ages 4-7-year olds, 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. Given age composition of the catches, it is likely the stock is above its PRI, so 2.1.1.a SG60 is met. However, with the low abundance indices, it is not clear that the stock is highly likely above PRI, so 2.1.1.a SG80 is not met.	
Deepwater redfish (Icelandic slope)	NH evidence	The stock status is uncertain. The lack of long time-series of abundance indices prevents analytical determination of stock status. The stock size indicator (survey biomass index) declined from 2001 to 2003, and has since been fluctuating without trend but does show a recent increase. There has been a small increase in ICES advice and TAC since 2015. Available information does not suggest that the stock is currently below the PRI. ICES has suggested setting catch no higher than 10,000 t as a starting point for the adaptive part of the management plan. The TAC is set for all fleets, although the measure is not designed to rebuild, just stabilise the stock until its status can be determined. Catch since 2011 has been below the TAC and since 2014 has been declining compared to the advice and TAC. On balance, TACs are in place such that the total catch is not hindering recovery and there is some evidence that this is effective, which meets 2.1.1.a at SG80.	ICES Advice REB_Ice 2018
Deepwater redfish (NE Arctic)	$B>=B_{MSY}$	There have been significant changes in the deepwater redfish stock assessments. This stock was benchmarked in 2018. Spawning stock biomass (SSB) increased steadily from 1992 to 2007, followed by stabilization slightly below that peak. Whilst the year classes 1996–2003 were weak, there is evidence for strong year classes 2005 – 2010. Recent recruitments are slightly above the long-term average. Fishing mortality has been low but has increased since 2014. ICES assesses that	ICES REB_NEArctic 2018

		fishing pressure on the stock is below possible precautionary levels; and spawning stock size is above MSY $B_{trigger}$ and above B_{pa} and B_{lim}. Because the SSB is well above MSY $B_{trigger}$ and B_{lim}, it is above its PRI with a high degree of certainty, it meets 2.1.1.a SG80. In addition, fishing mortality has been below a precautionary F_{MSY} (0.06) since 2003, which would suggest that the stock is has been at or above its MSY level during this period, which meets 2.1.1.a SG100.	
Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores)	B>>PRI	Spawning-stock biomass (SSB) has steadily increased for two decades, but has decreased in recent years, but remains well above MSY $B_{trigger}$ and B_{lim}. Recruitment (R) estimates in 2001–2012 are close to average. Fishing mortality (F) has decreased in the past two decades, but is still above F_{MSY}. Although there is a high degree of certainty that the stock is above its PRI, meeting 2.1.1.a SG80, because fishing mortality has been above F_{MSY} since 1980, it is unlikely that it is fluctuating around B_{MSY}, so 2.1.1.a SG100 is not met.	ICES Advice REG 2016
Greater silver smelt (Iceland)	B>>PRI	Survey indices, based on the Iceland autumn survey, show an increase in stock biomass to 2014 followed by fluctuations without an apparent trend in recent years. There is no evidence of a decline in stock size. The F_{proxy} has decreased since 2010, so the fishing mortality has fallen below the F_{MSY} proxy since 2014. No management limit reference point has been defined. The general results suggest that the stock is at least stable, and the exploitation rate has been at or below a sustainable level for at least 5 years, so the stock is highly likely above the PRI meeting 2.1.1.a SG80.	ICES Advice ARU 2018
Greenland halibut (Iceland / Greenland)	B>>PRI	The stock was well above MSY $B_{trigger}$ in the early part of the time-series. After dropping below the MSY Btrigger in 2004 and 2005 it has increased and is currently above MSY $B_{trigger}$. Recent fishing mortality (F) is estimated to be close to F_{MSY}. There is greater than 95% probability the stock above its PRI (B_{lim}=30%B_{MSY}) and greater than 90% it is above MSY $B_{trigger}$ (50%B_{MSY}), but 74% of B_{MSY} level. The stock is above its PRI with a high degree of certainty,	ICES Advice GHL 2018

		meeting 2.1.1.a SG80, but may not be fluctuating around MSY level, so 2.1.1.a SG100 is not met.	
Haddock (Iceland)	B>=B_{MSY}	The spawning-stock biomass (SSB) increased from 2001 to 2004, after several strong year classes, and was large until 2008. The SSB has decreased since 2008, but stabilized above B_{pa} in recent years. The harvest rate is currently estimated near the management target of 0.4. Recruitment (R) is highly variable. The 2014 year class is estimated to be strong, and the 2015 and 2016 year classes are close to the average. The biomass is well above the trigger point and well above B_{lim} (PRI). Overall results suggest that the stock is being maintained around MSY, its most productive level. Therefore, because the stock is above its PRI with a high degree of certainty and appears to be fluctuating around MSY level, 2.1.1.a SG100 is met.	ICES Advice HAD 2018
Herring (Iceland and Norwegian Spring Spawning)	B>>PRI	There are several stocks of herring caught around Iceland. Summer spawning herring is considered well above its B_{lim} and MSY $B_{trigger}$ point. Strong year classes in 1999–2002 led to an increase in the spawning-stock biomass (SSB), reaching the highest estimated levels in the late 2000s. SSB has declined since then because of high natural mortality caused by an Ichthyophonus infection (2009–2011 and 2017) and poor recruitment. The harvest rate increased after being at low levels at the beginning of the Ichthyophonus outbreak but is currently near the management target of 0.15, although it has been above this level in recent years. The Norwegian spring-spawning herring stock has been declining but still estimated to be above MSY $B_{trigger}$ in 2018. Since 1998 four large year classes have been produced (1998, 1999, 2002, and 2004). The 2005 to 2015 year classes are estimated to be average or small, but the 2016 year class, however, is estimated to be above average. Fishing mortality has been increasing since 2015 and is above F_{MSY} in 2017. The stock is still well-above its B_{lim}. Both stocks are above their MSY $B_{trigger}$ and	ICES Advice HER_Spr 2018; ICES Advice HER_Sum 2018

		so highly likely above their PRI, meeting 2.1.1.a SG80. However, although above their MSY $B_{trigger}$, both stocks have been continuously declining since 2006, so there is no evidence that they are fluctuating around B_{MSY}. Therefore, 2.1.1.a SG100 is not met.	
Lemon sole (Iceland)	B>>PRI	According to biomass indices from the spring survey, the lemon sole fishable stock decreased by about half from 1987 until 2000, but increased through 2002–2004, and has been fluctuating but remains high since then. There are no biomass reference points, but the biomass and recruitment indices remain higher than early series 1985-2002. The F_{proxy} has been highly variable for two decades, but appears to have been fluctuating a little above its target level. With recruitment and biomass being relatively high, it is highly likely that the stock is above its PRI, meeting 2.1.1.a SG80. However, without clear MSY reference points, and with the fishing above its target level, it is not clear that the stock is fluctuating around the MSY level, so 2.1.1.a SG100 is not met.	MFRI Advice LEM 2018
Ling (Iceland)	B>=B_{MSY}	Recruitment was high from 2004 to 2012, but has since declined to the levels of the 1980s and 1990s. The spawning-stock biomass (SSB) and the reference biomass (ling longer than 75 cm) in 2018 are among the highest in the time-series. The harvest rate (HR) has decreased since 2008 and is now equal to the lowest in the time-series, at HR_{MSY}. With the stock well above $B_{trigger}$ and B_{lim}, there is a high degree of certainty the stock is above PRI and at or above the MSY level, so it meets 2.1.1.a SG100.	ICES Advice LIN 2018
Long rough dab (Iceland)	B>>PRI	Long rough dab is only caught as by catch, and catches are very low, therefore MFRI did not advise a TAC for the 2018/2019 fishing year. The spring demersal survey biomass index has decreased since 2003 and has been low for a decade. The recruitment index was relatively high during 1991-1997 and 2011-2015, but high recruitment in the latter period has not resulted in increased stock biomass. Despite the ongoing decline in biomass, the juvenile index has been fluctuating	MFRI Advice PLA 2018

		since 1985 and there is no evidence of long-term decline. Given the high juvenile index, it is unlikely that the stock is below its PRI, and with the current very low catch, the fishery is not hindering any recovery to the MSY level, so the stock meets 2.1.1.a SG80. Without MSY reference points, it is not possible to determine whether the stock is fluctuating around MSY, so 2.1.1.a SG100 is not met.	
Lumpfish	B>>PRI	The MRI advice is based on a target for the F_{proxy}, while not allowing the female biomass to fall below the historic minimum. These imply reference points for the survey indices and an appropriate HCR. The female biomass index increased 2013-2015, but decreased between 2016 and 2018. The male biomass index has remained low for the past twenty years in comparison with the period 1985-1997. The female biomass is well above its historic low point, indicating that the stock is above its PRI. Female F_{proxy} has fluctuated greatly during the last thirty years, but has been below the target value since 2014. Overall, it is highly likely the stock is above its PRI, meeting 2.1.1.a SG80. However, without clear MSY references points, it is not possible to evaluate whether the stock is fluctuating at or above MSY, so 2.1.1.a SG100 is not met.	MFRI Advice LUM 2018
Mackerel (North East Atlantic)	B>>PRI	Based on the 2014 benchmarked assessment and subsequent update, this lowest level was estimated to have occurred in 2002 (1.84 million t). This is assumed to be the PRI. The estimate of SSB at spawning time in 2015 was 3.62 million tonnes (mt), which is well above the PRI and above the MSY $B_{trigger}$ level of 3.0mt. This is interpretation as being around or above the MSY level, meeting SG100. The spawning-stock biomass (SSB) is estimated to have increased in the late 2000s to reach a maximum in 2011 and has been declining since then. The stock is estimated to be below MSY $B_{trigger}$ in 2018, for the first time since 2007. The fishing mortality (F) has declined from high levels in the mid-2000s, but increased again after 2012, and remains above F_{MSY}. There has	ICES Advice MAC 2018

		been a succession of large year classes since the early 2000s, but the 2015 and 2016 year classes are estimated to be below average. Although the stock is declining, it remains highly likely that the stock is above its PRI (B_{lim}), so 2.1.1.a SG80 is met in 2018. The stock is clearly declining below MSY level and is not above B_{lim} with a high degree of certainty, so 2.1.1.a SG100 is not met.	
Anglerfish/Monkfish	B>>PRI	The biomass index was high in 2005-2011 compared to previous years, but has since then decreased substantially. Juvenile indices show strong recruitment for year classes 1998-2007, but poor recruitment before and after this period. F_{proxy} was stable when the stock peaked, but has decreased in recent years and is now lower than the target. There are no biomass reference points for this stock, but it is currently approximately around 30% of the high period. Overall, based on the historical information, it is highly likely the stock is above any PRI, meeting 2.1.1.a SG80. However, without MSY reference points and a declining biomass, it is not possible to determine whether the stock is above MSY, so 2.1.1.a SG100 is not met.	MFRI Advice MON 2018
Norway Lobster/Nephrops (Iceland)	B>>PRI	Fishing mortality has been low in recent years and is still below F_{MSY}. Harvestable biomass has decreased sharply and is at its lowest level. Recruitment has decreased since 2005 and has never been lower, but this decrease does not appear to be the result of a depleted spawning stock. The biomass of large specimens (proxy for SSB) is high but has decreased since 2009. MRI has not yet recommended a reduction in harvest rate, suggesting they believe SSB is still well above the PRI. Because it is highly likely the stock is above its PRI, 2.1.1.a SG80 is met. However, the decline in recruitment and subsequent biomass suggests that the stock is not fluctuating around MSY, so 2.1.1.a SG100 is not met.	MFRI Advice NEP 2018
Northern shrimp (Inshore)	NH evidence	There are 9 separate management units based around fjords. These are likely separate populations, but there is no information on the degree to which their recruitment is connected. It is unclear	MFRI Advice PRA_Inshore 2018

		whether they should be treated as separate stocks or a metapopulation. It is assumed by the MSC team that 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, and includes closure when the stock falls below limit reference point. The fisheries are responsive to the perceived stock status, so should not be hindering any recovery if they fall to low levels. There is evidence that biomass increases after closures or reduced catches (e.g. Arnarfjörður). Because there is evidence from the biomass surveys that the fisheries do not hinder recovery of these population units, 2.1.1.a SG80 is met.	
Northern shrimp (Offshore)	B>>PRI	There is one recognised management unit for the offshore shrimp population. As for inshore shrimp, the abundance of offshore shrimp is inversely related to the abundance of cod in the same areas. The biomass index has been relatively stable in 2012 2018, with the exception of the 2015 value which was the lowest in the time series. The F_{proxy} 2014-2016 was close to its target. Biomass has shown a recent increase and is well above its limit reference point. With stable or increasing biomass, fishing mortality at target levels, and biomass index well above its limit reference, it is highly likely that the stock is above its PRI, so SG80 2.1.1.a is met. Because there is no MSY reference point, it is not certain whether the stock is fluctuating around MSY, so 2.1.1.a SG100 is not met.	MFRI Advice PRA_Offshore 2018
Plaice (Iceland)	B>>PRI	In the recent stock assessment, the SSB was determined to be above B_{MSY} and highly likely above(>80% probability) above the limit reference point. Biomass has been increasing since 2000, and fishing mortality is currently at the target level in 2018. Because the stock is highly likely above its PRI 2.1.1.a SG80 is met. Although the stock is probably at MSY level, the risk of it being below PRI cannot currently be determined	MFRI Advice PLE 2018

		accurately, so 2.1.1.a SG100 is not met (see GSA 2.2.4).	
Saithe (Iceland)	$B>=B_{MSY}$	The spawning-stock biomass (SSB) has been above MSY $B_{trigger}$ since 1998 and is currently at the time-series maximum. The harvest rate (HR) has declined from 2009 and is presently below HR_{MSY}. Recruitment (R) has been fluctuating and is estimated to be well above the average in every year of the last decade, except 2018. The reference biomass (B4+) has increased since 2015 due to the 2013 year class, which is estimated to be strong. Because the stock is above its PRI (B_{lim}) and MSY $B_{trigger}$, and the harvest rate has been at or below HR_{MSY} since 2011, 2.1.1.a SG100 is met.	ICES Advice POK 2018
Sea cucumber(Iceland)	B>>PRI	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 are known to occur. Landings have been recommended to not exceed 10% of the estimated stock biomass in each area. CPUE provides an index of abundance, but the time series is very short (2008-2017). CPUE has been relatively stable in Faxaflói 2008-2015, was in the lower range in 2016 reaching a minimum in 2017. Off the east coast and in Aðalvík, CPUE declined rapidly in 2009-2015, increased in 2016, but declined again in 2017. The fishery is expanding, and it appears likely that a significant proportion of the biomass is unexploited (i.e. outside currently fished areas). Adjustments are still being made to TAC area boundaries to protect local populations. Overall, it is highly likely above PRI at the current time, so 2.1.1.a SG80 is met. However, there is no information on MSY level at this time, so 2.1.1.a SG100 cannot be met.	MFRI Advice KHG 2018
Small redfish (Iceland)	NH evidence	Catches have been sporadic, with catches remaining very low in most years, but peaking in 2010 at 2600t, whereas catches were around 500t to 2015 and have since declined. Norway redfish are caught in a wide area of the spring survey, mostly along the southern coast. The spring	MFRI Advice SFV 2018

		demersal survey biomass indices have increased rapidly since 2011, and were in 2016-2018 the highest recorded since 1985 and more than three times higher than in 2000. There are no management reference points for this stock, although implicit reference points are used to provide advice. It appears that current catches are having limited impact on stock. Because catches are low and the biomass has been increasing, even if the stock has been below its PRI, there is clear evidence of recovery, so 2.1.1.a SG80. Without reference points, it is not possible to determine whether the stock is fluctuating around its MSY level, so 2.1.1.a SG100 is not met.	
Spotted wolffish (Iceland)	B>PRI	The recruitment index and biomass index have been decreasing in recent years and these indices have been at lowest point in 2017 since measurement started in 1985. The indices appear likely to continue to fall unless there is a substantial reduction in catch. The proxy fishing mortality is above its target. Based on the index, the biomass is around 30% of the peak in the time series, but recruitment has been consistently low since 2012, and around 20% of the peak period 1992-97. Fishing mortality has been approximately around 130% of the MSY proxy since 2000. Given that biomass has decrease, but not to levels suggesting it is below the 50% MSY level, it is likely that the stock is above its PRI, meeting 2.1.1.a SG60. However, given the recent low recruitment and high exploitation rates over recent years, it is no longer highly likely to be above its PRI, so 2.1.1.a SG80 is not met.	MFRI Advice CAS 2018
Cusk/Tusk (Iceland)	B>=B_{MSY}	Recruitment in 2012–2015 was very low, and has increased since. Harvest rate (HR) has declined in recent years and is below the HR producing maximum sustainable yield (HR_{MSY}). Spawning-stock biomass (SSB) has been increasing in recent years; the reference biomass (tusk longer than 40 cm) has declined somewhat, but remains at a high level. SSB is well above MSY $B_{trigger}$. The biomass above its PRI with a high degree of certainty, and with the	ICES Advice USK 2018

		harvest rate having fallen below HR_{MSY}, it is highly likely that the stock is around its MSY level, meeting 2.1.1.a SG100.	
Whiting (Iceland)	B>>PRI	Catches peaked in 2011, but have decreased since then. The recruitment index has been low since 2009. The biomass index was low in 2012-2015 but has increased since then. Fproxy was high in 2009-2015, but has reduced in the last two years. There are no reference points for this stock and no TAC set 2018 because the catches are mainly bycatch in other fisheries. Status is uncertain, but there is no evidence of stock depletion or decline in recruitment. With biomass increasing and F_{proxy} decreasing it is highly likely that the stock is above its PRI and that the fisheries are not preventing any recovery to MSY level, meeting 2.1.1.a SG80. Without MSY reference points, it is not possible to determine whether the stock is fluctuating at MSY, 2.1.1.a so SG100 is not met.	MFRI Advice WHG 2018
Witch (Iceland)	B>>PRI	The spring demersal survey biomass index has been high since 2004. The recruitment index has, however, declined since 2009, and reached an all-time low in 2016, but has increased somewhat since. F_{proxy} has remained relatively low and stable over the last six years. With fishing mortality having been at the target level since 2012 and the biomass index remaining at a high level, it is highly likely the stock is above its PRI, meeting 2.1.1.a SG80. However, without MSY reference points and low recent recruitment, it is not possible to determine whether it is now fluctuating around its MSY level, so 2.1.1.a SG100 is not met.	MFRI Advice WIT 2018

3.4.3.2 Management

The exploitation of most primary stocks is controlled through a TAC. However, exploitation rates are also limited by fleet capacity, closed areas, and mesh size. Management of all primary stocks with a TAC is carried out under the same system as described in the Principle 1 section.

3.4.3.3 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 dockside agents and logged into electronic database by dates and regions, species and quantities. This 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.

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, Danish 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 anomalies. 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.

3.4.3.4 Bait Species

Longline and handline vessels use a variety of bait, subject to availability, price and preference. There is a general lack of quantitative data on bait use, and the assessment of bait relied mostly on information obtained during the site visit. Important source of bait are herring (Norwegian spring spawners), which is managed by MFRI, mackerel (NEA which is managed jointly by the EU, Norway and Faroe Islands), Pacific saury (*Cololabis saira*), which is managed under the auspices of the North Pacific Fisheries Commission, South Atlantic squid (*Loligo* spp.), which is managed under the auspices of South Atlantic Fisheries Commission, and artificial bait. There is no commitment to purchase bait from any particular source, such as sustainable sources.

For the bait species that have been identified, there is a commercial directed fishery on all stocks and an intention (to manage them to sustainable levels. Therefore, these stocks are considered primary species.

Local bait sources (herring, mackerel) are assessed by ICES and they are also caught as bycatch in the UoA fisheries. Status of stocks from sources from further afield (Pacific saury, *Loligo* squid) are more uncertain. No recent stock assessment has been completed from Pacific saury, but progress is being made (NPFC 2018). Squid could originate from a number of stocks for which the status is either uncertain or unknown.

The most common bait size is 30 g/hook compared to current reported catch rates of around 700g/hook (Chun Gil, 2005). Given also that the bait could consist of a mix of species from different stocks, each with life history characteristics giving them high resilience, the bait use as a proportion of the total catch indicates all bait should be treated as minor species (<5% of landings).

3.4.4 Secondary Species

See Appendix 6 for list of secondary species in English, Icelandic and Scientific names.

Secondary species are the part of the catch that is (i) not covered by P1, (ii) are not considered primary species (e.g. managed) and (iii) may be out of the MSC scope but are not assigned as ETP species (see next section). Although some of these species, such as Atlantic halibut and sea urchins are monitored and managed to a degree, the stock status has not been evaluated yet against reference points and they are not managed using TAC, rather there is a potential for intervention. These, for this assessment at this time, have been allocated to the secondary species group.

There are no main secondary species that are not out-of-scope species (e.g. >5% of the catch) for any UoA. We are considering three 'out of scope' bird species and five 'out of scope' marine mammal species (see Table 25) that are potentially vulnerable to these fisheries as 'main' species. For these 'out of scope' species, the focus of the assessment has been on gillnets and longlines which evidence indicates have much higher interaction levels than the other gears being assessed; see data provided below. In addition, information is insufficient to associate by-catch of out-of-scope species with trips where specific Principle 1 species are landed, so all activities of the fisheries (by gear) are considered in assessment of out-of-scope species.

3.4.4.1 Bycatch of out-of-scope species including secondary and ETP species

MFRI report bycatch data for three UoAs: gillnet, longline and bottom trawl. No bycatch data are reported for the other gears. MFRI have inspectors on all types of vessels, so if there were bird and mammal bycatch in the other UoAs, it would be reported. Hence this analysis assumed that gillnet, longline and trawl are the only UoAs concerned by interactions with out-of-scope species.

Information in this section comes from MFRI, 2017, unless otherwise specified.

Although all bycatch is supposed to be reported in logbooks, it appears that this is not always (usually) done, so MFRI have had to turn to other sources of data to estimate total bird and mammal bycatch from the UoAs. These are i) DoF onboard inspector reports (equivalent to scientific observer reports elsewhere) and ii) for the gillnet UoA (which is the main concern), the MFRI annual April cod gillnet survey, which is carried out on board commercial vessels using commercial gear (although not 100% following the same practice as the commercial fishery – see further discussion below). The gillnet survey sets ~4000 50m-long cod gillnets over ~2 weeks in April, of varying mesh size (6-9 inches), centred on the main cod fishing areas.

The inspector data have been more reliable since 2014, when inspectors starting systematically recording all bird and mammal bycatch – hence 2014 is taken as the starting year for this analysis. Depending on the UoA, inspector coverage ranges from <1% to ~5% (see Table 18 below), so the frequency of rare events is necessarily estimated using these data with considerable uncertainty. The inspector data are raised to estimate total fleet bycatch by a straightforward multiplication of relative effort inspected vs total, although following the suggestions of NAMMCO BYCWG (NAMMCO, 2018a), MFRI will consider a more sophisticated analysis with scaling up based on month and area, data permitting.

The survey data are raised to estimate total bycatch from the fleet in April, by scaling it up according to the relative effort (nets pulled) of the survey and the commercial fishery over the same time period. For the rest of the year, the data are raised by multiplying them by the ratio of survey effort to commercial effort (in the relevant month) plus by an abundance index to reflect seasonal changes in availability of the relevant species (monthly index relative to April abundance; Figure 22). The abundance index was created from historical (1991-3) records from fish markets around the country of sales of mammals and seabirds, which at that time was legal. Sale information for each market was published every Tuesday in Morgunblaðið, providing a convenient source of information.

Table 18. Inspector (observer) coverage by UoA and year, 2014-16 (MFRI, 2017)

Year	Cod gillnets			Trawl			Longline		
	Obs	*Total*	*% Obs*	*Obs*	*Total*	*% Obs*	*Obs*	*Total*	*% Obs*
2014	4020	308254	1.3	667	37412	1.8	434	16557	2.6
2015	3828	412243	0.93	698	39205	1.8	346	15310	2.3
2016	3948	581202	0.68	705	43597	1.6	454	15288	3.0

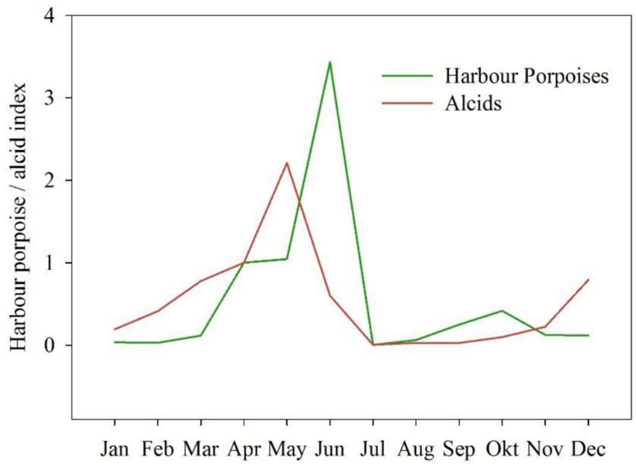

Figure 22. Abundance index used by MFRI for scaling up gillnet survey data, for harbour porpoises (green) and alcids (auks – guillemot, black guillemot, razorbill, puffin) (red).

3.4.4.2 Bycatch of out-of-scope species – data

The bycatch data for mammals and birds used in the assessment is presented in Table 19 below. It is emphasised again that estimates are uncertain, due to the low % coverage by observers (Table 18) and other reasons as explained in the previous section. To make this clear, the total number of observed bycatch events (where available) and the % CV are also given.

In Table 19, bycatch species have been categorised as ETP species (considered under PIs 2.3.1-3) or secondary species (considered under PIs 2.2.1-3). Because all the secondary species are out-of-scope (i.e. non-fish vertebrates) they are automatically designated as ‘main’.

Following FCRG SA3.1.5 (elements relevant to Iceland), species are categorised as ETP if any of the following apply:

- Species protected under Icelandic ETP legislation (this does not apply to any of the species in the table below)
- Species on Appendix I of CITES (none)
- Species in Table 1 Column A of the African-Eurasian Migratory Waterbird Agreement (common loon)
- Species ‘out-of-scope’ IUCN red-listed as vulnerable (VU), endangered (EN) or critically endangered (CR). Based on the recently-published Icelandic Redlist for birds[5] and mammals[6], this applies to common guillemot, common eider, common loon, northern fulmar, northern gannet, Atlantic puffin and great black-backed gull (Table 19).

[5] https://www.ni.is/midlun/utgafa/valistar/fuglar/valisti-fugla

[6] https://www.ni.is/midlun/utgafa/valistar/spendyr/valisti-spendyra

The other species in Table 19, to which none of these categories apply, have been categorised as secondary species. All out-of-scope species are also considered “main”.

Table 19. Estimates of gear interaction with marine mammal and seabird species, raised to levels for the entire fleet and averaged across years 2014-17. In relation to the species identification of seals, see Section 0 below. From MFRI (2017)

Species	GN	LL	TR	GN	LL	TR	GN	LL	TR	GN	LL	TR	Red List status		MSC category
	Estimated total annual bycatch (average 2014-17)			Bycatch observations (2014-16)			% CV of average 2014-16			Reported in logbooks (average 2014-16)			Icelandic (2017)	global where relevant (year)	
Harbour porpoise	1353	0	0	64			15			29			LC	LC (2008)	Secondary
Harbour seal	11.5	0	21.5	1		1	102		100	34			CR	LC (2016)	ETP
Grey seal	0	0	15.5			1			100	11			EN	LC (2016)	ETP
Harp seal*	112	0	0	9			35			6			n/a**	LC (2015)	Secondary
Ringed seal*	24.5	0	0	1			100						n/a**	LC (2016)	Secondary
Hooded seal*	11.5	0	0							1			n/a**	LC (2016)	Secondary
Northern fulmar	1436	1148	0	17	48		20	63			76		EN		ETP
Common guillemot	470	0	0	44			25			41			VU		ETP
Northern gannet	141	354	36	12		2	46		99				VU		ETP
Common eider	79	0	0	2			100			18			VU		ETP
Common loon	46	0	0	3			101			1			VU	LC (2018)	ETP
Razorbill	21	0	0	2			100			1			NT		Secondary
Atlantic puffin	10.5	0	0	1			101			1			CR		ETP
Cormorant	0	36	0		2			67		20			LC		Secondary
Great black-backed gull	0	52	0		2			100		1	8		EN		ETP
Lesser black-backed gull	0	114	0										DD	LC (2018)	Secondary
black guillemot	0	0	0							13			EN		ETP
white-beaked dolphin	0	0	0							1			LC	LC (2018)	Secondary
Brünnich guillemot	0	0	0							1			EN		ETP

* According to NAMMCO BYCWG, these are likely to be from misidentification of harbour and grey seals – see Section 0 below

** Species on global red list, which are either rare visitors or non-native settlers (introduced species).

3.4.4.3 Harbour porpoise

Harbour porpoise bycatch (along with northern fulmar bycatch; see below) is the number one bycatch concern for the cod gillnet fishery. It is not taken as bycatch in any other of the UoAs. Although, as noted above, bycatch estimates are uncertain, annual bycatch estimates have consistently been >1000 animals per year. Cod gillnet effort has been reducing over the last couple of decades, and total bycatch has therefore also most likely been reduced (Palsson et al, 2016).

Various estimates of annual mean harbour porpoise bycatch were presented by MFRI to the Scientific Working Group on Bycatch (BYCWG) of NAMMCO at their meeting in October 2018 (NAMMCO, 2018a; unfortunately the figures provided by MFRI are not presented in this report, but see Table 19):

- Estimate based on 2013-16 cod gillnet survey data, stratified by area and month;
- Unstratified estimate scaled up by the proportion of effort, based on 2013-17 survey data;
- As above, based on 2013-17 data from inspectors;
- The number of porpoises recorded by fishermen in logbooks.

The estimates were extremely divergent. Both estimates from the gillnet survey were similar, at ~1800 porpoises / year. The estimate from the inspectors was 223 / year, while ~35 / year were reported in logbooks. The Working Group expressed concerns about the bycatch estimates based on scaling up from the survey data, on the basis that the survey was unrepresentative of the fishery as a whole, in both time and space (it only occurs in April, which may be a month of particularly high bycatch (e.g. according to the data from inspectors), and occurs partly in a seasonally closed area). The Working Group refused to endorse any of the estimates, but as an interim measure agreed to take 1800 / year as an 'upper bound' to harbour porpoise bycatch in the cod gillnet fishery (NAMMCO, 2018). They made a series of recommendations which have been taken into account by MFRI in updated 2014-16 bycatch estimates (MFRI, 2017; updated version provided to team).

Another uncertainty is the overall population size of harbour porpoise around Iceland. The estimate provided by MFRI comes from a 2007 survey, which estimated the population at ~43,000 (median estimate, 95% CIs 32-162,000). Marine mammal aerial surveys in 2015 and 2016 attempted to update this estimate, but poor weather meant that no overall estimate of population size was possible in either year (NAMMCO, 2018b). It is reportedly likely that the 2007 estimate is an under-estimate (or at least, an under-estimate of the population at that time) but it is hard to say how it relates to the current population. MFRI are working on a project using genetic samples of harbour porpoise (obtained from fishermen) for 'close kin analysis' which should provide an improved and updated estimate of effective population size. An update was provided to the NAMMCO Scientific Committee in 2017 (NAMMCO, 2017) and 2018; the 2018 Scientific Committee report and the final report on the analysis, due to be published after review by the NAMMCO SC, are however not yet available.

In relation to management, MFRI have been trialing pingers on nets for the last two years. In 2017, using standard pingers, 11 porpoises were caught in pinger nets compared to 9 in control nets, while in 2018, using a female porpoise warning call as a deterrent, 13 porpoises were taken in pinger nets compared to 8 in control nets. MFRI scientists noticed a tendency for the pinger nets in 2018 to attract large males, suggesting that they were attracted by the female calls. So far, therefore, it does not look as if this method will work for the fishery.

3.4.4.4 Seals

According to MFRI estimates (Table 19), there is some seal bycatch in the cod gillnet fishery, and an estimate from the trawl fishery which is, however, derived from two observations by an inspector (one harbour, one grey) across the 4 years. Data on seal gillnet bycatch were also presented to NAMMCO BYCWG (NAMMCO, 2018a). According to information in this report, seal bycatch as reported by gillnet fishermen in logbooks amounted to ~34 harbour seals and ~11 grey seals per year, which is more consistent with the MFRI estimates in Table 19 based on survey and inspector data.

In relation to the species identification of seals, the dominant resident seals around the coast of Iceland are harbour seals and grey seals; other species of seals (harp, ringed, hooded) are present in Icelandic waters but are mainly resident further north since they pup on ice not on land[7]. NAMMCO BYCWG expressed the view that bycatch of these species was likely to be species misidentification (NAMMCO, 2018a). MFRI expressed confidence in the ability of the inspectors and survey participants to identify the seals correctly, but it was noted that the seals taken in gillnets are usually juveniles (<1 year old), making identification difficult (NAMMCO, 2018a). Summing the MFRI estimates of seal bycatch in the gillnet fishery (Table 19) together results in an overall bycatch estimate for the fishery of ~160 seals per year, which it appears is likely to be (very approximately) 2/3rds harbour seals and 1/3rd grey seals.

A new survey of harbour seals in 2016 estimated the adult population at 7,652 (Þorbjörnsson et al., 2017), which suggests a significant decrease (32% decline) since the previous survey in 2011 and a 77% decline since 1980. It also puts the population below the stated management objective of 12,000 (the most recent population estimate in 2006 when these targets were established; Sandra Granqvist, Icelandic Seal Centre, pers. comm.). A further survey was carried out in 2018 (and the intention is that surveys will be more frequent from now on), but these data are not yet available. On this basis, a bycatch of ~~100 animals a year in the gillnet fishery could possibly be significant, although it is important to emphasise that since the bycatch is mainly juveniles of <1 year, the figures are not directly comparable with the population estimate that refers to adult individuals, and will have less overall population-level impact than would a bycatch of adults, given a certain level of natural mortality for young seals. However, MFRI scientists were of the view that the main issue for seal populations in Iceland is likely to be hunting, which is unregulated and with no obligation for reporting. Bycatch of seals in lumpfish nets is also considerably more significant than in cod gillnets (Vottunarstofan Tún, 2017).

Grey seals were surveyed in 2017, and although this report is not yet published, MFRI scientists (Guðjón Már Sigurðsson, pers. comm.) reported that the survey estimate of adult population is ~6,000 individuals; an increase from the previous survey (2012: 4,200 individuals) and above the management objective of 4,100 individuals. Grey seals are also hunted, but reportedly less than harbour seals.

3.4.4.5 Seabirds

Many (most?) species of seabirds have been in decline in Iceland for more than a decade, and the key reason is thought to be a crash in the sandeel population in 2004-5 (Kristinn H. Skarphéðinsson, pers. comm.) – all species of auks, shags and fulmars are dependent on sandeels and now appear on the Icelandic red list for seabirds, revised in 2017 (Skarphéðinsson et al., 2017; see Table 19 and link provided in footnote above). Northern gannets and cormorants, conversely, do not depend on sandeels and these populations are doing better (although gannets are still considered 'vulnerable', for other reasons – see below). The drivers for the sandeel crash are not known, although climate change is suspected; however reportedly it may have happened before (in the 1930s).

Seabirds are not completely protected in Iceland. The Bird hunting and protection Act of 1966 bans the sale and use of birds taken as fisheries bycatch (Article 22[8]), but there is no regulation of the use of eggs and young, or of hunting, buying and selling of wild birds, except for a few species with some protection such as black guillemots (a bycatch in the lumpfish fishery particularly; not recorded by

[7] See https://nammco.no/marinemammals/ for natural history information on these species

[8] http://www.bagheera.com/wp-content/uploads/es_laws/Iceland-Act-No.-33-concerning-Bird-Hunting-and-Bird-Protection-in-Iceland..pdf

MFRI in the cod gillnet fishery, although given the data uncertainties it may occur from time to time).

In relation to fulmar specifically, MFRI estimate a similar magnitude of bycatch for the longline fishery and the gillnet fishery. NAMMCO BYCWG note in passing, however, (although they are concerned with mammals rather than birds) that this estimate for fulmar bycatch based on the survey is not consistent with the data from inspectors which suggest much lower rates of fulmar bycatch. The difference may arise from the fact that the survey catch is gutted directly on the deck of the vessel, rather than taken below for processing (if any), which attracts more birds to the survey vessel than a normal commercial fishing vessel. It may therefore be that the fulmar bycatch estimates (and other bird bycatch estimates?) for the gillnet fishery are too high.

Available information on seabird population size and trends in Iceland is summarised in Table 20. Table 20.

3.4.4.6 Bird and mammal bycatch management

The first management action required was to improve the estimates of bird and mammal bycatch, and MFRI has worked hard to do this over the last 5 years (see e.g. Palsson et al. 2015, MFRI 2017, NAMMCO 2018a). As well as requiring inspectors to record bycatch systematically, they have worked to develop methodologies for extracting the maximum out of the available data. There have also been repeated reminders by MII to fishermen that recording of bycatch in logbooks is mandatory, and at least for some species it appears that this message is starting to get through[9]. ISF is developing a phone app to simplify bycatch reporting.

Now that bycatch rates are becoming clearer, the government is trying to move on to a discussion of how bycatch can be reduced and mitigated. Tests of specific mitigation measures (pingers) for harbour porpoise have unfortunately not been successful. In 2017, MII convened a committee, with representation from fisheries, MII and MFRI, to discuss ‘best practice’ in reducing the environmental impact of fisheries, with a focus particularly on bird and mammal bycatch issues. This Joint Committee for the improved handling of Marine Resources (an approximate translation from the Icelandic) was to submit its report to the minister in late 2018.

[9] Although the suspension of the MSC certificate for the lumpfish fishery based on improved bycatch estimates was probably not helpful in this regard.

Table 20. Seabird population status, trends and conservation status; from Skarphéðinsson et al., 2017 unless otherwise indicated

Seabird species	Annual bycatch estimate and main gear (from Table 19)	Icelandic population size (pairs; date)	Icelandic population trends	Iceland red list status	Reason for red list status	depends on sandeels?
Northern fulmar	~3000 (GN and LL)	1.2 million (2017)	decreasing at >2% /yr (perhaps up to 7% /yr)	EN	projected population decrease of >90% by 2078 (3 generations) based on current trends	yes
Common guillemot	470 (GN)	690,000 (2006-8)	decreasing at ~1.6% /yr	VU	population decrease of >30% between counts in 1980s and 2000s	yes
Northern gannet	~500 (LL, some GN)	37,000 (2013-14)	increasing at ~2% /yr	VU	only five nesting areas in Iceland make it vulnerable	no
Common eider	79 (GN)	850,000* (2009)	increased 1970-2000 but since declining at ~1.5% /yr	VU	population decrease of >30% over 3 generations	no
Common loon	46 (GN)	2-300, perhaps more	gradual increase in recent years	VU	Icelandic population is small	no
Razorbill	21 (GN)	313,000 (2007)	decreasing at ~0.85% /yr (but trend not statistically significant; large fluctuations at some nest sites)	NT	some evidence of decline	yes
Atlantic puffin	10.5 (GN)	2 million (2014)	declining at ~4% /yr https://www.ni.is/node/27101	CR	projected population decrease of >90% by 2068 (3 generations) based on current trends	yes
Cormorant	54 (LL)	4,500 (2007)	increased since 1995 (2,346 pairs)	LC	population is large (>1000 pairs), growing and well-dispersed	no
Great black-backed gull	52 (LL)	6-8,000 (2016)	declined from 12-18,000 pairs in early 1970s	EN	population decline of 65% in 3 generations (1978-2014)	yes
Lesser black-backed gull	114 (LL)	unknown	first colonised Iceland in the 1930s, peaked at 50,000 pairs in 2004 then declined due to sand eel crash	DD	new survey is needed to evaluate current population status	yes
Black guillemot	13 (GN, from logbook)	10-15,000 (2000)	declining at just over 2% /yr although uncertain	EN	population decrease of >50% over the period 1981-2014	yes
Brünnich's guillemot	1 (GN, from logbook)	327,000 (2006-8)	declining at 2.6% /yr	EN	population decrease of ~two thirds, 1985-2027	yes

* Winter count; includes overwintering birds from Greenland and Svalbard.

3.4.5 Endangered, Threatened and Protected Species

3.4.5.1 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.

In Iceland some seabird and marine mammal species are not categorised as ETP as per the above distinctions and so are included as secondary 'out of scope' species, which are treated as main irrespective of catch levels.

There is some evidence of non-lethal interactions with species not mentioned in the MFRI data (humpback whales; Basran et al., 2019), but since they were studying scarring from old entanglements, they provide no evidence that the interactions took place in Icelandic waters. There was consensus among stakeholders that these were rare events, and there was no evidence of interactions with these species from MII observers or strandings. On this basis, the team decided that the bycatch data provided by MFRI should be used as the basis for identifying ETP species interacting with the various gears.

See Table 21 for bycatch data per gear for relevant ETP species.

3.4.5.2 ETP 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.

Table 21. Estimates of gear interaction with ETP marine mammal and seabird species, raised to levels for the entire fleet and averaged across years 2014-17. From MFRI (2017)

Species	GN	LL	TR	GN	LL	TR	GN	LL	TR	GN	LL	TR	Red List status		MSC category
	Estimated total annual bycatch (average 2014-17)			Bycatch observations (2014-16)			% CV of average 2014-16			Reported in logbooks (average 2014-16)			Icelandic (2017)	global where relevant (year)	
Harbour seal	11.5	0	21.5	1		1	102		100	34			CR	LC (2016)	ETP
Grey seal	0	0	15.5			1			100	11			EN	LC (2016)	ETP
Northern fulmar	1436	1148	0	17	48		20	63			76		EN		ETP
Common guillemot	470	0	0	44			25			41			VU		ETP
Northern gannet	141	354	36	12		2	46		99				VU		ETP
Common eider	79	0	0	2			100			18			VU		ETP
Common loon	46	0	0	3			101			1			VU	LC (2018)	ETP
Atlantic puffin	10.5	0	0	1			101			1			CR		ETP
Great black-backed gull	0	52	0		2			100		1	8		EN		ETP
black guillemot	0	0	0							13			EN		ETP
Brünnich guillemot	0	0	0							1			EN		ETP

3.4.6 Habitat

3.4.6.1 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. Figure 23 shows the bathymetry around Iceland, which subsequently contributes to the location and occurrence of habitat types, as well as distribution of some of the fisheries.

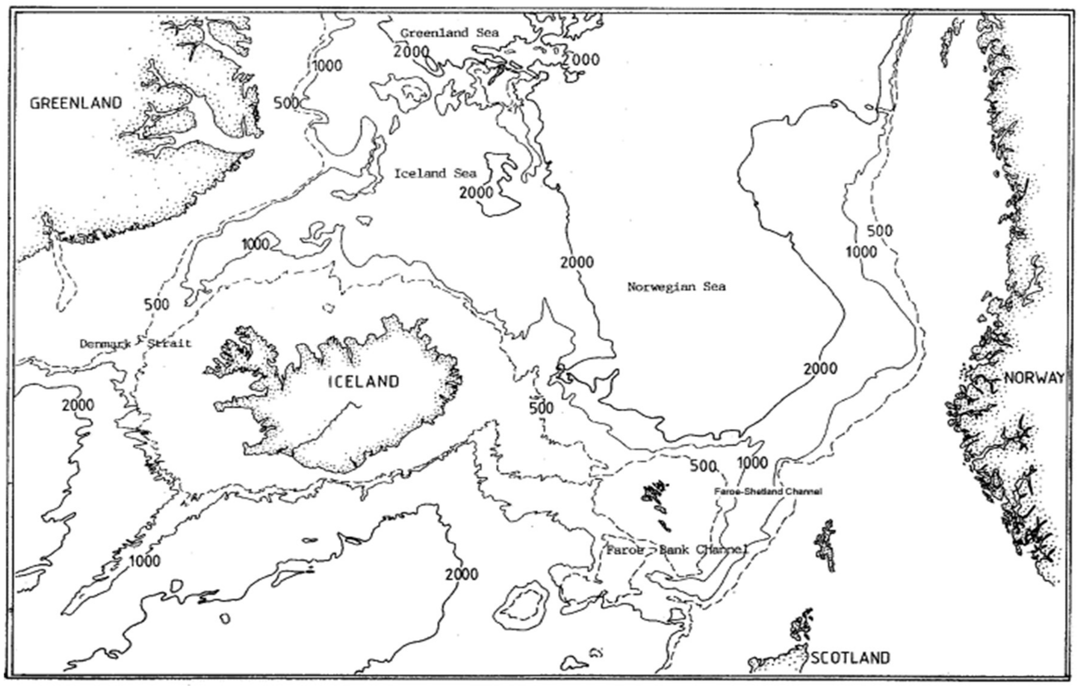

Figure 23 Bathymetry around Iceland (Source: Borenas and Lundberg 2004)

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 tend to dominate in the troughs and beyond the continental slope (Astthorsson et al 2007). The shelf around Iceland is narrowest off the south coast and is cut by submarine canyons around the country (ICES, 2017, ecosystem overview).

Differences in oceanographic conditions between 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).

3.4.6.2 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 MSC CR considers habitats on the basis of the substratum, geomorphology and biota characteristics, and provides detailed nomenclature (MSC CR v2.0 GSA3.13.2 Table GSA6). 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 24). The deeper benthic areas may have dense aggregations of mobile megabenthos, particularly in regions rich in organic matter. Dropstones in a muddy or sandy environment were observed to provide a substrate for various diverse sessile epifauna (Meißner et al, 2014).

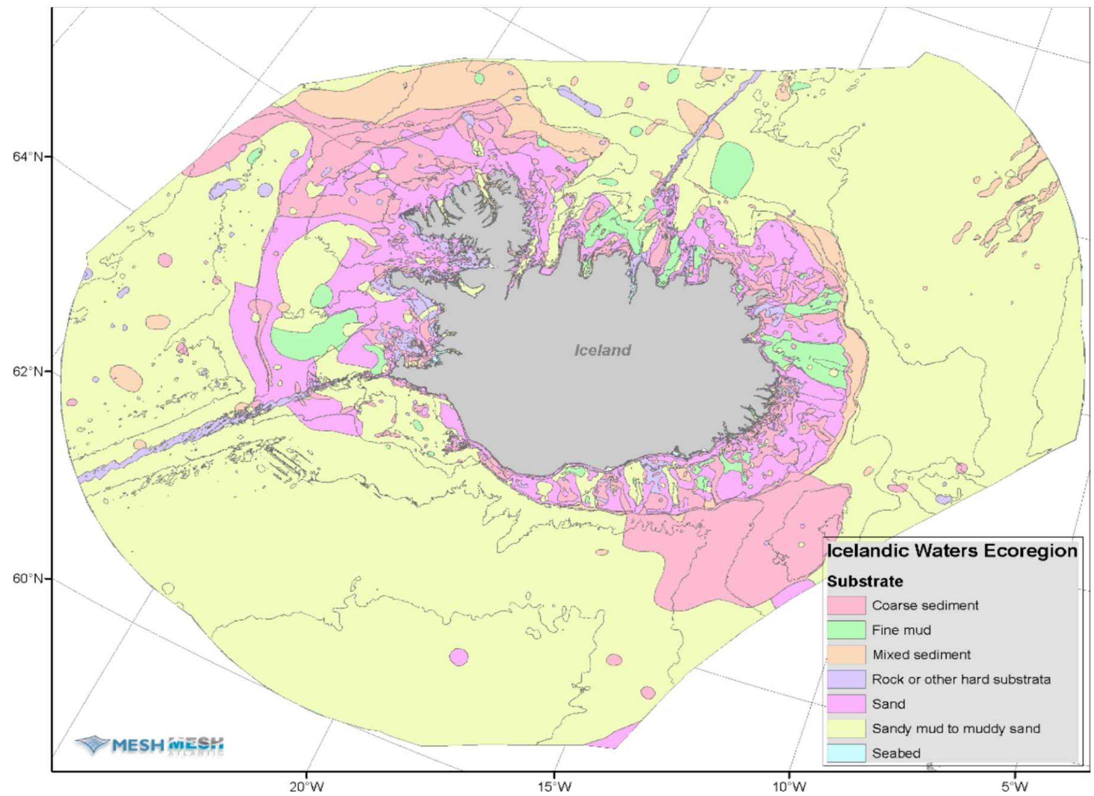

Figure 24 Major substrates in the Icelandic Waters ecoregion (compiled by EMODNET substrate habitats; www.emodnet-seabedhabitats.eu).

3.4.6.3 Vulnerable marine ecosystems (VMEs)

International guidance and vulnerable marine ecosystems (VMEs)

Following on from guidance produced by FAO[10] there has been increasing activity on the parts of governments and RFMOs to define and manage "vulnerable marine ecosystems". These are typically interpreted as significant aggregations of benthic organisms that create benthic habitats of importance in their own right and as habitat for other organisms. These areas may show high structural diversity, biodiversity and productivity and may in turn be important for the long-term health of commercial fish and shellfish stocks. In its advice to NEAFC and NAFO, ICES lists seven VME habitat types for the Northeast Atlantic and the taxa and species that are most likely to be found in these habitats[11]. Criteria for a VME indicator[12] are based on traits related to functional significance, fragility, and the life-history traits of component species that show slow recovery to disturbance. For each group it is the dense aggregations (beds/fields) that are considered to be VME in order to

[10] http://www.fao.org/in-action/vulnerable-marine-ecosystems/criteria/en/

[11]http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/NEAFC_VME_%20indicator_%20species_%20and_elements.pdf

[12] For definitions and listings of VME indicators, habitats and elements, we refer to NEAFC amendment of Recommendation 19:2014 (through Recommendation 9:2015) at the NEAFC website: http://www.neafc.org/rec/2014/19.

establish functional significance. Indicators include for example various species of crinoids, erect bryozoans, large sea squirts, sponges and corals.

The ICES Working Group on Deep-Water ecology (WGDEC) has undertaken an extensive review on ecosystem functioning and services of VME indicators in the North Atlantic (in: ICES WGDEC 2018b). Available evidence suggested that:

- VMEs support higher abundance and diversity of fish through different mechanisms (habitat provision, nursery function, protection from predators, enhancement of food quantity and quality).
- VMEs provide support for secondary production (invertebrate abundance and biomass) and diversity across most, if not all, size ranges (micro-, meio-, macro- and megafauna).
- Habitat complexity is an important contributor to enhanced fish and invertebrate assemblages, and not necessarily linked only to VME presence.
- VMEs, particularly cold-water coral (CWC) reefs, contribute significantly to organic carbon processing, directly and indirectly.
- VMEs contribute significantly to water circulation and C/CO2 exchange through physical modification of their environment, activity and growth, and supporting vertebrate and invertebrate production.
- Through biodiversity support and uniqueness of associated assemblages, VMEs hold significant potential for bioprospecting.

The MESH (OSPAR/JNCC) habitat map for OSPAR threatened and/or declining marine habitats for Iceland is presented as a broad scale map (Figure 25). 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).

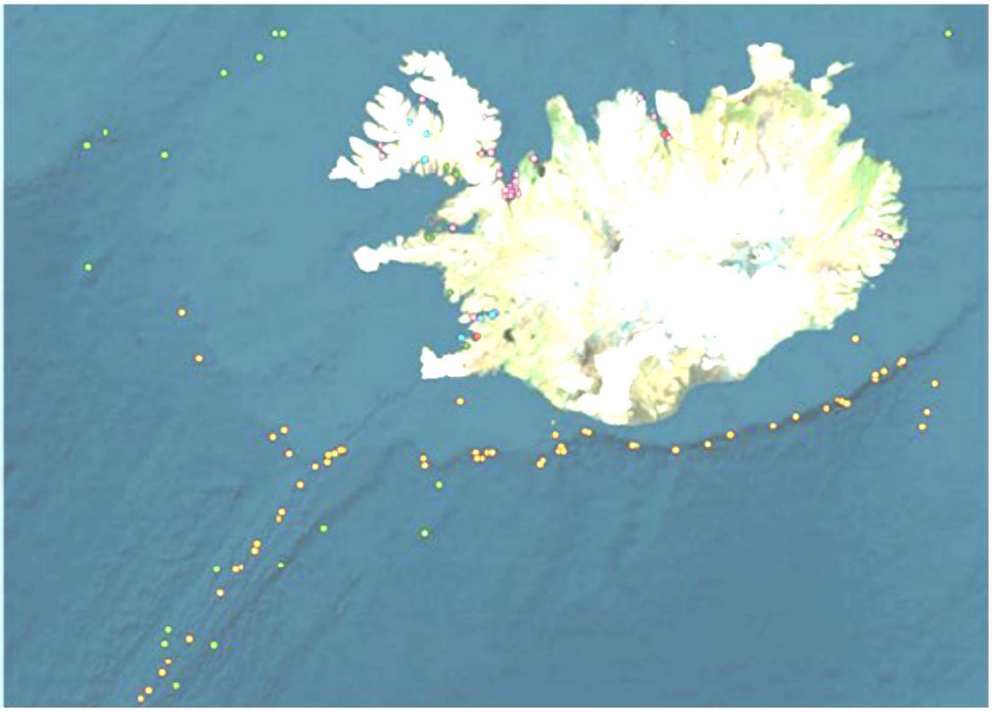

Figure 25 MESH (OSPAR/JNCC) habitat map for OSPAR threatened and/or declining habitats for Iceland. Yellow = Lophelia, green = deep-sea sponge aggregation, pink = maerl beds, red = hydrothermal vents, dark green = Zostera beds, blue = intertidal Mytilus edulis beds.

This multi-species fisheries under assessment occurs within the EEZ of Iceland and predominantly above the continental shelf, which has a depth range down to 50m, before the shelf drops off. Based on an evaluation of the depth ranges of VMEs and the deployment areas of the UoAs considered in the present assessment, it was determined that the following VMEs are evaluated.

- 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.

(i) 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 can be found to a depth to about 40m. 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 (Figure 26), predominantly found in fjords , and beds have rarely been reported below 20m depth (MFRI, pers. communication)

Figure 26 Geographic distribution of maerl beds in Iceland (Source: OSPAR 2010a)

There do not appear to be any particular protection measures for maerl beds. The main impacts on maerl beds in Iceland come from dredging for fertilisers and bycatch in the scallop dredges (Chen 2012 and refs therein). Harvesting of maerl in Iceland is currently taking place at 3 locations within Arnarfjörður; 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. 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). Climate change is also known to affect several key species that are part of coralligenous habitats (Martin et al., 2014).

(ii) 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 (Figure 27).

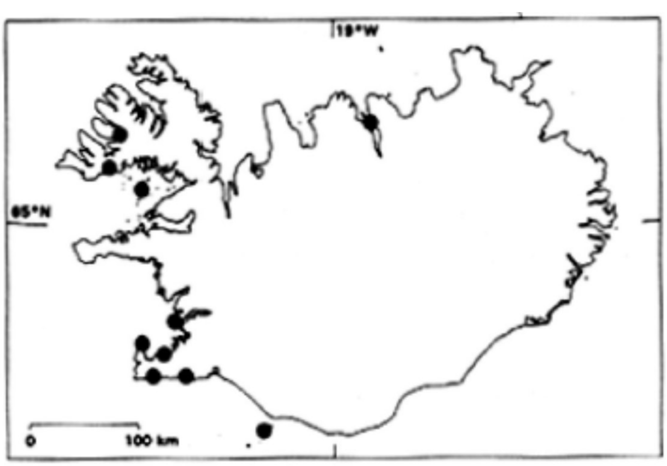

Figure 27 Distribution of M.modiolus around Iceland (Source: Ingolfsson 1996)

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 bycatch 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). There do not appear to be any directed protection measures for *M.modiolus* beds.

(iii) Reef-forming cold water coral (*Lophelia pertusa*)

Lophelia pertusa is a cold-water, reef-forming coral that has a wide geographic distribution ranging from 55^{o}N to 70^{o}N, where water temperatures typically range between 4-8^{o}C, at a depth range from 80-3000m. and beyond, but more commonly between 200-1000m depth. The coral does not contain zooxanthellae, thus is not dependent on light for photosynthesis. It is slow growing. Mapping of the distribution of these cold water corals around Iceland is an ongoing project (see Figure 28), using a variety of means from specific surveys to co-operative work with fishers.

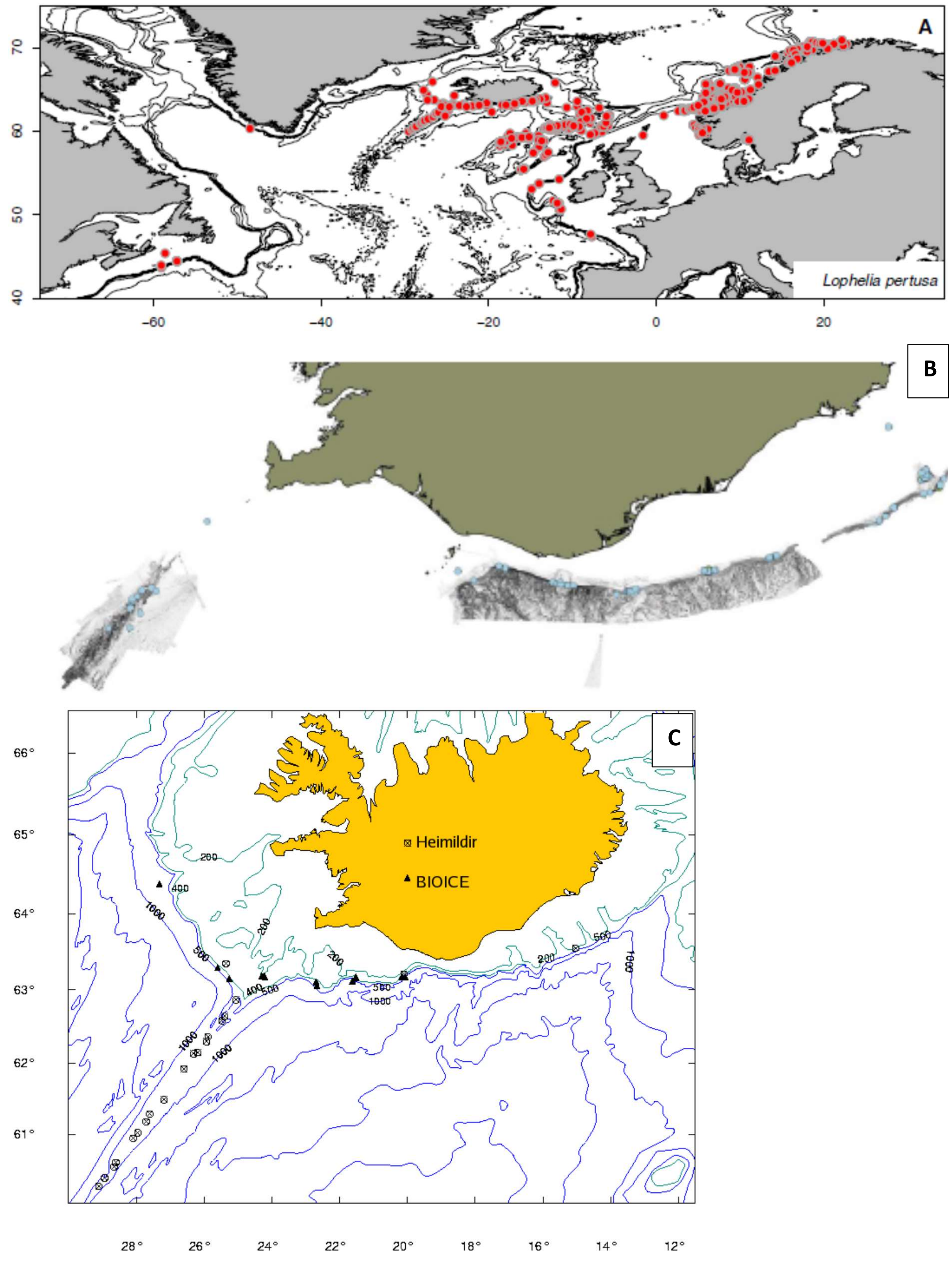

Figure 28 Occurrence of L. petusa reefs as of surveys up to 2014 (Source: Buhl-Mortensen et al 2015 (A), Olafsdottir et al, 2014(B) and C is based on information from the literature and the BIOICE database (Steingrimsson et al 2004)

The 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, as well as fisheries observations, a number of coral areas have been closed for all fisheries using bottom contact gear, as the habitat is easily damaged by such gears. There is some natural protection based on the location of these reefs, for example along ridges due to the complex lava rock formations. Based on experience from 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). MFRI has an ongoing programme mapping the seabed, including the location and distribution of *Lophelia* reefs (see reference to this mapping project at https://www.hafogvatn.is/en/research/seabed-mapping). This mapping project has been designated a main priority since 2017.

Studies to help understand the ecological significance of *Lophelia* stands have been published. The practice of using the stable isotope analysis (SIA) within specific ecosystems or habitats is now commonplace to trace 'who eats who'. SIA is for example being used at the wider ecological/habitat level, showing how different species contribute to the trophic web. The high biodiversity of coral reefs results in complex trophic webs where energy and nutrients are transferred between species through a multitude of pathways (Rix *et al*., 2018). The prominent role of coral reefs and adjacent sponge grounds in biogeochemical cycling in the food-limited deep ocean is increasingly supported (White *et al*., 2012; Cathalot *et al*., 2015). CWCs can act as *ecosystem engineers* boosting organic matter deposition at the seafloor by altering internal currents (Soetaert *et al*., 2016).

(iv) Coral gardens (incl. *Gorgonacea* and *Pennatulacea*)

Coral gardens are mainly deepwater 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). Gorgonacea corals occur in deep waters (>500 m) off the South and West of Iceland; they are relatively uncommon on the shelf (< 500m depth), are not found in the cold waters North East of Iceland 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 500m but more common in deep waters, especially off South Iceland. Alcyoneacea occur at depths of 500m to 1000m (average depth 700m), whilst Scleractinia have a wider depth distribution of 500m to 1500m with an average depth of 1200m. 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 700m and have a wide distribution around Iceland. The distribution of these genera is shown in Figure 29.

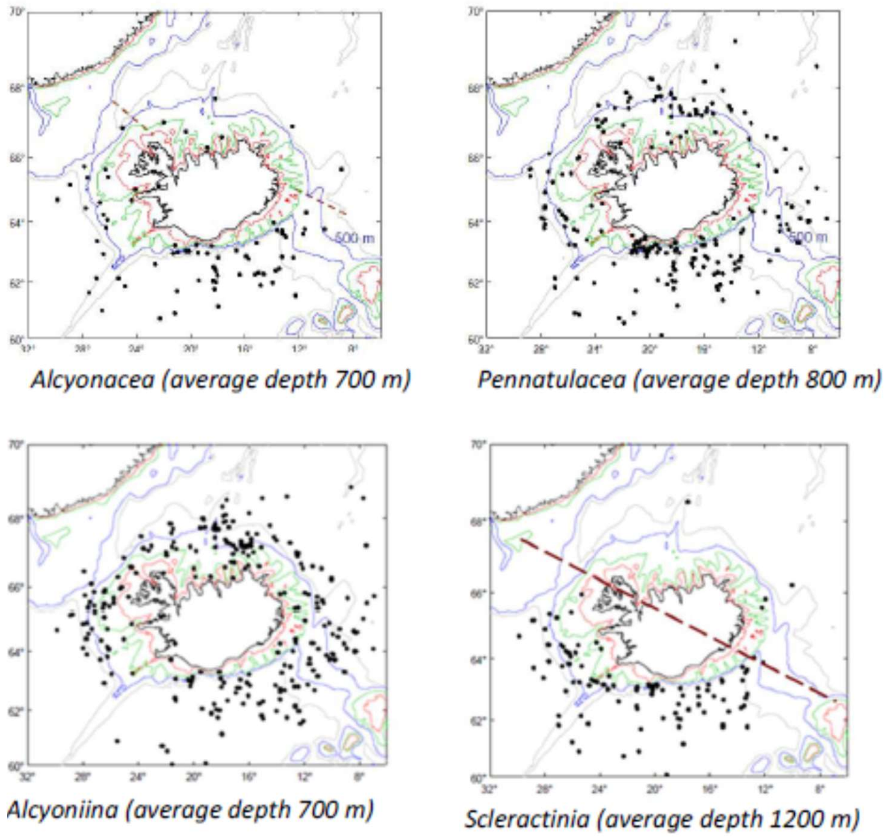

Figure 29 Distribution of coral garden forming genera (Source: Ólafsdóttir et al 2014)

Studies as part of the BIOICE project looked at the distribution of Gorgonacea corals around Iceland in relation to bottom trawling and showed little overlap, Figure 30 and Figure 31 (Garcia et al 2006).

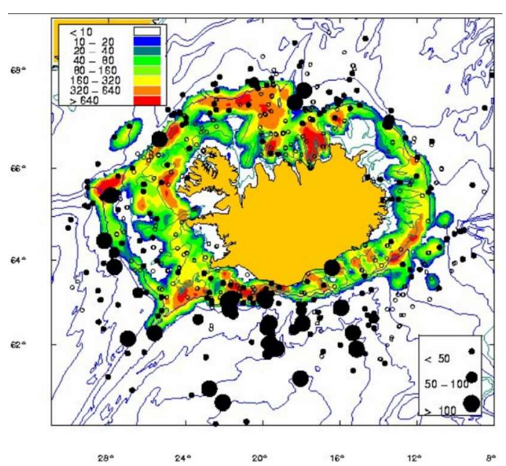

Figure 30 Distribution of Gorgonacea corals (number of colonies in a sample) off Iceland in relation to bottom trawling effort (total trawling hours 2003 [combined groundfish, shrimp and Nephrops fisheries]). Data from the BIOICE database. Source: Garcia et al. 2006

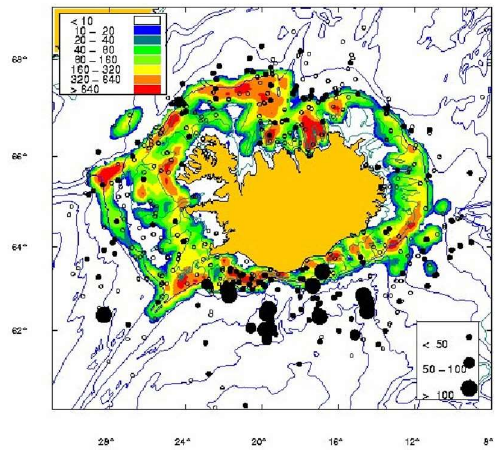

Figure 31 Distribution of Pennatulacea corals (seapens) off Iceland in relation to bottom trawling effort (total trawling hours 2003 [combined groundfish, shrimp and Nephrops fisheries]). Data from the BIOICE-database. Source: Garcia et al. 2006

(v) Sponges (*ostur*)

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*. Deep sea sponge aggregations are principally composed of sponges from two classes: Hexactinellida and Demospongiae. They are known to occur between water depths of 250-1300m. 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, following higher bycatches in the recent past (Figure 32).

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, 2006).

Rix *et al*. (2018) demonstrated how sponges, in the vicinity of CWCs, transfer coral-derived organic matter (DOM) and make it accessible to the associated reef fauna, confirming that sponges provide a trophic link between corals and higher trophic levels. Sponge aggregations have also been shown providing assailable C and N to fuel the food chains of oligotrophic reefs (Dayton 1979; Maldonado *et al*., 2016). Measuring the magnitude of seawater filtering by sponge communities in Northern Norway demonstrate the important role of these communities to the benthic boundary layer (Kutti *et al*., 2013).

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. No exact aging has so far been done but both size structure and comparable investigations in Antarctica point to decades if not centuries (Dayton 1979; Gatti 2002). 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 (client pers. Comm. Oct 2018).

In general, there appears to be little information on the occurrence and distribution of different sponges around Iceland. This information gap was also noted in the original assessments of these fisheries, and resulted in a condition, which has since been addressed, whereby the fisheries have initiated and implemented measures to gather bycatch information on sponges.

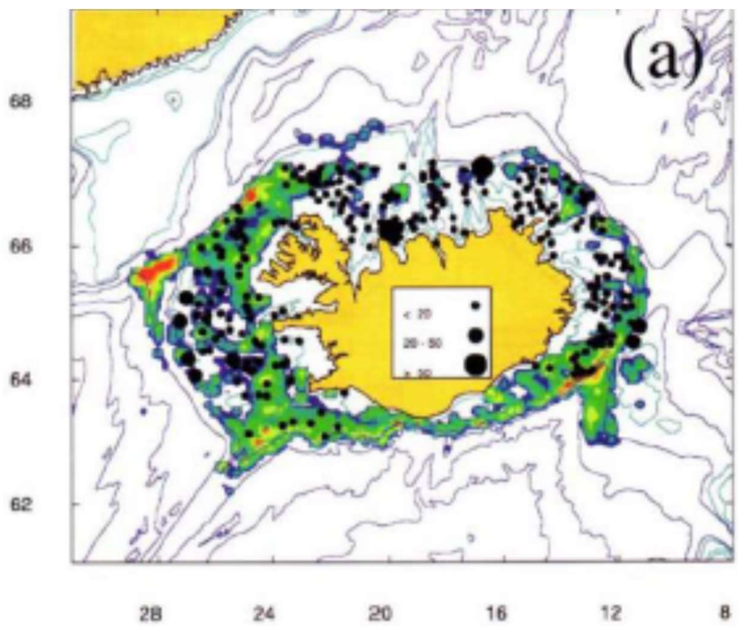

Figure 32 Biomass of sponge bycatch in 2002, superimposed on fishing effort as mean annual swept area (nm2 per 1° latitude x 1° longitude cell). Black dots indicate total biomass (kg/h otter trawl haul) of sponges in 2002 groundfish survey by Marine Research Institute. Source: OSPAR 2010e, Garcia et al 2006

There is currently no particular protection for sponge habitats. However, a number of seasonal or annual closures to bottom trawling exist which might have beneficial effects on the sponge habitats occurring there.

(vi) 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), near the island of Kolbeinsey on the Jan Mayen Ridge (100m; Fricke et al. 1989), east of

Grimsey (400m; Hannington et al. 2001[13]), and at Eyjafjordur, a fjord in northern Iceland (Omarsdottir, 2013).

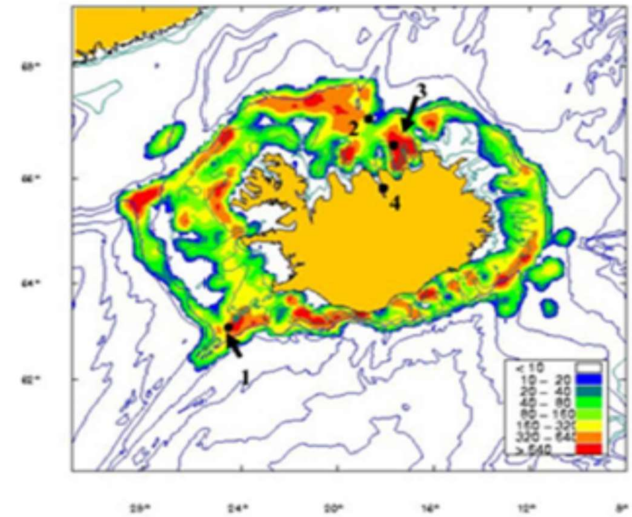

Figure 33 Location of areas of hydrothermal activity in Icelandic waters in relation to bottom trawling effort (total trawling hours 2003 [combined groundfish, shrimp and Nephrops fisheries]. (1) Steinahóll on the Reykjanes Ridge (2-4) Hydrothermal vents in the Tjornes Fracture Zone; Kolbeinsey vent fields (2), Grímsey vent fields (3) and in Eyjafjörður (4). Source: Garcia et al. 2006.

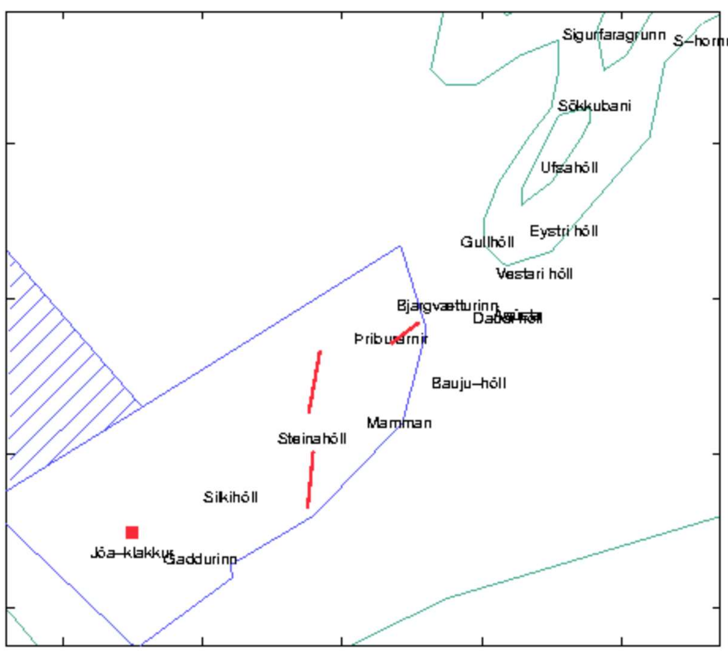

Figure 34 Position of the Steinahóll hydrothermal vent and occurrence of coral (indicated with red lines or square) on the Reykjanes Ridge. Area closed for demersal otter trawling (since 1994) is outlined with a blue line (closed throughout the year) and blue hatched area (trawling allowed 1st February – 15th April). Source: Steingrimsson and Einarsson 2004.

Figure 34 provides a close up of the Steinaholl vent, including mapped occurrence of coral. 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 34).

While cold-water corals (CWCs), and now more increasingly, sponge aggregations and reefs have for some time received considerable attention, cold seeps and hydrothermal vents are types of ecosystems that are gaining attention. Still very little is known about the functions of these systems (ICES WGDEEP 2018). Portail *et al*. (2016) showed a high similarity in ecosystem functioning in vents and seeps despite the environmental differences, suggesting that the ecological niches are not specifically linked to the nature of fluids. Studies indicate that these systems can be beneficial for animals like bacteria, shells, polychaetes, and even fish. Interesting new discoveries on how hydrothermal vents and cold seeps play an important role for deep-water ecosystem functioning are shown in the unique behaviour of a deep-sea skate which seems to actively use the high temperature of a hydrothermal vent in Galápagos to naturally incubate egg cases (Salinas de León *et al*., 2018). Cold-seep ecosystems are also believed to have served as nurseries for predatory elasmobranch fishes (skate and sharks) since at least the late Eocene period (Treude *et al*., 2011).

3.4.6.4 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, b). Iceland has nominated 14 areas to the OSPAR Network of Marine Protected Areas (OSPAR 2013).

Large areas of Icelandic waters are closed for fishing (Figure 35), 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. The Icelandic Coast Guard monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing.

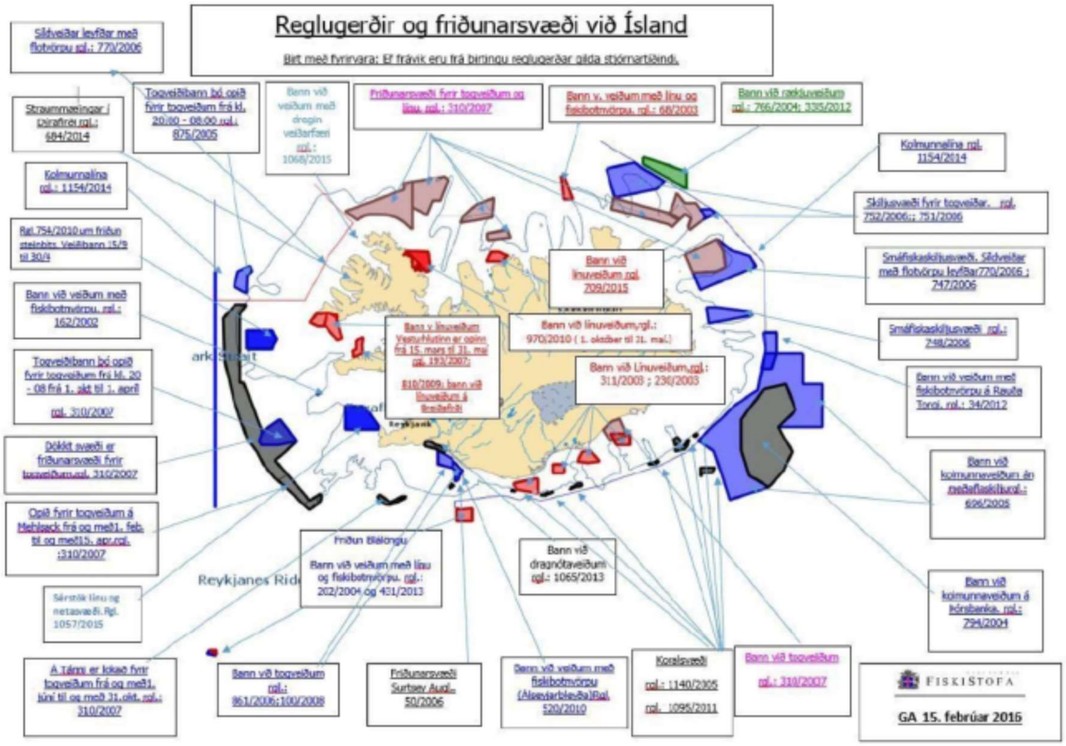

Figure 35 Areas with restricted fishing. Shadings indicate different levels of restriction and type of gear involved, ranging from temporary (e.g. time of day, season) to permanent closure. Source: Directorate of Fisheries (Icelandic version for February 2016: http://www.fiskistofa.is/fiskveidistjorn/veidibann/reglugerdarlokanir/)

The OSPAR Quality Status report (QSR 2010) provides a broad map of the location of protected areas in the NE Atlantic, of which the following figure (Figure 36) is an extract to show the broad location of the areas around Iceland.

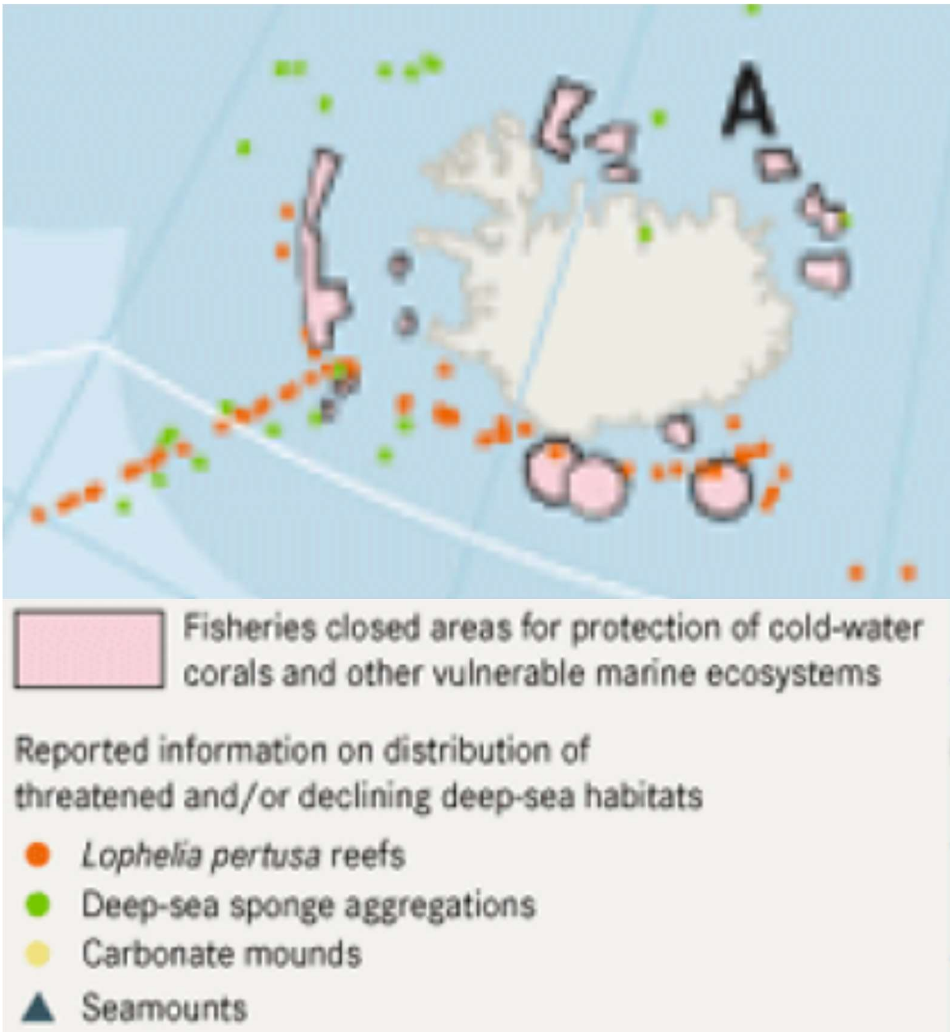

Figure 36 OSPAR 2010 QSR report on protected areas, extract of NE Atlantic area map (https://qsr2010.ospar.org/en/ch10_03.html)

In addition, a number of areas have been closed for fishing, specifically to protect cold water corals, for example to the Southwest and South of Iceland (Figure 37).

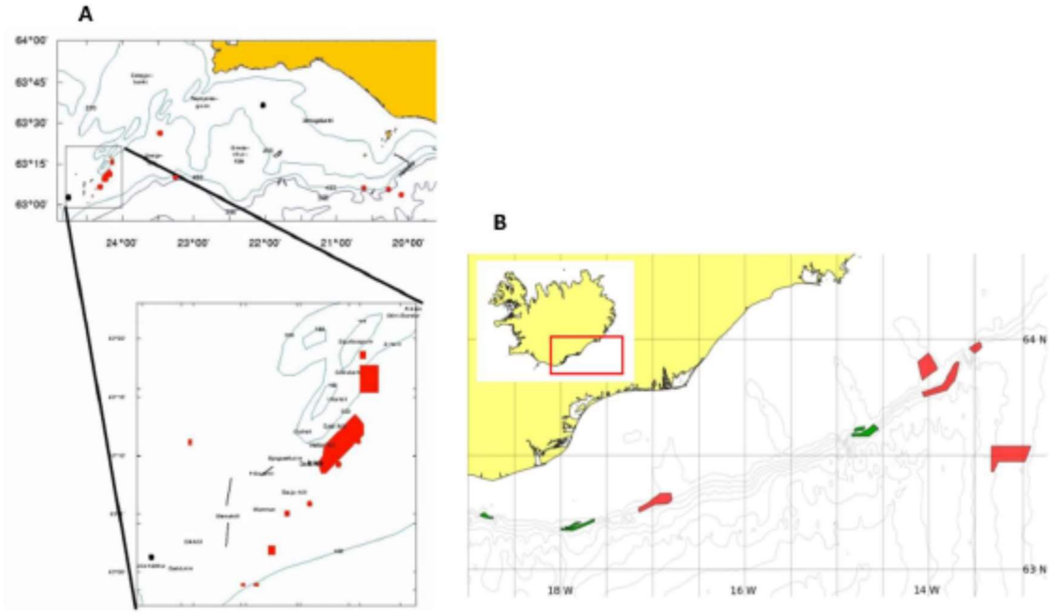

Figure 37 A: Coral areas off the SW coast of Iceland. B: Coral areas off SE Iceland where fishing operations have been banned since 2005 (green) and 2011 (red). Source: Ministry of Fisheries 2004; Ólafsdóttir & Burgos 2012.

In Iceland, once a reef area becomes known, the area is closed to fishing. Furthermore, skippers tend to avoid known reef areas due to the potential damage to the fishing gears and fishing time for repairs and/or recovery. MFRI interviewed retired fishermen who fished actively prior to 1970 and conducted a questionnaire-based survey with fishermen working in 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 area on the Reykjanes Ridge (36km²) and two areas near the Öræfagrunn Bank (68 and 30km², respectively; Garcia et al, 2006), 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, 2017 in ICES 2017 ecosystem overview). 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 (see Figure 38) . 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.

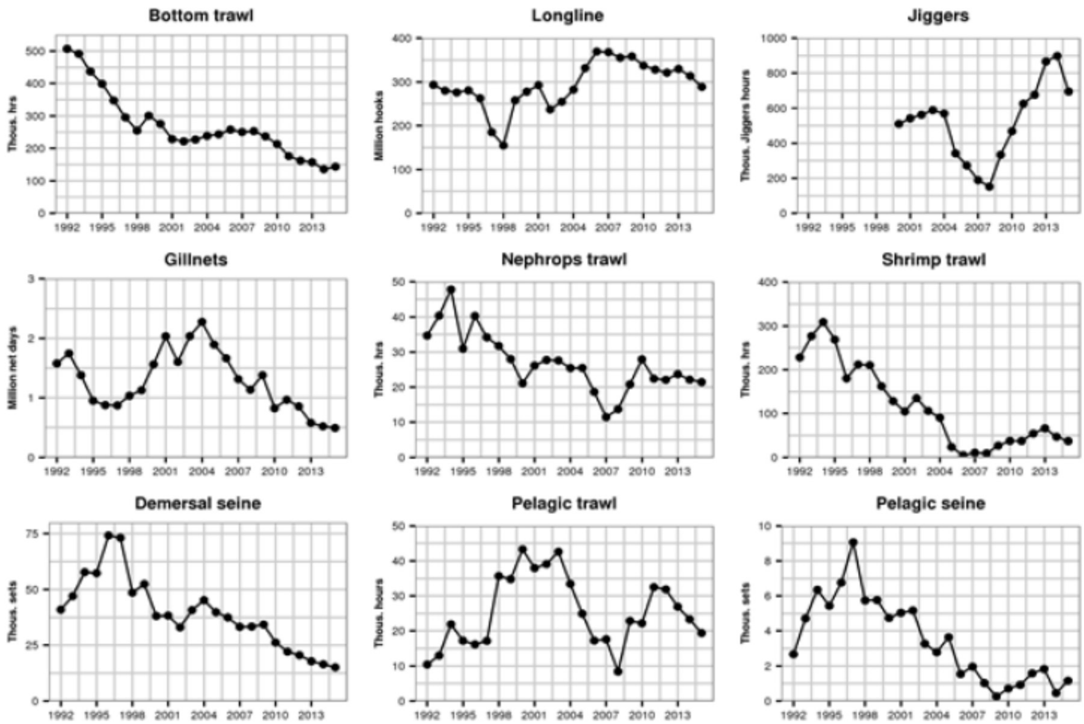

Figure 38 *Temporal trends in effort by gear since 1992, based on logbook entries (Source: ICES 2017, ecosystem overview)*

There continue to be developments in gear technology, for example for demersal trawl gear, where fishers are operating with semi-pelagic trawl doors, not touching the bottom, in order to reduce resistance and thus promote handling efficiency and reduce fuel consumption – with fishing practices being monitored based on fish per kg of fuel. This is an informal voluntary move, and not set within a code of conduct (ISF, pers. comm.). Other developments relate to the MFRI asking the MII to adopt a form of move on rule when any coral is noted in the nets (ISF, pers. comm.), although the practicality and oversight of such a rule are currently being reviewed. Under the current procedure, existing closed areas are clearly marked on the digital maps used by all vessels, surrounded by buffer zones, and any infringement triggers an alarm at Compliance, using VMS position of the vessel (Coast Guard, pers.com. Oct 2018).

As part of the first certificate on these fisheries, the client has been working on a number of measures to help improve the management of habitats. The client is introducing a joint project 'Botnlæg þekking skipstjórnarmanna_drög' (roughly translated as 'specific knowledge of naval officers' [courtesy of Google translate], between ISF member fisheries and MFRI. The project is interview based, conducting qualitative research by working with captains in order to map their knowledge and understanding of the different types of benthos they encounter in fishing areas, as well as interaction with the ecosystem on different fishing grounds. The presentation of this project has begun among the fisheries and has received positive feedback (Client and MFRI interview Oct 2018).

Samstarfsnefnd um bætta umgengni um auðlindir sjávar [Co-operation Committee on improved handling of marine resources]– the Ministry of Fisheries has established a Joint Committee to explore ways to minimize the effects of fisheries on the ecosystem. It has appointed as members different stakeholders within fisheries, such as general fisheries, from small boat fisheries, the Ministry, MFRI and from the Association of Icelandic Captains and Vessel Manager. One of the committee's main tasks is to formulate Recommendations to the Ministry on how to reduce and monitor catch of seabird and marine mammals in gillnets, for example. The committee was scheduled to complete its recommendations by June 2018 but asked the Ministry for an extension until November 2018 (NB: the document was not available at time of writing, Jan 2019).

3.4.6.5 Spatial distribution of fishing gear types and impact studies

The description of the gears used in these fisheries is available in previous certification reports, and not repeated here, as this is a re-certification for all the species and gears involved in this multi-species fishery. In order to evaluate the impact of the gears on the benthos, the maps showing the distribution and intensity of gear types used (Figure 39) are compared with the map showing the major substrate types (Figure 24).

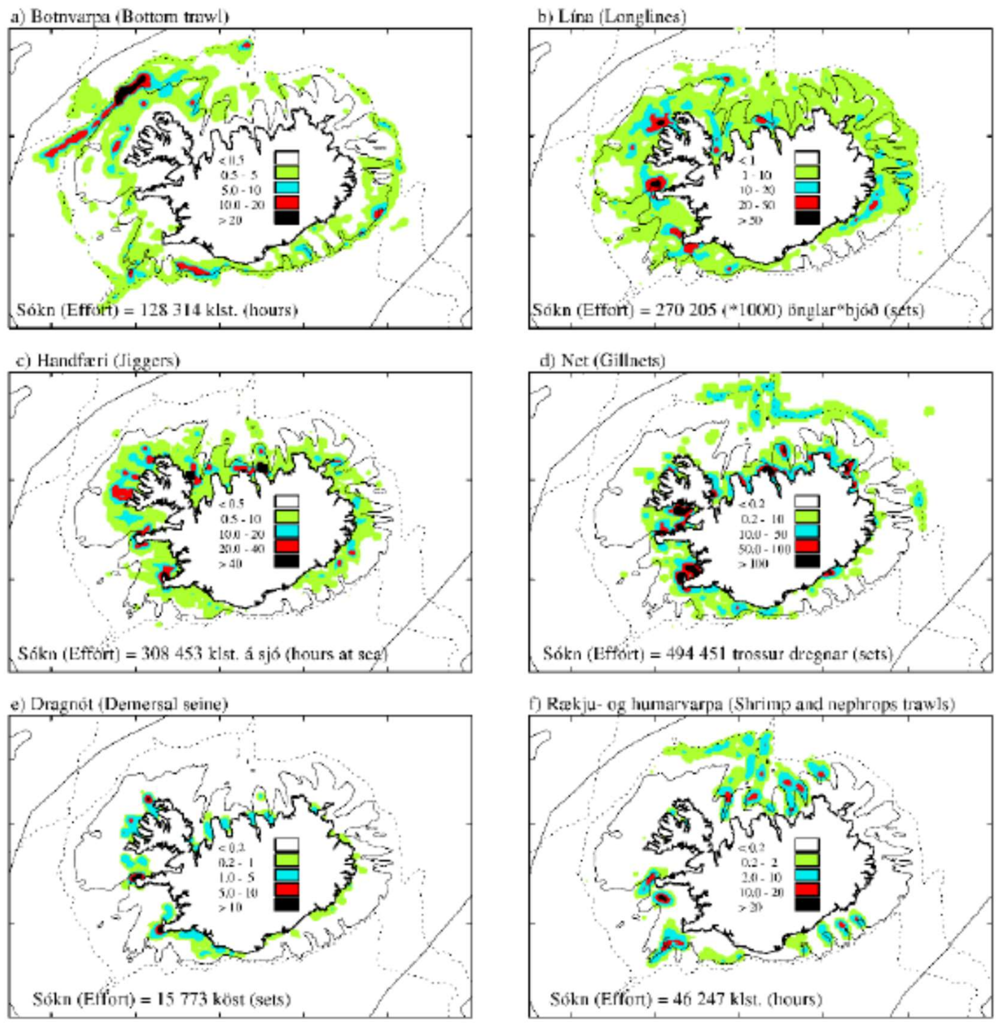

Figure 39 Spatial distribution of catches by gear type in 2017, (MFRI 2018)

Table 22 Commonly encountered habitats by gear type

Gear type	Commonly encountered habitat	MSC SGB[14]
Bottom Trawl TB	Fishing effort is concentrated in areas with coarse sediments, but also overlaps with areas characterised by soft bottoms including sand, sandy mud, muddy sand and mixed sediments. TB is not generally used on rougher grounds, because this would damage the gear	Fine (mud/ sand), flat, large erect biota
Nephrops trawl TN	Soft ground, usually soft mud that provides good burrowing habitat for Nephrops	As above
Danish Seine SD	Danish seine is not used to work on rough grounds (gear damage) and is used on relatively flat sandy or muddy seabeds.	As above
Longline LL	Demersal set, thus limited, point contact with ground. Fishing effort is concentrated in areas characterised by hard bottoms and coarse sediments, but longlines may also be deployed in soft bottom habitats.	As above; Medium/ low relief/small erect biota
Handline HD	Largely pelagic habitat although the end-weight may have contact with the ground.	NA
Gillnet GN	Largely pelagic habitat, although the footrope has contact with the ground. Fishing effort is concentrated in areas characterised by hard bottoms and coarse sediments, but gillnets may also be deployed in soft bottom habitats	Fine/flat/large erect biota Medium/low relief/small erect biota

Table 22 outlines the commonly encountered habitats by gear type. Within the ecoregion, abrasion caused by bottom trawls has been shown to impact fragile three-dimensional biogenic habitats in particular (e.g. sponge aggregations, coral gardens, and coral reefs), with impacts happening mainly in deeper waters (> 200 m). Effects of bottom trawling on soft substrates in shallow waters have been shown to be minor. Other impacts involve overturning boulders, scouring the seabed, and direct removal of and/or damage to epifaunal organisms. (ICES 2017, ecosystem overview).

Demersal trawling (bottom trawl and Nephrops trawl UoAs)

There are a number of studies and research projects to assess the impact of demersal fishing gears on benthos. Bottom trawling is one of the most widespread human impacts on the sea floor, and has the potential to inflict significant damage on benthic habitats and ecosystems, as has been shown in numerous studies[15] and also reviewed by Clark et al 2016. A global analysis of depletion and recovery of seabed biota after bottom trawling disturbance (Hiddink et al 2017) showed that depletion of biota and trawl penetration into the seabed are highly correlated, whereby otter trawls caused the least depletion, removing 6% of biota per pass and penetrating the seabed on average down to 2.4 cm, whereas hydraulic dredges caused the most depletion, removing 41% of biota and penetrating the seabed on average 16.1 cm. Median recovery times post-trawling (from 50 to 95% of unimpacted biomass) ranged between 1.9 and 6.4 years, where recovery rates after trawling depend on recruitment of new individuals, growth of surviving biota, and active immigration from

[14] SGB = Substratum, Geomorphology, Biota, as per MSC GSA3.13.2 and in particular Table GSA6

[15] Kaiser, M., Collie, J., Hall, S., Jennings, S., and Poiner, I. R. 2002. Modification of marine habitats by trawling activities: prognosis and solutions. Fish and Fisheries, 3: 114–136.; Kaiser, M. J., Clarke, K. R., Hinz, H., Austen, M. C. V., Somerfield, P.J., and Karakassis, I. 2006. Global analysis of response and recovery of benthic biota to fishing. Marine Ecology Progress Series, 311: 1–14.; Kenchington, E. L. R., Prena, J., Gilkinson, K. D., Gordon, Jr., D. C. , MacIsaac, K., Bourbonnais, C., and Vass, W. P. 2001. Effects of experimental otter trawling on the macrofauna of a sandy bottom ecosystem on the Grand Banks of Newfoundland. Canadian Journal of Fisheries and Aquatic Sciences, 58: 1043–1057; Lambert, G. I., Jennings, S., Kaiser, M. J., Hinz, H., and Hiddink, J.G. 2011. Quantification and prediction of the impact of fishing on epifaunal communities. Marine Ecology Progress Series, 430:71–86.

adjacent habitat. Trawling impact is a significant factor determining abundance, diversity and community composition on both muddy and rocky seabeds in West Greenland. Temperature, depth, current speed, and substrata are also important factors influencing abundance (notably temperature is the most important factor for many groups in rocky areas (Yesson et al 2017).

Functionally, these impacts of trawling translate into loss of biogenic habitat from potentially large areas. Benthic taxa, especially the mega-faunal components of deep-sea systems such as corals and sponges, can be highly vulnerable to fishing impacts. Some taxa have natural resilience due to their size, shape, and structure, and some can survive in natural refuges inaccessible to trawls. However, many deep-sea invertebrates are exceptionally long-lived and grow extremely slowly: these biological attributes mean that the recovery capacity of the benthos is highly limited and prolonged, predicted to take decades to centuries after fishing has ceased (Clark et al 2016). A recent study by Yesson et al (2017) has shown a significant negative impact on the overall abundance of epibenthic organisms on the West Greenland shelf as a result of bottom trawling. The trawl impact is strong for some taxa and functional groups, while environmental factors, including natural disturbance from icebergs (Gutt 2001) and temperature, are more important than trawling pressure in determining overall taxon composition and abundance for some groups. Soft sediment communities appear to be more resilient, while the effect on hard substrate can be seen in places trawled a decade ago.

Compared with untrawled areas, trawled sediments in the deep-sea regions are characterized by a lower organic carbon (C) turnover and are significantly depleted in organic matter content, meiofauna abundance and biodiversity, and nematode species richness and individual biomass (Pusceddu et al., 2014). The effects of deep-sea trawling extend not only to food availability for the benthos but also to the key ecosystem function of C cycling. Therefore, in deep-sea ecosystems, persistent trawling-induced resuspension of large amounts of high-quality nutritional resources, coupled with a slowdown of the organic C cycling, indicates that bottom trawling can exacerbate the natural food limitation of the deep-sea sediments.

Recovery time of *Lophelia* reefs to trawl damage is uncertain, as it depends on many factors, not least of which is the logistical difficulty of conducting such time series studies. *Lophelia* corallites can grow 5–10 mm /year (Mortensen & Rapp, 1998) and the growth rate of a *Lophelia* reef is estimated to be 1.3 mm /year (Mortensen, 2000). Consequently, it will take hundreds of years for a colony to reach a diameter of 1.5–2m while it will take thousands of years to build a reef structure 10–30m thick. Thus, it will take a significantly long time for the reefs to recover, including resumption of the extent of their ecological function, if at all.

Static gear (Gillnets, handline and demersal longlines)

Set longlines, whereby the hooks rest on or near the bottom, cause less of an impact on habitats compared to mobile gears. A study by Baer et al (2010), in support of a Canadian Science Advisory Workshop on the impacts of gears, showed that the demersal applications of longline and gillnet gear have some demonstrated impacts through entanglement and breakage of bottom features such as corals. The main concerns are with impacts on seamount ecosystems, deep-sea coldwater coral, and sponge communities. The prime mitigation strategy is avoidance of most sensitive areas. A study by Fossa et al (2002) on the impact on VMEs of gillnets and longlines conducted in the early 2000s in Norwegian waters showed that gillnets and longlines can have a significant impact on VMEs and damage by these types of fishing gear have been documented in Norwegian waters (Fossa et al 2010). Fossa concluded in 2010 (Fossa et al 2010) that "*We have reasons to believe that extensive use of gillnets in gorgonian forests can have a significant bycatch of gorgonians and hence significant impact. Although these fishing techniques obviously cause breakage and disturbance of corals, it is often assumed that the extent of damage is less compared to the effect of bottom trawling. However, a study of gorgonian corals on a Canadian longline fishing ground showed that this fishing practice had a clear impact on corals. Because these organisms are long-lived, the effect of a relatively low disturbance frequency may accumulate over time (Mortensen and Buhl-Mortensen 2004). Thus, persistent high use of longline and gillnet in coral areas can cause severe damage over* *time. Consistent international advice from ICES is now to ban all bottom-set gear where corals could be affected…"*

Fossa 2002 estimated that that between 30 and 50% of the reef areas on Norway are already damaged or impacted and Clark et al (2014) concluded that there is in general no evidence of "Recovery" of stony corals. This is likely to be very slow-decadal time scales, possibly 100s of years, if it can occur at all. Clark et al (2015) reviewed the impact of fishing gear on deep water benthic communities. They found that static gears, such as longlines and traps have lower impacts than mobile gear types. However, in certain conditions, for example during retrieval, static gear may move laterally across the seabed, resulting in impacts to the habitat and biota. Longline impacts on sessile fauna such as sponges and corals have been observed, where the animals have been broken by longline weights or by the mainline cutting through them while moving laterally during fishing or hauling (in Clark et al 2015). Line gears alter the seabed to a lesser extent than demersal trawl gears due to their much narrower footprint; lines can, however, drag on the seabed stirring up sediments, as well as interact directly with sessile organisms. Overall gillnets and longlines are lower impact gears compared to demersal trawls, but in deep sea communities such damage takes a long time to repair (see recovery tables in Clark et al 2014).

Direct interactions of fishing gear with epibenthic animals that results in physical damage can be classified into three basic types (in Clark et al 2015): (i) blunt impacts—the motion of a broad object through the benthos (e.g. groundrope, trawl doors, mesh, codend, or chafe mat), or the dropping of weights; (ii) line shear—the motion of a narrow object across or through the benthos (e.g. trawl sweeps and lower bridles, longlines when dragging across the seabed); (iii) hooking—direct interaction of hooks with the benthos (e.g. snagging animals). Blunt interactions generally result in the dislodgement or crushing of individuals, particularly larger, erect forms that are anchored to the seabed such as corals, sponges, and crinoids. These organisms can also be sheared off, hooked, or tangled in longlines.

Clark et al (2016) suggested that the low tolerance and protracted recovery of many deep-sea benthic communities has implications for managing environmental performance of deep-sea fisheries, including that (i) expectations for recovery and restoration of impacted areas may be unrealistic in acceptable time frames, (ii) the high vulnerability of deep-sea fauna makes spatial management—that includes strong and consistent conservation closures—an important priority, and (iii) biodiversity conservation should be balanced with options for open areas that support sustainable fisheries.

3.4.6.6 Information

The BIOICE (Benthic Invertebrates of Icelandic waters) program was in operation between 1992-2004, and had the aim of producing a basic inventory of benthic fauna within Icelandic territorial waters (Figure 40). 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 (12ºC to -0.9ºC) 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).

Since 2000, the Marine Research Institute maintains a programme 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. The aim is to compile a comprehensive picture of the entire continental shelf. The Marine Research Institute is also investigating the effects of fishing gear on the seabed and there is a growing focus on habitat studies in keeping with the increased emphasis of the ecosystem approach to marine research (www.hafro.is). Around 12% of the entire Iceland EEZ habitats has been mapped in detail using multi-beam echosounders (Figure 41).

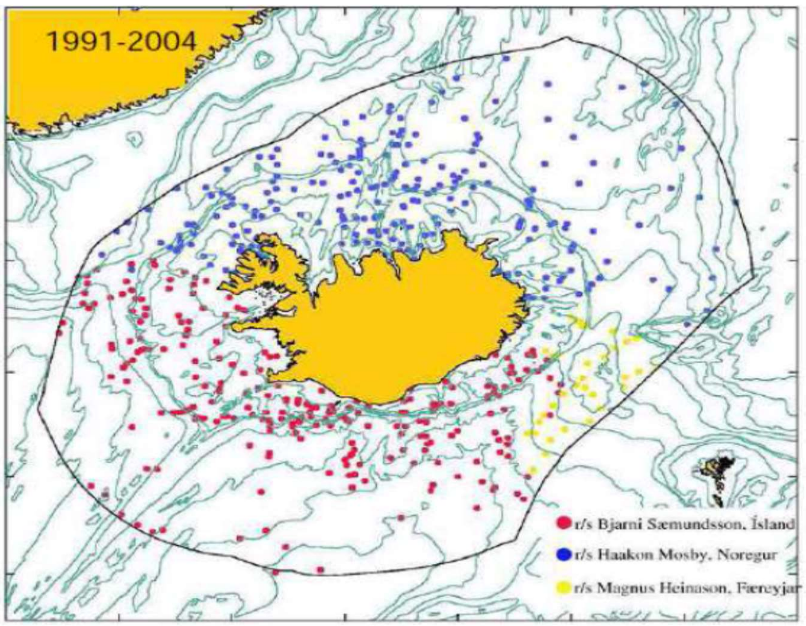

Figure 40 The research programme BIOICE (Benthic Invertebrates of Icelandic Waters): Distribution of sampling stations visited by three research vessels (different colours). Source: Gudmundsson and Helgason, 2014

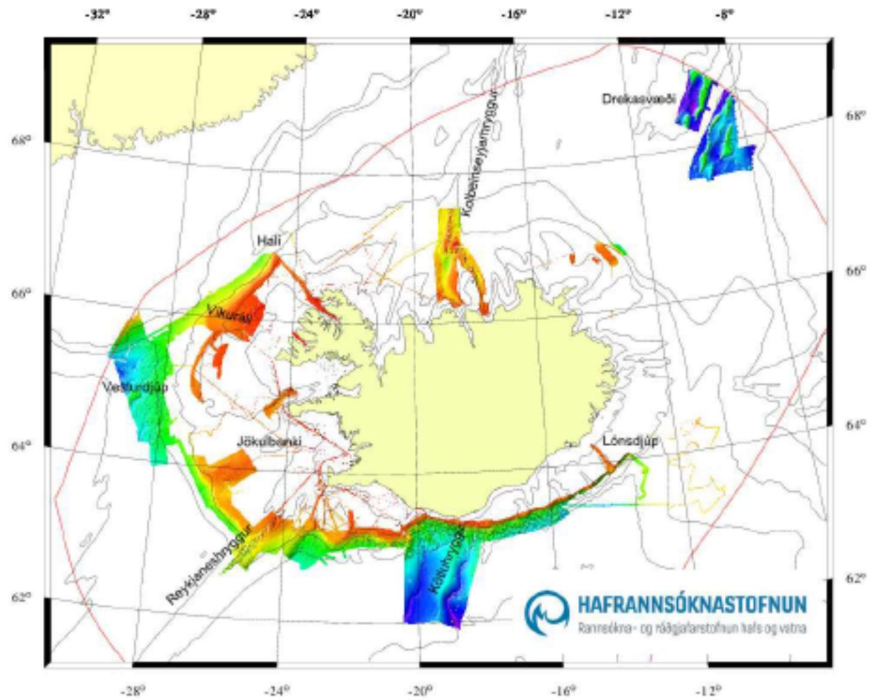

Figure 41 Iceland EEZ habitats which have been mapped in detail up to 2012 using multi-beam echo-sounders (coloured shading). Source: Burgos et al., 2014.

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 Figure 42), and to collect genetic samples in order to increase the available information on species identification (Omarsdottir et al., 2013).

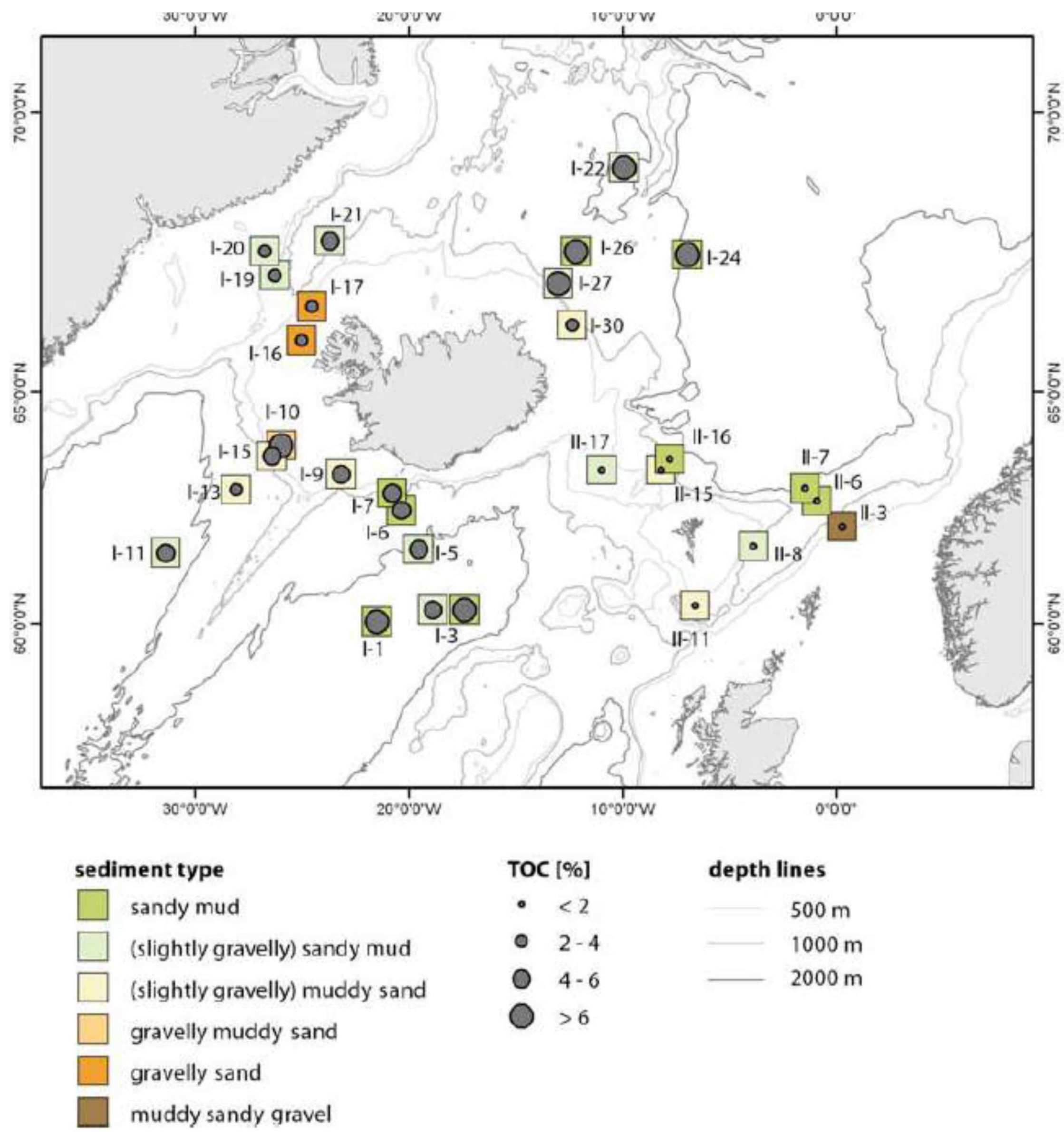

Figure 42 Sediment mapping around Iceland. Source: Meißner et al. 2014

In addition to the activities described above, a wide variety of research projects 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:

- Iceland has been part of the EU funded CoralFISHproject (http://eu-fp7-coralfish.net/) and https://cordis.europa.eu/project/rcn/89331/reporting/en. One study compared fish communities inside and outside coldwater coral habitats based on longline catches (Ragnarsson and Burgos 2018), and another examining bottom fishing activities. A coral habitat classification scheme 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 (MFRI, pers. comm, 2018 at site visit);

- Since 2014, as part of the conditions of the first certification period, the client has been implementing several measures on board the relevant vessels to collect and record benthos bycatch data. This is being done in collaboration with relevant MFRI researchers and is contributing to the benthos information database (Client, site visit 2018, and final surveillance audit of Saithe[16])
- In 2018 - ongoing, several potential vent sites on the Reykjanes Ridge are planned for survey (MFRI, pers.comm, 2018, at site visit);Icelandic researchers also participate actively in ICES research projects. In 2018 ICES advised on the deep -sea bottom fisheries footprint (Fig. 44), for depths of 200m and greater, based on VMS and logbook data for the years 2009–2011, from a number of EEA countries, including Iceland (ICES 2018a,b). The resultant maps of this footprint also show 800m depth contour (Fig. 43), below which bottom trawling shall not be permitted under the EU deep-sea access regulation (EU) 2016/2336. This regulation also contains habitat protection aspects for VMEs found in deep water, whereby waters below 800m are closed to bottom trawling. As part of this study, ICES used its VME database to identify areas where VMEs are known to occur (maps are presented in the publication for other areas, not including Iceland). Only a small portion of Iceland, the far Eastern side, was captured within this VMS survey, but work is ongoing and data collection in the Icelandic EEZ continues to be collated.

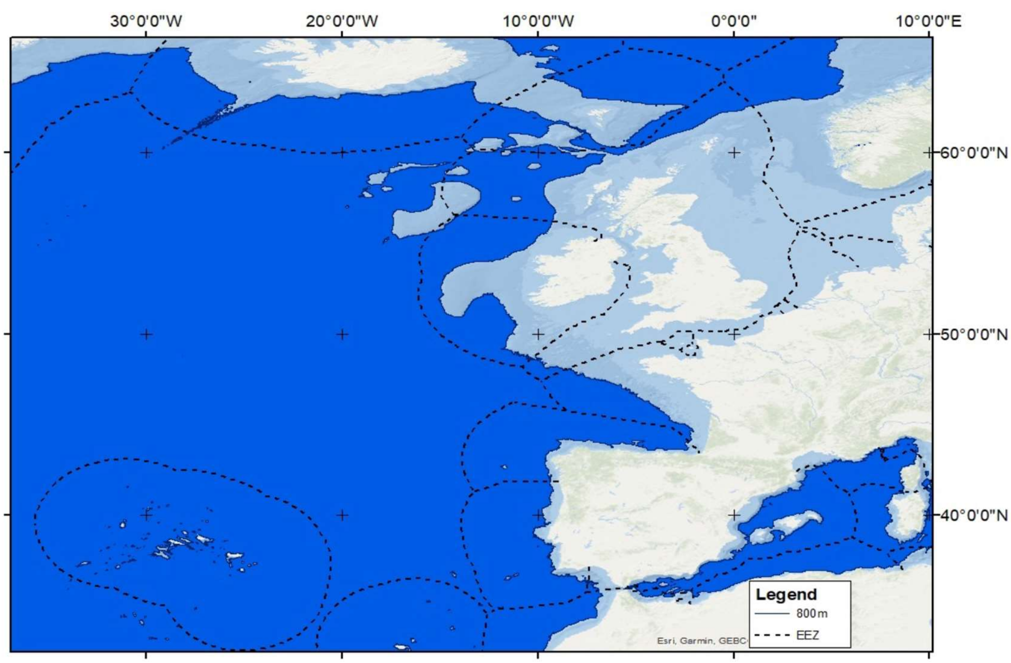

Figure 43 The area beneath the 800 m depth contour (dark blue) which shall be closed to bottom trawling under regulation (EU 2016/2336, Article 8.4). (Source: ICES Advice 2018)

[16] https://fisheries.msc.org/en/fisheries/isf-iceland-saithe-ling-atlantic-wolffish-and-plaice/@@assessments

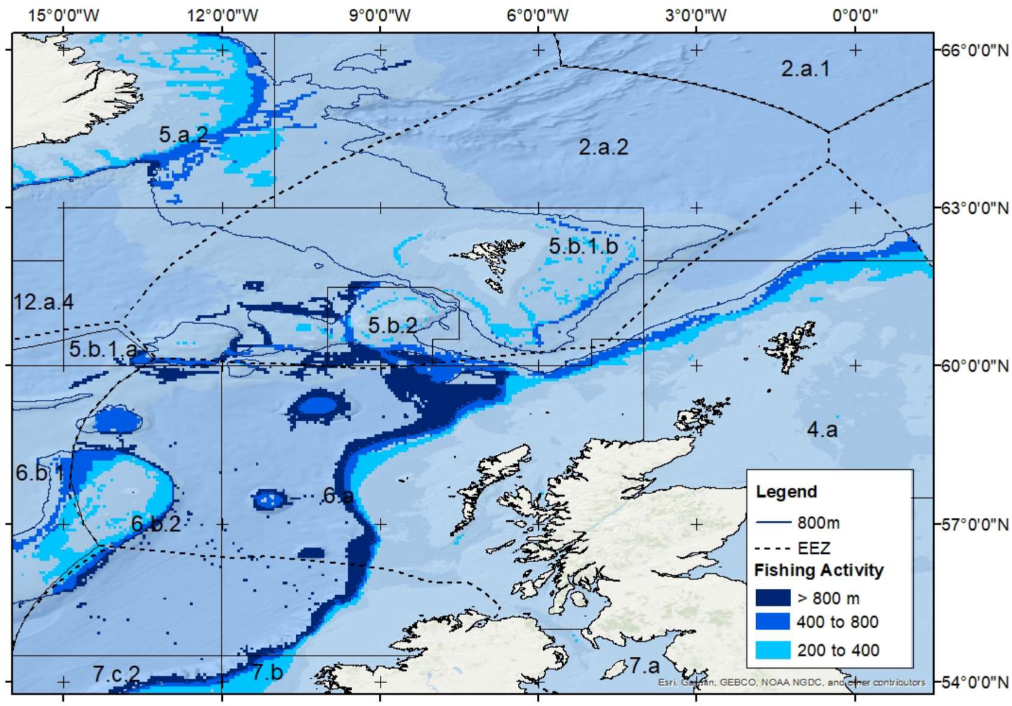

Figure 44 Fisheries footprint (2009–2011) in relation to the 800 m depth contour and the EU EEZ for ICES subareas 2, 4, 5, and the northern part of Subarea 6. (Source: ICES Advice 2018)

3.4.7 Ecosystem

3.4.7.1 Productivity

The physical oceanographic character and faunal composition in the southern and western parts of the Icelandic marine ecosystem are different from those in the northern and the eastern areas. The former areas are more or less continuously bathed by warm and saline Atlantic water while the latter are more variable and influenced by Atlantic, Arctic and even Polar water masses to different degrees. The annual primary productivity is generally higher in the warm Atlantic water off the south and west coasts (200–300 gCm^2 yr^1) than in the colder Sub-Arctic/Arctic water off the north and east coasts (100–200 gCm^2 yr^1),(Astthorson et al 2007). In general, mean annual primary productivity is higher in the Atlantic water than in the more variable waters north and east of Iceland, and higher closer to land than farther offshore. Similarly, zooplankton production is generally higher in the Atlantic water than in the waters north and east of Iceland.

3.4.7.2 Food-web

In the waters to the north and east of Iceland, available information suggests the existence of a simple bottom-up controlled food chain from phytoplankton through *Calanus*, capelin and to cod. Less is known about the structure of the more complex southern part of the ecosystem. Capelin is a key species in the ecoregion and its lifecycle and migration pattern is an important energy transfer in the ecosystem. Capelin feeds mainly on copepods and euphausiids in waters north of Iceland and then moves to Icelandic waters where it is one of the most important prey for many species, e.g. cod, haddock, saithe, Greenland halibut, seabirds, and marine mammals (ICES 2017, ecoregion overview).

From a foodweb perspective, Capelin (*Mallotus villosus*) is the most important pelagic stock (Astthorsson et al 2007). Other prey species of lesser importance are shrimp and sandeel. The annual consumption of fish, cephalopods, and crustaceans by cetaceans within the Icelandic Waters ecoregion has been estimated at 6.3 million tonnes (ICES 2017, ecoregion overview). Furthermore, Icelandic waters are an important feeding ground for some of the largest seabird populations in the Northeast Atlantic (Astthorsson et al 2007).

The foodweb has been affected by changes in hydrography, the capelin fishery, increased immigration of mackerel, and the increasing abundance of large baleen whales. Unlike capelin, mackerel feeds in the ecoregion and are a minor prey item, thereby exporting energy from the system (ICES 2017, ecoregion overview). The Icelandic marine ecosystem is highly sensitive to climate variations as demonstrated by abundance and distribution changes of many species during the warm period in the 1930s, the cold period in the late 1960s and warming observed during the recent years (Astthorsson et al, 2007).

From an ecosystem perspective, seabirds are an important component of the foodweb of this ecoregion. Around 30–50 million seabirds, consisting of 22 species, are found within the ecoregion. Substantial proportions of the total North Atlantic populations of some species are found there. Annual food consumption of six common seabird species has been estimated at 171 000 tonnes of capelin, 184 000 tonnes of sandeel and 34 000 tonnes of euphausiids. However, the populations of several seabird species has been declining significantly, and reduced prey availability has been suggested as the main cause for their decline, such as sandeel for puffins *Fratercula artica.* (ICES 2017, ecoregion overview).

Several species of marine mammals occur in the Icelandic ecoregion. Of the six pinniped species found here, two species breed locally (Harbour seal and Grey seal), both populations are currently in decline, as census data shows (ICES 2017 ecoregion overview). The decline appears to be partly due to hunting, there is ongoing research to establish reasons for the population decline (MFRI see https://www.hafogvatn.is/en/research/harbour-seal; and in particular research into fisheries interactions https://www.hafogvatn.is/en/research/harbour-seal/seal-fisheries-interaction. MFRI state on their website that 'suggestions have been made that one of the main reasons for the decline in the Icelandic harbour- and grey seal populations is by-catch in lumpsucker and cod gillnets'. This is current research (MFRI webpage accessed 5th Dec 2018).

Twenty-three species of cetaceans have been observed in Icelandic waters, twelve of which are seen on a regular basis. Cetacean surveys have been conducted at regular intervals between 1987 and 2016 and reveal varying trends in abundance. Both humpback whales and fin whales have shown an increase in numbers, whereas minke whales' abundance has decreased substantially in Icelandic coastal waters since 2001, most likely owing to decreased availability of important prey species such as sandeel and capelin (ICES 2017, ecoregion overview).

3.4.7.3 Impacts on the ecosystem

As well as the impact of fishing (removal of target species which are otherwise prey species), there are other impacts on the ecosystem, such as species invasion; the ecological impacts caused by the non-indigenous species in this region is poorly known, however records of such species and their extent are made (ICES 2017, ecoregion overview). The main pathway for introductions is vessels, either through ballast water or ship hull fouling. Secondary spread from neighbouring areas may account for the arrival of a few non-indigenous species

Twenty-two non-indigenous and cryptogenic (obscure or of unknown origin) species have been recorded in the Icelandic ecoregion, consisting of species belonging to phytoplankton, macroalgae, crustaceans, bivalves, tunicates, and fish. Four of those species (the brown seaweed Phaeophyceae, Atlantic rock crab *Cancer irroratus*, brown shrimp *Crangon crangon*, and flounder *Platichthys flesus*) are invasive in Icelandic waters but are native to other ICES ecoregions. At least one of the recently arrived non-indigenous species, the Chilean crab *Cancer plebejus*, is not yet registered in the neighboring areas (Faroe Plateau, Barents Sea, Greater North Sea, and Norwegian Sea) (ICES 2017, ecoregion overview).

Other impacts on the marine ecosystem include pollution, either from vessels direct or coming off the land and then distributed by currents. Iceland has signed up to and ratified the International Convention for the Prevention of Pollution from Ships, MARPOL[17], which is the main international convention covering prevention of pollution of the marine environment by ships from operational or accidental causes. MARPOL has been updated by Annexes and amendments through the years. The Convention currently includes six technical Annexes, and Iceland has signed up to all six but Annex IV, which deals with release of sewage from ships. Special Areas with strict controls on operational discharges are included in most Annexes. Amongst other issues, the Convention deals with different types of garbage and specifies the distances from land and the manner in which they may be disposed of; the most important feature of Annex V is the complete ban imposed on the disposal into the sea of all forms of plastics. Plastic pollution is an increasing issue, whereby more plastic objects appear to be washed up on the beaches of Northern Iceland, compared to Southern Iceland, possibly a result of prevailing currents and which countries they pass by (Site visit interview with Coastguard, 11th oct 2018).

3.4.7.4 Ecosystem models

Ecosystem models are being used to study the interactions between predator and prey species within the context of fishing, whereby fishing is handled as a top predator. A trophic web model, such as Ecopath with Ecosim (EwE) looks at fishing fleets as a top predator, with top-down impact on harvested organisms. Ribeiro et al (2018) conducted such a simulation study with the aim to better understand the Icelandic marine ecosystem and the interactions within. This was done by constructing an EwE model of Icelandic waters, and the model was run with data from 1984 to 2013, fitting such data as time series of biomass estimates, landings data and mean annual temperature. The model performed satisfactorily when simulating previously estimated biomass and known landings, and it was proposed to use the model as a tool to investigate the impact of fishing policies on the marine ecosystem, when taking into account the harvested species with direct and/or indirect links to lower trophic levels (Ribeiro et al 2018).

Another ecosystem model recently used to study the Icelandic marine bioregion is 'Atlantis', which is a deterministic bio-demographic and bio-geochemical model, tracking Nitrogen through the biological and detritus groups. It models invertebrates as biomass pools (mgN/m^2 or mgN/m^3) and uses vertebrates age-structured models (Desjardins 2015). This end-to-end ecosystem model has been further applied by Sturludottir et al (2018) to explore system dynamics and model reliability in Icelandic waters. As fisheries management is mainly built on single species stock assessment models, and multispecies or ecological models are essential for building capacity around ecosystem-based fisheries management, the Atlantis end-to-end ecosystem model has been shown to be a reliable tool for evaluating alternative ecosystem and fisheries management scenarios. This model is considered to produce reliable results for the most important commercial groups (Sturludottir et al, 2018).

[17] www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx

3.5 Principle Three: Management System Background

3.5.1 Jurisdiction

The ISF multi-species demersal fishery takes place in the Icelandic EEZ and it is therefore a fishery that operates within a single jurisdiction. Some foreign vessels are licensed to fish in the Icelandic EEZ under a bilateral agreement between Iceland and their home countries.

However, the stocks of three species extend into other nations waters: Blue ling and Tusk into the Greenland EEZ and Golden Redfish, which is widely distributed in across the North Atlantic. These three species are part of stocks shared between Iceland and Greenland (in the case of Blue ling and Tusk) and more widely (in the case of Golden Redfish).

As a contracting party of the North East Atlantic Fisheries Commission (NEAFC) and signatory to the UN Fish Stocks Agreement, Iceland has made a binding commitment to bilateral and multilateral co-operation on fisheries management.

3.5.2 Objectives

The objective of Icelandic fisheries management, as stated in the Fisheries Management Act, is to ensure conservation and efficient utilization of marine living resources in the Icelandic EEZ. The precautionary approach is not mentioned explicitly in the 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.

Iceland is a member of the North East Atlantic Fisheries Commission (NEAFC). "The objective of NEAFC is to ensure the long-term conservation and optimum utilisation of the fishery resources in its Convention Area, providing sustainable economic, environmental and social benefits."[18]

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 Fisheries Management Act, amended in 2006. 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 and 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.

The Ministry of Industries and Innovation (MII) – which has two ministers: one for Industry and Commerce 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.

Iceland is signatory to, and has ratified, the 1982 Law of the Sea Convention (UNCLOS) and the 1995 UN Fish Stocks Agreement, which requires the use of the precautionary approach. Iceland is also signatory to the UN's Sustainable Development Goals, which includes a commitment to ensure fish stocks are at or above MSY. This commitment was re-iterated in the statement by Minister for Fisheries and Agriculture at the UN conference on implementing SDG 14 on sustainable use of the oceans, seas and marine resources in June 2017. [19]

[18] https://www.neafc.org

[19] https://sustainabledevelopment.un.org/content/documents/24704iceland2.pdf.

The Directorate of Fisheries (Fiskistofa) is the implementing body within the management system. It is an Icelandic government institution within the jurisdiction of MII that is responsible for implementing government policies on fisheries management and the handling of seafood products; enforcing laws and regulations in fisheries management; monitoring of fishing activities and applying sanctions for non-compliance; and collecting, processing, and publishing fisheries data in collaboration with Statistics Iceland (Directorate of Fisheries, 2012). The Directorate is also responsible for monitoring, control and surveillance, in cooperation with the Coast Guard, which is a civilian law enforcement agency under the Ministry of the Interior.

The DF oversees the daily operation of the individual transferable quota system. In 1984, the introduction of the demersal vessel quota system preceded increasing management that resulted in a uniform Individual Transferable Quota (ITQ) system in nearly all fisheries by 1991 (Runolfsson & Arnason, 2003). The Fisheries Management Act, a comprehensive ITQ legislation, was enacted in 1990 (Runolfsson & Arnason, 2003). According to the ITQ system, all fisheries are subject to vessel catch quotas which represent shares in TAC (Runolfsson & Arnason, 2003). The quotas are permanent, perfectly divisible, and fairly freely transferable (Runolfsson & Arnason, 2003; Arnason, 2005). The quotas retain an annual fee that maintains enforcement costs (Runolfsson & Arnason, 2003; Arnason, 2005). Initially, quotas were allocated based on catch history of the vessel prior to the implementation of the ITQ system (Arnason, 2005).

3.5.4 Stakeholders and consultation processes

Iceland has a consensus-based system for fisheries management and long tradition of continuous consultation and close cooperation between government agencies and user-group organizations. As emphasized by all stakeholders interviewed during the site visit, lines of communication are short 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 are invited to sit on committees established to review changes in government, and they meet for regular consultations with the Ministry, the Directorate and the Parliament's (Althing) Permanent Committee for Fisheries and Agriculture. These include, but are not restricted to, Fisheries Iceland (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) and the Fisheries Association of Iceland (which also incorporates the two latter as well as the National Association of Small Boat Owners (NASBO), the Icelandic Seamen's Federation and others). Also, local authorities are actively engaged in fisheries management and have easy access to the management system.

Recent examples of the collaborative approach to fisheries management in Iceland include a Regulatory review of environmental conservation measures, which was undertaken by the standing committee described above[20]. The objective was to ensure regulations on fishing tackle and closed areas remain fit for purpose and to recommend clarifications and simplifications. A team of invited specialists appointed by the Ministry and led by Fisheries Iceland has been tasked with proposing ideas and solutions to by-catch issues through a Code of Conduct for Icelandic fishers.

The collaborative approach to management in Iceland is evident in the Statement on Responsible Fisheries in Iceland signed in 2007 by the Ministry, the MRI, the DF and the Fisheries Association of Iceland. It beings, "This statement is a part of providing information about the Icelandic fishing

[20] Fisheries Iceland (2018), Niðurstöður starfshóps um faglega heildarendurskoðun á regluverki varðandi notkun veiðarfæra, veiðisvæði og verndunarsvæði á Íslandsmiðum – lokaskýrsla til Sjávarútvegs- og landbúnaðarráðherra. Final Report of a working group on professional overall auditing of the regulatory framework regarding the use of fishing tackles, fishing areas and protection areas in the Icelandic waters - final report to the Minister of Fisheries and Agriculture. September 2018.

industry and how measures are taken to ensure responsible fisheries and the proper treatment of the marine ecosystem around Iceland[21].

There are no NGOs with an explicit focus on fisheries management in Icelandic waters, but there has been engagement on this assessment, primarily related to bird and marine mammal by-catch. Birdlife International was interviewed for this assessment has engaged in previous Icelandic assessments and is actively involved in the development of by-catch mitigation measures in Icelandic fisheries.

Consultation processes cover policies and regulatory issues, and also include discussions of the annual scientific recommendations by the Marine and Freshwater Research Institute (MFRI). 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

As laid out in the Fisheries Management Act, monitoring, control and surveillance is by the Directorate of Fisheries in collaboration with the Coast Guard, the MFRI 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.

Fishing vessels over 6GT are required to keep an electronic logbook and report catches to the Directorate of Fisheries. Smaller vessels are allowed to return to the DF upon completing fishing trip. Vessel Monitoring System (VMS) is also required for all UoA vessels.

Inspectors from the Directorate may accompany fishing vessels on voyages 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 using a risk-based framework.

All fish landed into Iceland is weighed by an authorized 'weighmaster', employed by the municipality and hence independent of both buyer and seller. The Directorate provides real-time reporting of catches and quota, where stakeholders can monitor the performance of individual vessels, their catch from each fishing trip and vessel quota status.

A system for graduated sanctions is applied with a warning for a less serious first-time offence, then fines, withdrawal of fishing permit, leading up to imprisonment for serious or repeat violations. In addition to official sanctions, self-regulation is significant within the Icelandic fishing community, and compliance is further enhanced by user-group involvement in regulatory development.

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, including salary cost, for a period of up to two months. All decisions on the suspension of harvest rights are made publicly available.

The Directorate of Fisheries reports on compliance levels among Icelandic fisheries, in annual reports and on its website. In 2017 there were 890 infringements recorded of which most (80%) related to logbook offences (Fiskistofa Arsskyrsla, 2017). 220 of these cases were referred to the legal department for further consideration This indicates that (a) compliance levels are generally good and (b) sanctions are being applied. The main infringement is failure by small coastal vessels to submit the catch log after a fishing trip. The bigger vessels all have electronic logbooks and do not report this problem.

Iceland's National Audit Office has reviewed the Icelandic Monitoring Control and Surveillance system and is due to report by the end of 2018. MII intend to use the findings of this external

[21] http://www.fisheries.is/management/government-policy/responsible-fisheries/.

performance evaluation to make improvements, as they have with others (e.g. Rikisendurskoðun, Independent auditor of state accounts, umboðsmaður Alþingis, Ombudsman of the Parliament) (MII pers. Comm.).

4 Evaluation Procedure

4.1 Harmonised Fishery Assessment

The fisheries under re-assessment are part of Iceland's multi-species demersal fishery and as such have elements overlapping with other fisheries within the Icelandic EEZ that have undergone full MSC assessment, namely:

- ISF Iceland cod;
- ISF Iceland haddock;
- Icelandic gillnet lumpfish (withdrawn at the time of this PRDR);
- ISF Norwegian & Icelandic herring trawl & seine;
- ISF Iceland capelin;
- ISF Iceland mackerel (suspended at the time of this PRDR);
- ISF Iceland anglerfish;
- ISF Greenland halibut;
- ISF Iceland northern shrimp - inshore & offshore;
- ISF Iceland lemon sole.

In accordance with FCR 7.4.16, the assessment team took due consideration of these other assessments for those elements that overlap with the UoAs under assessment here. Of most relevance were the following demersal assessments that have overlapping gears and were assessed under version 2.0 of the MSC standard:

- ISF Iceland cod;
- ISF Iceland haddock;
- ISF Iceland anglerfish;
- ISF Greenland halibut;
- ISF Iceland lemon sole.

There is considerable overlap in team members between these fisheries and this current assessment, enabling each to be considered in terms of results and conditions. There has been considerable effort across Icelandic certificates to align conditions and ensure new conditions are introduced consistently across all certificates.

This re-assessment takes forward a number of recent conditions, but also introduces new conditions under 2.3 (ETP). These are due to the new Red List published for Iceland resulting in a change of the allocation of species between secondary out-of-scope and ETP species. The resulting conditions therefore harmonise with those established under 2.2 in this and other assessments.

It should also be noted that the most recent surveillance was that undertaken in October 2018 for the fisheries under assessment here. The conditions on 1.1.2 (Ling), 1.2.2 (Ling), 1.2.2 (Tusk), 2.4.1 and 2.4.2 that remain open from earlier assessments (and included in the recently certified lemon sole assessment) were closed by the assessment team in this latest surveillance. This explains the significant difference in scores on these PIs.

4.2 Previous assessments

This assessment is a re-assessment of seven demersal species that are being combined into one certificate. The original assessment resulted in two separate certificates for saithe and for ling being awarded in 2014 and 2015 respectively.

Two sets of UoCs using the same fishing gears were later added to these certificates in 2017 following expedited audits, i.e. Atlantic wolffish and plaice added to saithe; Blue ling, Golden redfish and tusk added to ling.

As a result of this integration of certificates, the certificate extensions and the various conditions associated with the UoCs, at surveillance in 2018 it was agreed to consider the conditions in PI order. These are summarised in the table below.

The following conditions were only set in 2017 and not closed during the October 2018 4th surveillance audit:

- PI 1.1.2 for wolffish;
- PI 1.2.2 for blue ling, wolffish and plaice;
- PI 2.2.1, 2.2.2 for gillnet; and
- PI 2.2.3 for gillnet and longline

It was agreed with the MSC that it is unreasonable to expect that these be closed prior to this re-assessment and so could be carried forward under this re-assessment ("exceptional circumstances" as per 7.11.1.3 of FCR v2.0).

Table 5: *Summary of Conditions in previous assessments of the ISF Iceland mixed demersal Fishery**

Unit of Certification:		***Condition set:***		***Scores & condition timing***							
Species	***Gear***	***P.I. no***	***Year set***	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
Atlantic wolffish	All	1.1.2	2017				75				Due
Ling	All	1.1.2	2015		75	75		90	Due		
Atlantic wolffish	All	1.2.2	2017				75				Due
Blue ling	All	1.2.2	2017				75				Due
Tusk	All	1.2.2	2017				65	80			Due
Ling	All	1.2.2	2015		75	75	75	80	Due		
Plaice	All	1.2.2	2017				75				Due
all species	TB,DS,LL	2.1.1	2014	75		80		Due			
all species	TB,DS,LL	2.1.2	2014	75		80		Due			
all species	GN	2.2.1	2017				75				Due
all species	GN	2.2.2	2017				75				Due
all species	GN, LL	2.2.3	2017				75		Due		
all species	TB	2.4.1	2014	75	75	75	75	85			
all species	TB	2.4.2	2015		75	75	75	90			
TB: Bottom trawl; DS: Danish seine; LL: Longline; GN: Gillnet											

* Closed conditions are greyed out for subsequent years.

The previous surveillance reports for these fisheries under the two certificates F-TUN 1106 (Saithe, Ling Atlantic Wolffish & Plaice) and F-TUN 1107 (Golden Redfish, Blue Ling and Tusk) detail the rationale for closing the conditions. In summary, P1 conditions for Tusk and Ling were closed during the 4th surveillance audit when reference points (1.1.2) and appropriate HCRs (1.2.2) were set and implemented for the Tusk and Ling stocks.

For the P2 conditions relating to trawl UoAs (2.4.1 and 2.4.2), the actions undertaken by MFRI and the DoF showed that a partial strategy to protect deep sea sponge aggregations and coral gardens from trawling is being implemented and the conditions could be closed at the 4th surveillance audit.

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 re-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 catch profile data (see Catch profile 2013-2017.xlsx provided along side this report) and stock assessment/population information for the relevant species, 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.

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

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 8th to 12th October 2018, see Table 23 below.

Table 23 Itinerary of site visit and stakeholder consultation in the ISF Multi-species fishery assessment

Date	Name of organisation	Subjects of Consultation
8th Oct	Iceland Sustainable Fisheries ehf. (the Client)	The client fishery
	Atvinnuvega- og nýsköpunarráðuneytið (Ministry of Industries & Innovation)	Overall fisheries management and policies
	Vessel visit – Danish seine, Nephrops trawl Jón á Hofi/Þorlákshöfn	Discussion with skipper re. management, fishing patterns & locations, by-catch, compliance.
9th Oct	Hafrannsóknastofnun (Marine & Freshwater Research Institute)	Fisheries research and advice
	The Icelandic Seal Centre	Seal by-catch monitoring, reporting & management
	Fiskistofa (Directorate of Fisheries)	Fisheries statistics, enforcement, monitoring and control, evaluations.
		Fishers´ view on the fishery and its management; fishing gears and logging of fishing on board
	Icelandic Institute of Natural History	Bird by-catch monitoring, reporting & management
	Fuglavernd – BirdLife Iceland (fuglavernd.is)	Bird by-catch monitoring, reporting & management
	Vessel visit – trawler (HB Grandi, Reykjavík)	HB Grandi skipper and fleet manager: re. management, fishing patterns & locations, by-catch, compliance.

10th Oct	Norwegian, Faroese and Greenlandic management and enforcement authorities (see Table 24)	Discussion re. management, reporting & compliance of vessels operating in Icelandic EEZ.
11th Oct	Icelandic Coastguard - Landhelgisgaeslan	Control and enforcement, fleet reporting, sanctions.
12th Oct	Iceland Sustainable Fisheries ehf.	Closing meeting with the Client

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 24.

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 conditions and their milestones, was completed and presented to the Client in March 2019.

Table 24 Participants in assessment team meetings with the client and stakeholders in the ISP Iceland multi-species demersal fishery

Name	Affiliation / Role
Kristinn Hjálmarsson	Iceland Sustainable Fisheries ehf. (the Client)
Brynhildur Benediktsdóttir;	Ministry of Industries & Innovation
Þorsteinn Hilmarsson Áslaug Hólmgeirsdóttir	Directorate of Fisheries
Guðmundur Þórðarson Guðjón Már Sigurðsson	Marine & Freshwater Research Institute
Sandra Granqvist	The Icelandic Seal Centre
Kristinn Haukur Skarpheðinssson	Icelandic Institute of Natural History
Hólmfriður Arnardóttir	Fuglavernd – BirdLife Iceland (fuglavernd.is)
Einar Guðnason (Captain)	Vessel visit – Nephrops trawler (Jón á Hofi, Þorlákshöfn)
Heimir Guðbjörnsson (Captain); Einar Bjargmundsson; Birkir Hjálmarsson	Vessel visit – Bottom trawler (HB Grandi, Reykjavík)
Modulf Overvik	Norwegian Directorate of Fisheries
Ulla Svarrer Wang;	Fiskimálaráðið – Faroese Ministry of Fisheries
Meinhar Gaarrblykke	Fiskveiðieftirlitið – Faroese Fisheries Inspectorate
Mads T. Nedergaard	Greenland Ministry of Fisheries and Hunting
Ásgrimur L. Ásgrimsson	Icelandic Coastguard – Landhelgisgaeslan

4.4.3 Evaluation Techniques

The table below provides links to the tables showing the scoring elements that were considered in the assessment.

Table 25 Scoring elements

Component	Scoring elements	Main/Not main	Data-deficient or not
Primary species	see Table 15	Varies by gear: See catch profile tables Table 8 onwards.	No
Secondary species	See Appendix 6 Table 31	All out of scope main. No in-scope main	No (minor secondary not scored)
ETP species	See Table 21	All	No
Habitats	See Table 22	n/a	No

Responsibilities for review and developing initial scoring justifications were divided between the team. 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).

All in-scope species were identified as primary or secondary and then as main or minor species based on the catch profiles (3.4.2 Species Allocations & Catch Profiles). This included consideration of their resilience in setting landings references between 2% for less resilient and 5% for more resilient species. For out-of-scope species (which are automatically designated 'main', if they are not ETP species), information was available to determine risks. All secondary in-scope species were minor components of the landings.

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

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.

Current Eligibility Dates	
Units of Certification	***Eligibility Date***
ISF Iceland saithe – All units of certification	1.9.2013
ISF Iceland golden redfish – All units of certification	1.9.2013
ISF Iceland saithe and ling – All ling units of certification	27.8.2015
ISF Iceland saithe, ling, Atlantic wolfish & plaice – All Atlantic wolfish and plaice units of certification	9.5.2017
ISF Iceland golden redfish, blue ling & tusk – All blue ling and tusk units of certification	9.5.2017

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 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. CAB has contacted Icelandic auctions to alert them of this. CAB is not aware that any non-certified auctions are engaged in such processing activity. At the time of the release of this report, the following four auction operations are CoC certified in Iceland:

- MSC-C-55750 Fiskmarkaður Íslands – Rifi
- MSC-C-56902 Fiskmarkaður Snæfellsbæjar
- MSC-C-55627 Reiknistofa fiskmarkaða

MSC-C-56363 Fiskmarkaður Vestfjarða – Bolungarvík.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, Danish seine, gillnet, handline and longline 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 multi-species demersal fishery 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; furthermore, such segregation should also be ensured in the event certified and non-certified gear is applied during the same fishing trip; any fish caught by a non-certified gear and /or caught in a location outside the scope of the certification must be declared as non-certified;
- 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; this includes ensuring that product kept in – and received from – cooler/freezer storage is traceable to date, vessel and gear of catch, and that the basic packaging and labelling of the

product has not been tampered with by the cooler/freezer storage unless that entity has acquired Chain of Custody certification. .

Table 26 Traceability factors within the ISF Iceland multi-species demersal 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 six assessed gears, these species may be caught in very small quantities by other gears in the Icelandic EEZ such as shrimp trawls or anglerfish gillnets or sea-angling, which are not included in the assessment. The same management and reporting requirements apply to these gears. 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 highly unlikely, would be reported as such 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 these species from non-certified gear used within the Icelandic EEZ are segregated by 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 these species 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 client group fishing the same stock	These species are caught by a large number of vessels, most of them Icelandic ones that are part of the UoC. Icelandic vessels operating gear that is not a part of the UoC, catch a small amount of the average annual total catches. Foreign 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. Fish stored in freezer/cooler storages after landing and prior to sale and/or processing is subject to traceability systems with lots established prior to storage which remain traceable to catch details (date, vessel, gear) during and upon release from storage. Risk of co-mingling with non-certified fish, in the event storage staff would engage in the re-packing and re-labelling of units (pallets) received, with certified and non-certified sub-units (boxes) loaded together on same delivery unit (pallet). Still, each sub-unit is traceable back to the input pallet and thus to catch trip and vessel. In the event that eligible vessels are landing these species 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 catches from vessels within the UoC and from 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, including auction conducting primary processing and/or storage facility conducting re-packing of the actual product and/or relabeling of primary packaging units. 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.
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 operators 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[22]. Un- or semi-processed catch may thus be exported, after landing and weighing, 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.

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

5.3 Eligibility to Enter Further Chains of Custody

Potential certification will include fish caught by all registered Icelandic vessels and Norwegian, Faroese and Greenlandic vessels with valid permit to operate within the Icelandic EEZ. It will also include fish handled by all 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/aflamarkheimildir/uthlutadaflamark/fyrriar/ (*Úthlutun til skipa 2016/2017 and 2017/2018*).

Fish from eligible fishing vessels, whole and/or semi-processed, landed at any officially approved landing site (harbour) and/or sold via 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. Cooler/freezer storages, be they operated or sub-contracted by fishing companies, do not require Chain of Custody, unless they engage in re-labelling of primary units stored and/or re-packing of the actual product.

In summary, fish from the certified fishery is eligible to be sold into chain of custody provided:

- Fish originates from any of the 42 units of Certification and is landed at any of the landing points listed in the tables below.
- Fish was caught by any registered Icelandic vessel or Norwegian, Greenlandic or Faroese vessel with valid permit to operate within the Icelandic EEZ.
- Fish is received directly from a fishing vessel or is sold via any officially licenced auction (provided the auction does not take ownership of the fish or is not engaged in its processing).
- Fish stored after landing in cooler/freezer storage is also eligible for entering into chain of custody, provided the storage does not take ownership of the fish or engages in re-packing of the actual product or re-labelling of basic packaging units of the fish during storage.

The Client, Iceland Sustainable Fisheries Ltd., has issued a statement outlining the general terms of a potential extension of the client group for wider sharing of a potential certificate (published in its entirety in section 3.1.1 above). A list of current members of the client group can be obtained directly on the ISF website (see https://www.isf.is/isf-aethildarfyrirtaeligki.html) or from Vottunarstofan Tún upon request. Members of the client group who first take ownership of fish after landing, as well as any member and non-member engaged in post-landing processing of the fish, will need to hold MSC CoC 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.

Buyers that are not members of the client group will need to verify that (a) the supplier is CoC certified with the UoA species in scope, (b) the species was derived from one of the Units of

Certification (see Table 3-1) and that (c) the product has at some point passed through a member of the ISF client group. If condition (c) is not met, buyers may wish to notify next link of buyers in the chain that the product cannot be marketed to the final consumer with the ecolabel unless and until such condition has been met.

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/.

Lists of the official points of landing for fish in Iceland, as well as in Greenland, the Faroe Islands and Norway, are provided below.

List of officially approved landing harbours in Iceland		
Vestmannaeyjar	Þingeyri	Hauganes
Þorlákshöfn	Flateyri	Hjalteyri
Grindavík	Suðureyri	Akureyri
Sandgerði	Bolungarvík	Grenivík
Keflavík	Ísafjörður	Húsavík
Vogar	Súðavík	Kópasker
Hafnarfjörður	Norðurfjörður	Raufarhöfn
Kópavogur	Drangsnes	Þórshöfn
Reykjavík	Hólmavík	Bakkafjörður
Akranes	Hvammstangi	Vopnafjörður
Hvalseyjar	Blönduós	Borgarfjörður Eystri
Arnarstapi	Skagaströnd	Seyðisfjörður
Rif	Sauðárkrókur	Mjóifjörður
Ólafsvík	Hofsós	Neskaupstaður
Grundarfjörður	Haganesvík	Eskifjörður
Stykkishólmur	Siglufjörður	Reyðarfjörður
Brjánslækur	Ólafsfjörður	Fáskrúðsfjörður
Haukabergsvaðall	Grímsey	Stöðvarfjörður
Patreksfjörður	Hrísey	Breiðdalsvík
Tálknafjörður	Dalvík	Djúpivogur
Bíldudalur	Árskógssandur	Hornafjörður
Source: Directorate of Fisheries (www.fiskistofa.is), July 2019. See also http://www.fiskistofa.is/veidar/aflaupplysingar/landanir-eftir-hofnum/.		

List of officially approved landing harbours in Greenland	
Port	**LOCODE**
Aasiaat	GLJEG
Ilulissat	GLJAV
Maniitsoq	GLJSU
Nanortalik	GLJNN
Narsaq	GLJNS

Nuuk	GLGOH
Paamiut	GLJFR
Qaqortoq	GLJJU
Qasigiannguit	GLJCH
Sisimiut	GLJHS
Tasiilaq	GLAGM
Upernavik	GLJUV
Uummannaq	GLUMD

Notes:

1. This list includes all main ports in Greenland; there are several other landing sites in Greenland but merely intended for small and open vessels.
2. Greenland has, accoring to PSC-scheme in NAFO and NEAFC only allowed for foreign landings in the port of Nuuk.
3. Greenland has two ports with EU border inspection post (BIP) namely Nuuk and Sisimiut. Sisimiut may only allow Canadian landings from Canadian waters

Source: Inussiarnersumik Inuulluaqqusillunga, Greenland Fisheries License Control Authority, July 2019
See also https://psc.neafc.org/designated-contacts#GRL.

List of officially approved landing harbours in the Faroe Islands

Á Sundi	Søldarfjørður
Fuglafjørður	Sørvágur
Hvalba	Toftir
Klaksvík	Tórshavn
Kollafjørður	Tvøroyri
Runavík	Vágur
Sandur	Vestmanna
Skála	Oyri
Skopun	

Source: Fiskveiðieftirlitið (The Faroe Islands Fisheries Inspection), July 2019

List of officially approved landing harbours in Norway

Port	LOCODE	Port	LOCODE
Ålesund	NOAES	Kirkenes	NOKKN
Andenes	NOADN	Kjøllefjord	NOKJF
Båtsfjord	NOBJF	Kristiandsund	NOKSU
Bodø	NOBOO	Leknes	NOLKN
Bremanger	NOBRE	Lødingen	NOLOD
Egersund	NOEGE	Maløy	NOMAY
Ellingsøy	NOELL	Rypefjord	NORYF
Fiskarstrand	NOFST	Selje	NOSJE

Flekkerøy	NOFLE	Senjahopen	NOSJH
Flem	NOFLM	Sirevag	NOSRV
Florø	NOFRO	Skudeneshavn	NOSKU
Fosnavag	NOFOS	Smøla	NOSMO
Gunhildvagen	NOGHV	Sortland	NOSLX
Hammerfest	NOHFT	Stavern	NOSTV
Harstad	NOHRD	Storebø	NOSTB
Harøysund	NOHRS	Tromsø	NOTOS
Hjørungavag	NOHJO	Trondheim	NOTRD
Honningsvåg	NOHVG	Træna	NOTRN
Husøy Karmey	NOHSO	Uthaug	NOUTH
Hvaler	NOHVA	Vardø	NOVAO
Kårvikhamn	NOKAH	Vedde	NOVDD
		Værøy	NOVEY
Note: This list includes all main ports in Norway; there are numerous other small capacity landing sites in Norway but mostly intended for small vessels. Source: Norwegian Directorate of Fisheries / Modulf Overvik 2019. See also https://psc.neafc.org/node/318.			

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

There is no inseparable or practically inseparable (IPI) species caught in the fishery. As outlined in the first PCR for the golden redfish fishery, there are other Sebastes species caught in the same grounds as the golden redfish, but fishery practices are in place to minimize mixing.

6 Evaluation Results

6.1 Principle Level Scores

Table 27 Final principle scores

Principle		**Atlantic Wolffish**	**Blue Ling**	**Golden Redfish**	**Ling**	**Plaice**	**Saithe**	**Tusk**
Principle 1 – Target Species		80.0	83.3	82.5	88.3	80.0	86.7	88.3
Principle 2 Ecosystem*	Bottom trawl TB	86.3	86.3	86.3	86.3	86.3	86.3	86.3
	Nephrops trawl TN	86.3	86.3	86.3	86.3	86.3	86.3	86.3
	Danish seine SD	87.3	87.3	87.3	87.3	87.3	87.3	87.3
	Longline LL	82.0	82.0	82.0	82.0	82.0	82.0	82.0
	Handline LH	87.3	87.0	87.3	87.3	87.0	87.3	87.3
	Gillnet GN	81.0	80.7	81.0	81.0	81.0	81.0	81.0
Principle 3 – Management System		87.7	87.7	87.7	87.7	87.7	87.7	87.7

*Note: variation in P2 scores of the same gear type results from varied scores for 2.1 dependent upon the catch profile of the gears in relation to the species concerned.

6.2 Summary of PI Level Scores

Table 28 PI level scores for ISF Iceland multi-species demersal fishery

Atlantic wolffish PI Scores

				TB	TN	SD	LL	LH	GN
Principle	Component	Performance Indicator (PI)		Score	Score	Score	Score	Score	Score
One	Outcome	1.1.1	Stock status	80	80	80	80	80	80
	Management	1.2.1	Harvest strategy	80	80	80	80	80	80
		1.2.2	Harvest control rules & tools	75	75	75	75	75	75
		1.2.3	Information & monitoring	80	80	80	80	80	80
		1.2.4	Assessment of stock status	85	85	85	85	85	85
Two	Primary species	2.1.1	Outcome	95	95	95	95	95	100
		2.1.2	Management strategy	95	95	95	95	95	95
		2.1.3	Information/Monitoring	100	100	100	100	100	100
	Secondary species	2.2.1	Outcome	90	90	90	85	90	75
		2.2.2	Management strategy	90	90	90	75	90	65
		2.2.3	Information/Monitoring	85	85	85	70	85	70
	ETP species	2.3.1	Outcome	80	80	90	75	90	75
		2.3.2	Management strategy	85	85	85	65	85	65
		2.3.3	Information strategy	80	80	80	60	80	60
	Habitats	2.4.1	Outcome	80	80	85	95	85	95
		2.4.2	Management strategy	80	80	80	80	80	80
		2.4.3	Information	85	85	85	85	85	85
	Ecosystem	2.5.1	Outcome	80	80	80	80	80	80
		2.5.2	Management	85	85	85	85	85	85
		2.5.3	Information	85	85	85	85	85	85
Three	Governance and policy	3.1.1	Legal &/or customary framework	100	100	100	100	100	100
		3.1.2	Consultation, roles & responsibilities	95	95	95	95	95	95
		3.1.3	Long term objectives	80	80	80	80	80	80
	Fishery specific management system	3.2.1	Fishery specific objectives	90	90	90	90	90	90
		3.2.2	Decision making processes	85	85	85	85	85	85
		3.2.3	Compliance & enforcement	80	80	80	80	80	80
		3.2.4	Monitoring & management performance evaluation	80	80	80	80	80	80

Blue ling PI Scores

				TB	TN	SD	LL	LH	GN
Principle	Component	Performance Indicator (PI)		Score	Score	Score	Score	Score	Score
One	Outcome	1.1.1	Stock status	90	90	90	90	90	90
	Management	1.2.1	Harvest strategy	80	80	80	80	80	80
		1.2.2	Harvest control rules & tools	75	75	75	75	75	75
		1.2.3	Information & monitoring	80	80	80	80	80	80
		1.2.4	Assessment of stock status	85	85	85	85	85	85
Two	Primary species	2.1.1	Outcome	95	95	95	95	90	95
		2.1.2	Management strategy	95	95	95	95	95	95
		2.1.3	Information/Monitoring	100	100	100	100	100	100
	Secondary species	2.2.1	Outcome	90	90	90	85	90	75
		2.2.2	Management strategy	90	90	90	75	90	65
		2.2.3	Information/Monitoring	85	85	85	70	85	70
	ETP species	2.3.1	Outcome	80	80	90	75	90	75
		2.3.2	Management strategy	85	85	85	65	85	65
		2.3.3	Information strategy	80	80	80	60	80	60
	Habitats	2.4.1	Outcome	80	80	85	95	85	95
		2.4.2	Management strategy	80	80	80	80	80	80
		2.4.3	Information	85	85	85	85	85	85
	Ecosystem	2.5.1	Outcome	80	80	80	80	80	80
		2.5.2	Management	85	85	85	85	85	85
		2.5.3	Information	85	85	85	85	85	85
Three	Governance and policy	3.1.1	Legal &/or customary framework	100	100	100	100	100	100
		3.1.2	Consultation, roles & responsibilities	95	95	95	95	95	95
		3.1.3	Long term objectives	80	80	80	80	80	80
	Fishery specific management system	3.2.1	Fishery specific objectives	90	90	90	90	90	90
		3.2.2	Decision making processes	85	85	85	85	85	85
		3.2.3	Compliance & enforcement	80	80	80	80	80	80
		3.2.4	Monitoring & management performance evaluation	80	80	80	80	80	80

Golden Redfish PI scores

Principle	Component		Performance Indicator (PI)	TB Score	TN Score	SD Score	LL Score	LH Score	GN Score
One	Outcome	1.1.1	Stock status	70	70	70	70	70	70
		1.1.2	Stock rebuilding	90	90	90	90	90	90
	Management	1.2.1	Harvest strategy	85	85	85	85	85	85
		1.2.2	Harvest control rules & tools	80	80	80	80	80	80
		1.2.3	Information & monitoring	80	80	80	80	80	80
		1.2.4	Assessment of stock status	90	90	90	90	90	90
Two	Primary species	2.1.1	Outcome	95	95	95	95	95	100
		2.1.2	Management strategy	95	95	95	95	95	95
		2.1.3	Information/Monitoring	100	100	100	100	100	100
	Secondary species	2.2.1	Outcome	90	90	90	85	90	75
		2.2.2	Management strategy	90	90	90	75	90	65
		2.2.3	Information/Monitoring	85	85	85	70	85	70
	ETP species	2.3.1	Outcome	80	80	90	75	90	75
		2.3.2	Management strategy	85	85	85	65	85	65
		2.3.3	Information strategy	80	80	80	60	80	60
	Habitats	2.4.1	Outcome	80	80	85	95	85	95
		2.4.2	Management strategy	80	80	80	80	80	80
		2.4.3	Information	85	85	85	85	85	85
	Ecosystem	2.5.1	Outcome	80	80	80	80	80	80
		2.5.2	Management	85	85	85	85	85	85
		2.5.3	Information	85	85	85	85	85	85
Three	Governance and policy	3.1.1	Legal &/or customary framework	100	100	100	100	100	100
		3.1.2	Consultation, roles & responsibilities	95	95	95	95	95	95
		3.1.3	Long term objectives	80	80	80	80	80	80
	Fishery specific management system	3.2.1	Fishery specific objectives	90	90	90	90	90	90
		3.2.2	Decision making processes	85	85	85	85	85	85
		3.2.3	Compliance & enforcement	80	80	80	80	80	80
		3.2.4	Monitoring & management performance evaluation	80	80	80	80	80	80

Ling PI scores

Principle	Component		Performance Indicator (PI)	TB Score	TN Score	SD Score	LL Score	LH Score	GN Score
One	Outcome	1.1.1	Stock status	90	90	90	90	90	90
	Management	1.2.1	Harvest strategy	85	85	85	85	85	85
		1.2.2	Harvest control rules & tools	85	85	85	85	85	85
		1.2.3	Information & monitoring	90	90	90	90	90	90
		1.2.4	Assessment of stock status	90	90	90	90	90	90
Two	Primary species	2.1.1	Outcome	95	95	95	95	95	100
		2.1.2	Management strategy	95	95	95	95	95	95
		2.1.3	Information/Monitoring	100	100	100	100	100	100
	Secondary species	2.2.1	Outcome	90	90	90	85	90	75
		2.2.2	Management strategy	90	90	90	75	90	65
		2.2.3	Information/Monitoring	85	85	85	70	85	70
	ETP species	2.3.1	Outcome	80	80	90	75	90	75
		2.3.2	Management strategy	85	85	85	65	85	65
		2.3.3	Information strategy	80	80	80	60	80	60
	Habitats	2.4.1	Outcome	80	80	85	95	85	95
		2.4.2	Management strategy	80	80	80	80	80	80
		2.4.3	Information	85	85	85	85	85	85
	Ecosystem	2.5.1	Outcome	80	80	80	80	80	80
		2.5.2	Management	85	85	85	85	85	85
		2.5.3	Information	85	85	85	85	85	85
Three	Governance and policy	3.1.1	Legal &/or customary framework	100	100	100	100	100	100
		3.1.2	Consultation, roles & responsibilities	95	95	95	95	95	95
		3.1.3	Long term objectives	80	80	80	80	80	80
	Fishery specific management system	3.2.1	Fishery specific objectives	90	90	90	90	90	90
		3.2.2	Decision making processes	85	85	85	85	85	85
		3.2.3	Compliance & enforcement	80	80	80	80	80	80
		3.2.4	Monitoring & management performance evaluation	80	80	80	80	80	80

Plaice PI scores

				TB	TN	SD	LL	LH	GN
Principle	Component	Performance Indicator (PI)		Score	Score	Score	Score	Score	Score
One	Outcome	1.1.1	Stock status	80	80	80	80	80	80
	Management	1.2.1	Harvest strategy	80	80	80	80	80	80
		1.2.2	Harvest control rules & tools	75	75	75	75	75	75
		1.2.3	Information & monitoring	80	80	80	80	80	80
		1.2.4	Assessment of stock status	85	85	85	85	85	85
Two	Primary species	2.1.1	Outcome	95	95	95	95	90	100
		2.1.2	Management strategy	95	95	95	95	95	95
		2.1.3	Information/Monitoring	100	100	100	100	100	100
	Secondary species	2.2.1	Outcome	90	90	90	85	90	75
		2.2.2	Management strategy	90	90	90	75	90	65
		2.2.3	Information/Monitoring	85	85	85	70	85	70
	ETP species	2.3.1	Outcome	80	80	90	75	90	75
		2.3.2	Management strategy	85	85	85	65	85	65
		2.3.3	Information strategy	80	80	80	60	80	60
	Habitats	2.4.1	Outcome	80	80	85	95	85	95
		2.4.2	Management strategy	80	80	80	80	80	80
		2.4.3	Information	85	85	85	85	85	85
	Ecosystem	2.5.1	Outcome	80	80	80	80	80	80
		2.5.2	Management	85	85	85	85	85	85
		2.5.3	Information	85	85	85	85	85	85
Three	Governance and policy	3.1.1	Legal &/or customary framework	100	100	100	100	100	100
		3.1.2	Consultation, roles & responsibilities	95	95	95	95	95	95
		3.1.3	Long term objectives	80	80	80	80	80	80
	Fishery specific management system	3.2.1	Fishery specific objectives	90	90	90	90	90	90
		3.2.2	Decision making processes	85	85	85	85	85	85
		3.2.3	Compliance & enforcement	80	80	80	80	80	80
		3.2.4	Monitoring & management performance evaluation	80	80	80	80	80	80

Saithe PI scores

				TB	TN	SD	LL	LH	GN
Principle	Component	Performance Indicator (PI)		Score	Score	Score	Score	Score	Score
One	Outcome	1.1.1	Stock status	90	90	90	90	90	90
	Management	1.2.1	Harvest strategy	85	85	85	85	85	85
		1.2.2	Harvest control rules & tools	85	85	85	85	85	85
		1.2.3	Information & monitoring	80	80	80	80	80	80
		1.2.4	Assessment of stock status	90	90	90	90	90	90
Two	Primary species	2.1.1	Outcome	95	95	95	95	95	100
		2.1.2	Management strategy	95	95	95	95	95	95
		2.1.3	Information/Monitoring	100	100	100	100	100	100
	Secondary species	2.2.1	Outcome	90	90	90	85	90	75
		2.2.2	Management strategy	90	90	90	75	90	65
		2.2.3	Information/Monitoring	85	85	85	70	85	70
	ETP species	2.3.1	Outcome	80	80	90	75	90	75
		2.3.2	Management strategy	85	85	85	65	85	65
		2.3.3	Information strategy	80	80	80	60	80	60
	Habitats	2.4.1	Outcome	80	80	85	95	85	95
		2.4.2	Management strategy	80	80	80	80	80	80
		2.4.3	Information	85	85	85	85	85	85
	Ecosystem	2.5.1	Outcome	80	80	80	80	80	80
		2.5.2	Management	85	85	85	85	85	85
		2.5.3	Information	85	85	85	85	85	85
Three	Governance and policy	3.1.1	Legal &/or customary framework	100	100	100	100	100	100
		3.1.2	Consultation, roles & responsibilities	95	95	95	95	95	95
		3.1.3	Long term objectives	80	80	80	80	80	80
	Fishery specific management system	3.2.1	Fishery specific objectives	90	90	90	90	90	90
		3.2.2	Decision making processes	85	85	85	85	85	85
		3.2.3	Compliance & enforcement	80	80	80	80	80	80
		3.2.4	Monitoring & management performance evaluation	80	80	80	80	80	80

Tusk PI scores

Principle	Component		Performance Indicator (PI)	TB Score	TN Score	SD Score	LL Score	LH Score	GN Score
One	Outcome	1.1.1	Stock status	90	90	90	90	90	90
	Management	1.2.1	Harvest strategy	85	85	85	85	85	85
		1.2.2	Harvest control rules & tools	85	85	85	85	85	85
		1.2.3	Information & monitoring	90	90	90	90	90	90
		1.2.4	Assessment of stock status	90	90	90	90	90	90
Two	Primary species	2.1.1	Outcome	95	95	95	95	95	100
		2.1.2	Management strategy	95	95	95	95	95	95
		2.1.3	Information/Monitoring	100	100	100	100	100	100
	Secondary species	2.2.1	Outcome	90	90	90	85	90	75
		2.2.2	Management strategy	90	90	90	75	90	65
		2.2.3	Information/Monitoring	85	85	85	70	85	70
	ETP species	2.3.1	Outcome	80	80	90	75	90	75
		2.3.2	Management strategy	85	85	85	65	85	65
		2.3.3	Information strategy	80	80	80	60	80	60
	Habitats	2.4.1	Outcome	80	80	85	95	85	95
		2.4.2	Management strategy	80	80	80	80	80	80
		2.4.3	Information	85	85	85	85	85	85
	Ecosystem	2.5.1	Outcome	80	80	80	80	80	80
		2.5.2	Management	85	85	85	85	85	85
		2.5.3	Information	85	85	85	85	85	85
Three	Governance and policy	3.1.1	Legal &/or customary framework	100	100	100	100	100	100
		3.1.2	Consultation, roles & responsibilities	95	95	95	95	95	95
		3.1.3	Long term objectives	80	80	80	80	80	80
	Fishery specific management system	3.2.1	Fishery specific objectives	90	90	90	90	90	90
		3.2.2	Decision making processes	85	85	85	85	85	85
		3.2.3	Compliance & enforcement	80	80	80	80	80	80
		3.2.4	Monitoring & management performance evaluation	80	80	80	80	80	80

6.3 Summary of Conditions

The table below summarises the conditions resulting from the scores in this re-assessment. It includes conditions on 1.2.2 and 2.2.1-3 that are carried forward from the previous certificate (see above). As this re-assessment is against version 2.0 of the standard, the previous condition on PI 1.1.2 for wolffish is now incorporated in condition 1.2.2 on HCRs for wolffish.

The new conditions on 2.3.1-3 are closely related to the 2.2.1-3 conditions for gillnet and longline UoAs and due to the new Icelandic Red List resulting in some species of marine mammal and seabird now being considered as ETP species rather than secondary out-of-scope species.

In relation to the carried-over conditions on 2.2.1-3, the fishery was audited against the Year 1 milestones during the site visit (see Year 4 audit report; the conditions were imposed in Year 3). Originally, there were only two milestones (Year 1 and Year 2), to take the fishery to the end of the first certification period. However, MFRI emphasised repeatedly that a longer time series of bycatch data is required to draw appropriate conclusions, as required for closing these conditions.

Based on this independent scientific advice, it was decided that the most appropriate course of action is to impose new conditions on 2.2.1-3, starting the milestones at Year 1 of the next certification period (if the fishery is certified), rather than continue with the remaining milestones in the carried-over conditions. In addition to this scientific consideration, the team noted that there would be no audit next year (corresponding to Year 2 of the previous conditions), because of this re-assessment process underway. Furthermore, the conditions on 2.3.1-3, while extremely similar to the carried-over conditions on 2.2.1-3, are not carried over, but rather are new, since the new Red List has resulted in the re-classification of several out-of-scope species from secondary to ETP, and logically, since the conditions are very similar, the milestones should align. Hence the conditions on 2.2.1-3, carried-over from the previous certificate, as well as the milestones and client action plan have been revised, rather than carried over wholesale from the previous (current) certificate.

Table 29: Summary of Conditions

No.	***Units of Assessment***	***Condition***	***Performance Indicator***	***Related to previously raised condition? (Y/N/NA)***
1	Atlantic wolffish – All gears	Well-defined HCRS should be in place	1.2.2	Y
2	Plaice – All gears	Well-defined HCRS should be in place	1.2.2	Y
3	Blue Ling – All gears	Well-defined HCRS should be in place	1.2.2	Y
4	Gillnet	Secondary species above biologically based levels or ensure UoA does not hinder recovery	2.2.1	Y
5	Gillnet & Longline	A partial strategy is in place to ensure secondary species are above biologically based levels and/or ensure UoA does not hinder recovery, which is subject to regular review for alternative measures.	2.2.2	Y
6	Gillnet & Longline	Information is adequate to assess the risk posed by UoA fisheries to secondary species	2.2.3	Y
7	Gillnet & Longline	UoAs are highly likely to not hinder recovery of ETP species.	2.3.1	Y
8	Gillnet & Longline	A strategy is in place to manage impacts of UoAs on ETP species	2.3.2	Y
9	Gillnet & Longline	Information is adequate to assess the UoA related mortality and impact on ETP species and support a strategy to manage impacts on ETP species.	2.3.3	Y

6.4 Recommendations

Table 30: *Recommendations*

Recommendation 1 **UoAs: longline and handline fisheries**	
Performance Indicator	PI 2.1.2 and 2.1.3
Purpose	For longline and handline, bait is considered as a primary species. The catch to bait-use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account the fact that several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. It is not possible to determine the status of the stocks that are used to supply bait.
Recommendation	It is recommended that only stock identified as sustainable be used as a source of bait. It is also recommended that the bait used and the source of that bait be better documented in the longline and handline fisheries.

Recommendation 2 **UoAs: All gears**	
Performance Indicator	PI 2.4.2
Purpose	Habitat mapping projects and initiatives are being implemented (involving interviews with fishers, and self-reported recording of benthos in trawl for example) and this Recommendation is designed to follow up on these fledgling projects at future audits
Recommendation	The progress of the Joint Committee for the improved handling of Marine Resources (an approximate translation from the Icelandic) will be monitored as part of the continued certification of the fisheries. The client is encouraged to contribute to the success of this committee. The newly introduced project to interview fishers as part of habitat mapping will be monitored as part of the fishery audit. The client is encouraged to continue the implementation of this project.

6.5 Determination, Formal Conclusion and Agreement

The assessment team recommends that the ISF Iceland multi-species demersal fishery be granted certification against the MSC Fisheries Standard as well managed and sustainable fisheries. This determination is made, provided the conditions set are sufficiently addressed in a plan of action submitted by the Client (see Appendix 1.3).

Tún´s Certification Committee has met to review the report and its findings. The Committee concurs with the team´s recommendation that all the 42 Units of Assessment of the ISF Iceland multi-species demersal fishery shall be certified.

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Appendices

Appendix 1: Scoring and Rationales

Appendix 1.1: Performance Indicator Scores and Rationale

PI 1.1.1 Stock status

To score SIa (recruitment impairment), the 2018 spawning stock biomass (SSB) of each species was compared to its PRI. Many of the PRI are formally used as B_{lim} in the management of the species' fishery (tusk, ling, golden redfish and saithe). In the case of Atlantic Wolffish, the PRI was based upon the lowest observed biomass in the assessment time series. In the case of plaice, scoring was based upon the number of generations of exploitation at or below F_{MSY} (GSA 2.2.4). In the case of blue ling, WGDEEP (2016) had developed an estimate of B_{lim} although it has not been incorporated into management. The stock assessments and benchmark review process provided estimates of uncertainty, which allowed determination of the probability of B_{2018} being greater than the PRI.

To score SIb (achievement of MSY) at SG80, the 2018 spawning stock biomass (SSB) of all species except plaice was compared to the notional estimate of biomass at F_{MSY}. In the case of plaice, scoring was based upon the number of generations of exploitation at or below F_{MSY} (GSA 2.2.4). See section 3.3.1 on reference points for further details. MSC (2017) allows scoring at SG80 if stock biomass is above 2*B_{PA}. This was used to confirm the score of tusk. Current biomass had to be both above the target and fluctuating about this target for at least five years to score SG80.

To score SIb (achievement of MSY) at SG100, it is necessary to evaluate whether or not biomass has been fluctuating around the level consistent with MSY with a high degree of certainty or has been above this level over recent years. Given the uncertainties in estimation of B_{MSY}, rather than base scoring on statements of probability, scoring was based on duration of SSB and F/HR being above B_{MSY} and below F_{MSY} respectively. SSB was required to be above the target consistently for at least one recent generation. Also, fishing mortality had to be below F_{MSY} for at least two recent generations.

The tables below provide the information used in the scoring of SIa and SIb by summarising the status information of the Principle 1 stocks.

Table 1.1.1a. Information used to score SIa (stock status relative to recruitment impairment); note that for plaice, probability biomass > PRI based upon GSA 2.2.4 determination

Stock	PRI	Biomass			60	80	100
		B_{2018}	B_{2018}/PRI	P(B_{2018}>PRI)	Pr(B2018 gt PRI)	Pr(B2018 gt PRI)	Pr(B2018 gt PRI)
					gt eq 70%	gt eq 80%	gt eq 95%
Atlantic Wolffish	17.0	31.2	1.84	0.93	x	x	
Blue Ling	592.0	1088.0	1.84	1.00	x	x	x
Golden Redfish	160.0	296.0	1.85	0.94	x	x	
Ling	7.1	34.2	4.82	1.00	x	x	x
Plaice	NA	46.7	F<=F_{MSY} for 2 gen	0.80	x	x	
Saithe	44.0	232.9	5.29	1.00	x	x	x
Tusk	4.5	14.0	3.14	1.00	x	x	x

Table 1.1.1b. Information used to score SIb (stock status in relation to achievement of MSY): SG80; note that for plaice, probability biomass > target based upon GSA 2.2.4 determination

Stock	BMSY (2*B_{PA})	Biomass			80
		B_{2018}	B_{2018}/B_{MSY} (2*BPA)	Years fluctuating about target	B2018 eq or gt TRP
Atlantic Wolffish	28.8	31.2	1.08	19	x
Blue Ling	1072.0	1088.0	1.01	17	x
Golden Redfish	400.0	296.0	0.74	0	
Ling	31.2	34.2	1.10	13	x
Plaice	NA	46.7	1.00	F<=F_{MSY} for 2 gen	x
Saithe	130.0	232.9	1.79	17	x
Tusk	15.2 (12.5)	14.0	0.92 (1.12)	5	x

Table 1.1.1c. Information used to score SIb (stock status in relation to achievement of MSY): SG100; note that for plaice, probability biomass > target based upon GSA 2.2.4 determination

Stock	BMSY (2*B_{PA})	Biomass			F or HR_{MSY}	F or HR			100	
		B_{2018}	B_{2018}/B_{MSY} (2*B_{PA})	No gens gt target		F or HR $_{2017}$	F or HR_{2017}/F or HR_{MSY}	No gens lt target	Biomass gt TRP for 1+ gens	F or HR lt F_{MSY} for 2+ gens
Atlantic Wolffish	28.8	31.2	1.08	0.4	0.30	0.25	0.83	0.4		
Blue Ling	1072.0	1088.0	1.01	1.3	1.75	0.58	0.33	1.8	x	
Golden Redfish	400.0	296.0	0.74	0.0	0.10	0.12	1.24	0.0		
Ling	31.2	34.2	1.10	0.8	0.24	0.24	1.00	0.0		
Plaice	NA	46.7	1.00	NA	0.30	0.20	0.67	F<=F_{MSY} for 2 gen		
Saithe	130.0	232.9	1.79	1.4	0.20	0.12	0.61	0.5	x	
Tusk	15.2 (12.5)	14.0	0.92 (1.12)	0.1	0.17	0.09	0.52	0.2		

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.
Saithe	Y	Y	Y
Plaice	Y	Y	N
Ling	Y	Y	Y
Blue Ling	Y	Y	Y
Tusk	Y	Y	Y
Golden Redfish	Y	Y	N
Atl. Wolffish	Y	Y	N
Justification	Tusk, Ling, Golden Redfish, Saithe and Blue Ling: PRIs (B_{LIM}) are used in MII management of Tusk, Ling, Golden Redfish and Saithe. For Blue Ling, the WGDEEP has recommended a limit reference point for the survey index. Benchmark/HCR reviews provide estimates of uncertainty (CV) which ranges 25-30% depending on the stock. Based upon these, 2018 biomass in all these stocks was above their PRI with at least 80% probability (Table 1.1.1a). SG60 and SG80 are met. Plaice: As per GSA 2.2.4, given that fishing mortality has been at or below the real F_{MSY} for about 2 generations, it is highly likely (>=80% probability) that current biomass is above the PRI. SG60 and SG80 are met. Wolffish: the PRI was based upon the lowest observed biomass (1980) in the assessment time series when there is no evidence of recruitment impairment. Benchmark/HCR reviews of the other stocks provide estimates of uncertainty (CV) which ranges 25-30%. Based upon these, 2018 biomass was above its PRI with at least 80% probability (Table 1.1.1a). SG60 and SG80 are met. Tusk, Ling, Saithe, and Blue Ling: 2018 biomass was above its PRI with at least 95% probability. Because these stocks were above the PRI with a high degree of certainty, SG100 is met. Golden Redfish: 2018 biomass was above its PRI with 94% probability. Therefore, because the golden redfish was not above their PRI with a high degree of certainty, SG100 is not met. Plaice: As per GSA 2.2.4, SG100 is not met. Atlantic Wolffish 2018 biomass was above its PRI with 93% probability. Therefore, because 2018 Atlantic wolffish biomass was not above its PRI with a high degree of certainty, 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.

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
Atl. Wolffish		Y	N
Blue Ling		Y	N
Golden Redfish		N	N
Ling		Y	N
Plaice		Y	N
Saithe		Y	N
Tusk		Y	N
Justification	All Stocks except Atlantic wolffish, Golden Redfish and Plaice: 2018 biomass has been fluctuating around notional estimates of biomass associated with F_{MSY}, this being about this level in the case of Blue Ling for 17 years, and well above this level in the case of Ling and Saithe, again for an extended period. In the case of Tusk, while biomass has been fluctuating about B_{MSY}, this is for the most recent 5 years. While B_{2018} was 92% of B_{MSY}, it was 112% of 2*B_{PA}. Both cases meet MSC guidelines on scoring SG80 (Table 1.1.1b). SG 80 is met. Atlantic wolffish: The current FMSY proxy (0.3 year^{-1}) with average recruitment over the last generation (16.5 years) of year-classes entering the stock of 11.5 million individuals implies B_{MSY} of around 28.8 kt. In 2013, biomass was ~28 kt and was projected to increase to 31.2 kt by 2018. Since 2006, fishing mortality has been declining, reaching the F_{MSY} proxy in 2013. The 2014-2017 median fishing mortality is 0.26 year^{-1}, below the proxy with 70% probability (assuming a relatively high CV of 30%). This implies that fishing mortality has been below F_{MSY} for 0.4 generations, but biomass before this was high relative to the expeceted biomass at MSY. There has been sufficient time of exploitation at or below F_{MSY} to achieve B_{MSY} conditions by 2018 given the initial high stock status. Therefore it is highly likely that the stock is around B_{MSY} and will continue to fluctuate at or above this level with the current fishing mortality. SG 80 is met. Golden Redfish: The median estimate of B_{MSY} is 400 kt, ranging 250-550 kt. 2*B_{PA} is 440 kt which is within this range but above the median. B_{2018} was 296 kt which is at the lower range of the B_{MSY} range. It could be argued that the stock is at biomass consistent with F_{MSY} harvesting. However, due to the change in perception of historical stock status as a consequence of an error in previous assessments, it now appears that the stock had been exploited at this level with fishing mortality since 2010 being just above F_{MSY} = 0.097 but ranging 0.107-0.126. Lower exploitation rates would achieve higher biomass (Table 1.1.1b). SG80 is not met. Plaice: As per GSA 2.2.4, given that fishing mortality has been at or below the real F_{MSY} for 2 generations, the it is highly likely (80% probability) that current biomass is at or fluctuating around a level consistent with MSY. SG80 is met. All Stocks except Golden Redfish and Plaice: While biomass has been above that associated with the target, only in the case of Saithe and Blue Ling was this for greater than one generation. In the case of Tusk, Saithe, and Blue Ling, 2017 fishing mortality/HR has been considerably below its F_{MSY} although in this first two species, this has been the case of only a short period (<0.5 generation). For Blue Ling, harvest rates have been below the F_{MSY} for a longer period but still less than two generations. In the case of Ling, fishing mortality has only been in the vicinity of F_{MSY} in 2017. In the case of Atlantic Wolffish, fishing mortality has been less than its F_{MSY} proxy for only 0.4 generations. In no case, were both the biomass and fishing mortality criteria met (Table 1.1.1c). SG100 is not met. Plaice: As per GSA 2.2.4, SG100 is not met.		
References	Hjörleifsson and Björnsson, 2013, ICES (2013; 2014; 2016; 2017; 2018), Lassen et al (2014),		

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
	Mace (1994), MFRI (2018a-h), MSC (2017), Myers at al., (1999), NWWG (2016), Restrepo et al (1998), Tun (2014a; 2014b; 2015; 2017a; 2017b), WGDEEP (2016)		
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)	B_{LIM}	See column PRI of Table 1.1.1a	See column B_{2018}/PRI of Table 1.1.1a
Reference point used in scoring stock relative to MSY (SIb)	B_{MSY} (or 2*B_{PA}) F or HR_{MSY}	See column B_{MSY} (2*B_{PA}) of Table 1.1.1b See column F or HR_{MSY} of Table 1.1.1c	See column B_{2018}/ B_{MSY} (2*B_{PA}) of Table 1.1.1b See column F or HR_{2018}/F or HR_{MSY} of Table 1.1.1c

OVERALL PERFORMANCE INDICATOR SCORES:		
	Atl. Wolffish	**80**
	Blue Ling	**90**
	Golden Redfish	**70**
	Ling	**90**
	Plaice	**80**
	Saithe	**90**
	Tusk	**90**
CONDITION NUMBER (if relevant):		**See 1.1.2 for Golden redfish**

PI 1.1.2 Stock rebuilding for Golden Redfish

Golden Redfish scored 70 for PI 1.1.1, so PI 1.1.2 is scored.

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?	Y		Y
	Justification	The 2014 HCR review for golden redfish comprehensively evaluated the performance of the HCR under a range of stock and fishery assumptions and uncertainties. A major feature of the stock (as with many redfish stocks) is poor-moderate recruitment punctuated with very strong recruitment. This presents challenges to the design of a harvest strategy to ensure long-term sustainability. These simulations indicated that, under the HCR, the stock can recover from B_{lim} (160 kt) to biomass in the order of B_{MSY} (400 kt) in about 20 years, less than one generation (T_{GEN}=31.25 years). In practice, this will be somewhat dependent upon the strength of recruiting year-classes. Nevertheless, SG60 and SG100 are met because rebuilding is expected within one generation and is the shortest practicable timeframe.		
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?	Y	Y	N
	Justification	The annual stock assessments, which comprehensively evaluate fishery and survey data, provide the monitoring to determine whether or not rebuilding is taking place and whether or not harvest adjustments are required. SG60 is met. The simulations conducted in 2014 provide evidence that the rebuilding strategy is likely to work. Further, evidence from the recent stock assessments indicate that biomass has been rebuilt from below B_{lim} in about 2000 to the lower range of B_{MSY} in 2018, even accounting for higher than F_{MSY} fishing mortality, as a consequence of an assessment error. SG80 is met. Biomass is being rebuilt to the lower range of B_{MSY}, as predicted by the 2014 simulations. However, there has been a recent downturn in biomass which may be due to recruitment but may also be due to greater than F_{MSY} harvest rates in the recent past. Further experience with the HCR is needed to provide strong evidence of its stock rebuilding		

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe	
		performance. SG100 is not met.	
References		ICES (2014), MFRI (2018d)	
OVERALL PERFORMANCE INDICATOR SCORES:			
		Golden Redfish	**90**
CONDITION NUMBER (if relevant):			

PI 1.2.1 Harvest strategy

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
Scoring Issue		SG 60	SG 80	SG 100
a	Harvest strategy design			
	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.
Atl. Wolffish		Y	Y	N
Blue Ling		Y	Y	N
Golden Redfish		Y	Y	N
Ling		Y	Y	N
Plaice		Y	Y	N
Saithe		Y	Y	N
Tusk		Y	Y	N
	Justification	The harvest strategy adopted by MII and consistent with MSC requirements consists of objectives operationalized through harvest control rules which set harvest levels and rates with respect to reference points, stock assessment conducted by either ICES or MFRI which inform the HCRs, tools such as TACs and effort measures (e.g. gear regulations, temporal and spatial measures) put in place by MII to regulate harvesting and enforcement to ensure effective implementation of the tools. The objective of the harvest strategies for all stocks is to maintain them at levels consistent with MSY and, the case of all stocks except wolffish and plaice, through an explicit precautionary approach, avoiding low biomass levels which would impair stock rebuilding. In the case of wolffish and plaice, the precautionary approach has been applied, as all Icelandic fisheries are guided by this, but it is implicit. (The Conditions 1 & 2 for defining HCRs address this issue.) This is consistent with PI 1.1.1 SG80 objectives. The evaluation of fishery performance is primarily through stock assessment, reviewed and finalised either at ICES working groups, or for plaice and Atlantic wolffish, review within MFRI, which then inform management decisions by MII. Scientific advice to management can lead to a number of responses, although the primary control on exploitation of all stocks is the TAC. The Ministry of Fisheries (MII) is responsible for management of the Icelandic fisheries, and issues regulations for commercial fishing for each fishing year, including management of TACs. Since the 2010/2011 fishing season, all vessels have operated under a TAC. The TACs are managed through an individual transferable quota (ITQ) system. The ITQ system allows free transfer of quota between boats, and can either be on a temporary (one-year leasing) or a permanent (permanent selling) basis. Mixed fisheries are managed through a transfer of quota between boats, quota year and species. With some minor exceptions, it is required by law to land all catches of Principle 1 species within the Icelandic EEZ, so no minimum landing size is in force. To reduce fishing of small fish, various measures such as mesh size regulation, sorting grids and closure of fishing areas are in place. The ITQ system allows for limited flexibility with regards converting a quota share of one species into another within a boat (less than 5%), allowance of landings of fish under a certain size without it counting fully in weight to the quota, and allowance of the		

PI 1.2.1		There is a robust and precautionary harvest strategy in place
		transfer of unfished quota between management years. The objective of these measures was to minimize any incentive to discard. It is possible to overshoot TACs because ITQs can be exchanged to a limited extent between species and years. Whether there is a problem in practice is evaluated when looking at realised harvest rates or fishing mortalities against their target levels. Blue ling, tusk and golden redfish are shared with neighbouring countries and occur outside the Iceland EEZ (ICES Division 5a). Tusk and blue ling are primarily shared with East Greenland. For blue ling, of particular concern to the management is susceptibility to sequential depletion of spawning aggregations. Two spawning areas were depleted before 1993 and have not yet recovered. Closed areas provide protection for the remaining spawning aggregations. For golden redfish in East Greenland, as in Iceland, the fishery is controlled by a TAC. The Greenland TAC is for *Sebastes norvegicus* and *S. mentella* combined. In the Faroe Islands the fishery is regulated through individual transferable effort quotas and closed areas. There are a number of additional controls on harvest as well as TACs. The fleet capacity has been set at reduced levels commensurate with the stock productivity, technical measures have been introduced to improve gear selectivity, and temporary and permanent closed areas have been implemented to protect vulnerable components of the stocks and their habitat. There is a system of instant area closures, which aims to minimize fishing on juveniles. An area is closed temporarily (for 2 weeks) for fishing if on-board inspections (not 100% coverage) reveal that more than a certain percentage of the catch is composed of fish less than the defined minimum length. However, this has been primarily a measure used for cod, so benefits to other species are uncertain. It has also been reviewed recently and may be withdrawn. Although shared stocks face some specific problems (which are addressed under other PIs), they are assessed within ICES, and the intent of their harvest strategies, to maintain stocks at MSY, remains the same as for other stocks. There are bilateral agreements between Iceland, Norway and the Faroe Islands relating to a fishery of vessels in restricted areas within the Icelandic EEZ. Faroese vessels are allowed to fish 5600 t of demersal fish species in Icelandic waters which includes maximum 1200t of cod and 40 t of Atlantic halibut. The rest of the Faroese demersal fishery in Icelandic waters is mainly directed at tusk, ling, and blue ling. All vessels operating within Iceland EEZ are subject to the same rules. As a consequence of the harvest strategies, there has been an overall reduction in fishing effort, reducing mortality across all stocks more into line with stock productivity. The most recent stock assessment of golden redfish indicated that whereas it was considered that fishing mortality had been at the target level in past years, it is now estimated to have been above it. This change in perception was due to an error in the previous stock assessments, which was only detected in the most recent assessment. It was determined that the model had not converged to the “best solution” in the 2017 and previous recent assessments with the retrospective analysis indicating that the biomass in recent years should have been estimated lower. Thus, the catches have been routinely above the target level (see PI 1.2.2). Notwithstanding this, fishing mortality has been reduced since 2003 to close to the target since 2010 and the SSB has increased above the trigger although it is currently declining due to recent poor recruitment. It is expected that the harvest strategy informed with the new assessment will reduce fishing mortality back down to the target. Overall, the elements of the harvest strategy (effective data collection, scientific advice and appropriate management response for each stock)appear to be working together and have worked to achieve target exploitation levels in these stocks. Therefore, because the harvest strategies are consistent with PI 1.1.1, are responsive to the state of the stock and their elements work together to achieve objectives, SG60 and SG80 are met. It is not clear that the harvest strategies have been designed to achieve their long-term

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		objectives. While there is a clear feedback-control system that responds to specific issues and adjusts exploitation rates to achieve long term objectives, these have been developed over time on a species-by-species basis. Different elements of the harvest strategy have been developed in response to scientific advice over previous decades. There is evidence of a long-term policy to reduce fishing mortality, but it is not clear that this has been planned or designed in the sense of having a specific goal. For a designed harvest strategy, we would expect to have evidence from management strategy evaluations (MSE), for example, supporting a long-term plan. The lack of evidence of an over-arching harvest strategy design prevents these fisheries meeting SG100.		
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.
Atl. Wolffish		Y	Y	N
Blue Ling		Y	Y	N
Golden Redfish		Y	Y	N
Ling		Y	Y	N
Plaice		Y	Y	N
Saithe		Y	Y	N
Tusk		Y	Y	N
	Justification	The stock status of each stock is regularly monitored through the annual stock assessments; the estimates of fishing mortality and spawning stock biomass provide some evidence that the harvest strategy has been achieving its objectives in each case. The evaluation of the harvest strategies has been limited. There is a demonstrable success in implementation and the outcome for each stock in moving fishing mortality towards their target level and corresponding increases in SSB. This amounts to evidence indicating that the harvest strategies are achieving their objectives although the strategies have been put in place relatively recently -all within less than 2 generations. Furthermore, additional parts of the strategies, such as the closed areas, and technical controls on gears are likely to be working based on plausible argument, but no direct evidence of their effect is available. Because there is clear evidence that the harvest strategies are achieving their objectives by driving stocks towards exploitation rates, and thereby SSB, to target levels, the fisheries meet SG60 and SG80. For all stocks, the harvest strategy has not been fully evaluated, particularly given that they form part of a multispecies, multigear fishery. The fisheries have only recently achieved their target exploitation level, so a number of years' information will be needed before evidence is available indicating that they are able to maintain the stock at the target level. A long period (at least 2 generations) for the harvest strategy achieving its objectives, or management strategy evaluations, would provide evidence sufficient for a "full evaluation", but neither is available in these cases, so SG100 is not met.		
c	**Harvest strategy monitoring**			
	Guidepost	Monitoring is in place that is expected to determine whether the harvest		

PI 1.2.1		There is a robust and precautionary harvest strategy in place		
		strategy is working.		
Atl. Wolffish		Y		
Blue Ling		Y		
Golden Redfish		Y		
Ling		Y		
Plaice		Y		
Saithe		Y		
Tusk		Y		
	Justification	For all stocks, an annual programme is implemented to monitor stock status. This provides feedback on all aspects of the performance of the harvest strategy, including changes in abundance, exploitation rates, catches relative TAC, and the size composition of landings. For all stocks, there is considerable feedback on the performance of each component of the harvest strategy. Because full monitoring is in place and is used to evaluate whether the harvest strategy is working for each stock, SG60 is met.		
d	**Harvest strategy review**			
	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
Atl. Wolffish				N
Blue Ling				N
Golden Redfish				Y
Ling				Y
Plaice				N
Saithe				Y
Tusk				Y
	Justification	For all stocks, there is an annual review of management advice by MFRI or through ICES, although the ICES system is noticeably more transparent. ICES periodically undertake benchmark reviews as well as stock assessment updates which evaluate performance of the management strategies in relation to objectives. For saithe, ling, tusk and golden redfish, there is clear evidence of adjustment of the harvest strategy by MII. These are not only adjustments of TAC, which forms part of the harvest control rule, but management responses in terms of review and changes to the harvest control rules themselves, and closed areas to protect spawners and juveniles. However, there has been no formal external review of the overall strategy for any of the stocks, so unambiguous evidence is lacking. Therefore, evidence of a review relies on recognising improvements that have occurred in the harvest strategy, over and above applying the harvest control rule. For saithe, ling, tusk and golden redfish, there is evidence for reviews and improvements in the harvest strategy. Therefore, for these stocks, SG100 is met. For plaice, blue ling and Atlantic wolffish, although reviews may have been conducted, clear evidence of review and improvements is lacking, so 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

<table>
<tr><td colspan="2">PI 1.2.1</td><td colspan="3">There is a robust and precautionary harvest strategy in place</td></tr>
<tr><td></td><td>Justification</td><td colspan="3">None of the Principle 1 species are sharks and therefore this issue is not scored.</td></tr>
<tr><td>f</td><td colspan="4">Review of alternative measures</td></tr>
<tr><td></td><td>Guidepost</td><td>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.</td><td>There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.</td><td>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.</td></tr>
<tr><td colspan="2">Met?</td><td>Not relevant</td><td>Not relevant</td><td>Not relevant</td></tr>
<tr><td></td><td>Justification</td><td colspan="3">SI.f is scored if there is some non-negligible proportion of the catch that is unwanted, but this is up to the discretion of the assessors (CR2.0 GSA3.5.3). Currently discards are reported as negligible or very low for all Principle 1 stocks considered (estimated to be around 1% of the landings) and are therefore not included in the stock assessments. This could be interpreted as negligible, and therefore not relevant. This can lead to perverse scoring where a fishery that has significant unwanted catch could score higher than one where the unwanted catch is negligible. The low discards are mostly the result of management and commercial initiatives that minimise the incentive to discard, as well as require by law all commercial species are landed.

The discards have been inferred by comparing at-sea with port length samples, which measures the amount of “high-grading”, but not other causes of discarding. Because it is illegal to discard, it is possible that unwanted fish may also be retained. In this context “unwanted” fish is unclear where fishers may have a preference. The primary concern with any review should be discarding and that is what is considered here.

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 (e.g. to discourage capture of small fish, there are upper limits on the percentage weight of fish that can be landed below minimum landing size and any cod, saithe, haddock or redfish which is landed, 50% weight is counted against the individual quota). There is flexibility in the 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), an allowable gillnet mesh size range, and real time area closures to reduce the take of undersize fish. In addition, individual boats may be allowed a limited transfer of allowable catch of one species to another. The effect of these measures on the quota system is regularly reviewed. Importantly, the fishing industry has a policy to make best possible use of all product, including bio-medical products and new markets for new products. This converts otherwise unwanted to wanted catch, which is perhaps the most effective way of dealing with this issue.

Although there is no dedicated review of unwanted mortality, levels of discarding are considered in the stock assessment as these will be included in any fishing mortality. This on-going consideration is evident in the stock assessment, scientific advice and policy documents. This review occurs annually. Any review of alternative measures to reduce unwanted catch would occur if discarding was determined through the assessment process as a non-negligible risk to the fishery management system. This review may be part of or independent of the assessment process. Because there is an annual review of discarding levels, and currently discarding is not perceived as a significant problem or risk in Iceland fisheries due to past actions, SI.f is not scored.</td></tr>
</table>

PI 1.2.1	There is a robust and precautionary harvest strategy in place	
References	DLS (2012), ICES (2014, 2016a; 2017a; 2017b; 2017c; 2018a), Lassen et al (2014), MFRI (2017), MSC (2017), Meyers et al (1999), NWWG (2016), Tun (2014a; 2014b; 2015; 2017a; 2017b), WGDEEP (2016; 2018)	
OVERALL PERFORMANCE INDICATOR SCORE:	Atlantic Wolffish	**80**
	Blue Ling	**80**
	Golden Redfish	**85**
	Ling	**85**
	Plaice	**80**
	Saithe	**85**
	Tusk	**85**
CONDITION NUMBER (if relevant):		

PI 1.2.2 Harvest control rules and tools

Note: the previous assessment's condition on 1.1.2 (Reference Points) for Atlantic Wolffish is now incorporated within the consideration of PI 1.2.2.

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.
Atl. Wolffish		Y	N	N
Blue Ling		Y	N	N
Golden Redfish		Y	Y	N
Ling		Y	Y	Y
Plaice		Y	N	N
Saithe		Y	Y	Y
Tusk		Y	Y	Y
	Justification	Atlantic Wolffish and Plaice: While there is a well-defined harvest control rule in place that MII uses to set TACs based on the target exploitation rate, it is not part of a formal management plan as it does not yet incorporate the full MSY and PA elements. In both cases, the MSY F_{proxy} is based upon a Yield Per Recruit analysis, in the case of Atlantic Wolffish being F_{max} (0.3) and for Plaice being $F_{0.1}$ (0.22). Thus, it is only "generally understood" that further actions would be taken if indicators suggested the stocks were declining below the target level. The evidence that action would be taken can be seen in		

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place
		other stocks, for instance action taken to protect spawning areas, reduce catch as well as the intent to develop a well-defined rule for Atlantic wolffish and plaice. Because the HCRs to reduce the exploitation rate as the PRI is approached are generally understood, SG60 is met. While the previous MSC assessment accepted these as F_{MSY} proxies, support for this is stronger for plaice than for Atlantic wolffish. For the latter, there was a concern, which remains, that it is less precautionary than alternative proxies such as $F_{0.1}$ and $F_{40\%SPR}$. The precautionary characteristics of the wolffish F_{MSY} proxy need to be examined, particularly in regard to avoiding biomass dropping below the PRI. As well, for both species, there is no formal consideration of a limit reference point in the HCR as well as no analogy to $B_{TRIGGER}$ which reduces exploitation as B_{LIM} is approached. There would therefore be beneficial to define a biomass limit reference point consistent with the PRI above which the stocks would be maintained with high probability. Due to the lack of a well-defined HCR should the stocks fall below the trigger reference point and approach the limit reference point, SG80 is not met. Blue Ling: The Blue Ling HCR which has been used by MII to set TACs since 2013 is based upon the Category 3 DLS approach modified based upon the WKLIFE process. Catch outside of Iceland has been an insignificant part of the total with the latter well below the stock-level TAC, although all catches are considered in evaluating the HCR. Although the rule is well-defined and in place, it is not part of a formal management plan as it does not incorporate the full MSY and PA elements. There is no formal consideration of a limit reference point in the HCR as well as no analogy to $B_{trigger}$ which reduces exploitation as B_{lim} is approached, although such action is expected. Evidence for this is the approach to managing other stocks and the search for an improved HCR for blue ling which will incorporate such actions in a well-defined way. WGDEEP (2016) recommended use of limit and precautionary reference points based upon the Icelandic fall survey index although this modification to the HCR has not been adopted. Due to the data limitations, F_{MSY} and associated biomass has not been analytically determined. Rather, the MSY F_{proxy} target (1.75) was confirmed by ICES (2016) as a proxy for F_{MSY}. Thus, the rule to reduce the exploitation rate as the PRI is approached is only generally understood, so SG60 is met, but SG80 is not met. Golden Redfish: The HCR adopted by MII as a consequence of the 2014 review was incorporated into a formal Icelandic management plan as of 2015 and will be used to set TACs until the next scheduled 5-year review in 2020. There are explicitly defined TACs for the Iceland and Greenland components of the fishery which has been the case since 2007. It includes biomass and fishing mortality limit, precautionary and target reference points which ensure that as biomass declines below $B_{trigger}$, fishing mortality is proportionally reduced as B_{lim} is approached. B_{lim} is consistent with the MSC definition of a PRI. The fishing mortality target is based upon F_{max} from a Yield Per Recruit analysis. F_{max} has been recognized as a poor proxy for F_{MSY} although the review explicitly considered its merits as a target fishing mortality. This will likely be revisited during the 2020 review. ICES considered the HCR to be precautionary as it results in less than 5% probability of SSB $< B_{lim}$ in all years (short, medium, and long term). The HCR is considered by ICES to be in conformity with the ICES MSY and PA approaches. Because there is a well-defined HCR in place that will reduce exploitation as the PRI is approached and keep the stock fluctuating around MSY, SIa meets SG80. Golden Redfish: While the HCR uses an F_{MSY} proxy, this is based upon F_{MAX} from a Yield Per Recruit analysis, which while accepted by ICES, is recognized as a poor F_{MSY} proxy. As well, no additional precaution has been included in the HCR to ensure that it will produce biomass consistent with harvesting at F_{MSY}. Further, ICES had recommended that the HCR be amended to include management action if SSB fell below B_{lim} to safeguard the stock in very unusual circumstances, although this has not been adopted yet. Therefore, because the HCR may not keep the stock fluctuating at or above MSY most of the time and precautionary action may be needed if the stock falls below B_{LIM}, SG100 is not met.

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
		Saithe: The HCR adopted by MII as a consequence of the 2013 review was incorporated into a formal Icelandic management plan as of 2013/14 and will be used to set TACs until the next scheduled 5-year review in 2019 (rolled over from 2018). It includes biomass and harvest rate (HR) limit, precautionary and target reference points which ensure that as biomass declines below $B_{trigger}$, fishing mortality is proportionally reduced as B_{lim} is approached. Although B_{lim} was changed in 2016 (from 61kt to 44 kt), this does not impact the performance of the HCR. B_{lim} is consistent with the MSC definition of a PRI and the fishing mortality target is based upon an analytically derived estimate of F_{MSY} and is expected to maintain biomass consistent with this fishing mortality. ICES considered the HCR to be precautionary as it results in less than 5% probability of SSB < B_{lim} in all years (short, medium, and long term). The HCR is considered by ICES to be in conformity with the ICES MSY approach. Because there is a well-defined HCR in place that will reduce exploitation as the PRI is approached and keep the stock fluctuating around MSY, SIa meets SG80. Saithe: The HCR adopted by MII as a consequence of the 2013 review adopted a target HR which are set above that at HR_{MSY} (0.20 versus 0.22). The lower target was chosen to be more precautionary. Therefore, harvesting at HR_{MGT} will produce biomass consistent with harvest at F_{MSY} and includes a precautionary buffer to ensure achievement of these conditions. Further, the 2013 review evaluated four HCR options and chose that which ensured long-term maintenance of conditions consistent with F_{MSY} which at the same time stabilizing inter-annual variation in yield. Because the well-defined HCR should keep the stock fluctuating at or above MSY most of the time, SIa meets SG100. Tusk and Ling: The HCRs adopted by MII as a consequence of the 2017 review were incorporated into a formal Icelandic management plan as of 2017/18 and will be used to set TACs until the next scheduled 5-year review in 2023. They include biomass and harvest rate (HR) limit, precautionary and target reference points which ensure that as biomass declines below $B_{trigger}$, fishing mortality is proportionally reduced as B_{lim} is approached. B_{lim} is consistent with the MSC definition of a PRI and the fishing mortality target is based upon an analytically derived estimate of F_{MSY} which is expected to maintain biomass consistent with this fishing mortality. ICES considered the HCR to be precautionary as it results in less than 5% probability of SSB < B_{lim} in all years (short, medium, and long term). The HCR is considered by ICES to be in conformity with the ICES MSY approach. Because there is a well-defined HCR in place that will reduce exploitation as the PRI is approached, and keep the stock fluctuating around MSY, SIa meets SG80. Note that the assessment of Tusk has not included catch information from the Greenland part of Subarea 14. Historically the catches from this area have on average been around 1% of the total catch but this increased to ~15% of the total catches in 2016 and 2017. However, a management strategy evaluation (MSE) has shown that the HCR is robust to this uncertainty. It was recognized that if the recent higher levels of catch in the Greenland area of Subarea 14 continue, the treatment of catch data may need to be reconsidered in future assessments and management. Tusk and Ling: The HCRs adopted target HRs which are set below those at HR_{MSY} (0.13 versus 0.17 in the case of tusk and 0.18 versus 0.24 in the case of ling). The lower targets were chosen by MII as they are more precautionary compared to HR_{MSY} while not producing significantly less long-term yield (2% difference). Therefore, harvesting at HR_{MGT} will produce biomass at least consistent with harvesting at F_{MSY} and includes a precautionary buffer to ensure achievement of these conditions. SIa meets SG100.		
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

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
				robust to the main uncertainties.
Atl. Wolffish			Y	N
Blue Ling			Y	N
Golden Redfish			Y	N
Ling			Y	N
Plaice			Y	N
Saithe			Y	N
Tusk			Y	N
	Justification	Atlantic Wolffish and Plaice: While there have not been formal evaluations of the HCRs under a range of uncertainties, the stock assessments use the similar approach as in the Tusk, Ling, Saithe and Golden Redfish in which a range of observation uncertainties and stock processes are considered. Through the HCR, these uncertainties are included in the TAC advice. Although exploration of error is less than other species, they are sufficient to test the HCR and ensure that it is robust to main uncertainties, so SIb meets SG80. Atlantic Wolffish and Plaice: There has been no formal evaluation of the impact of a range of uncertainties on the robustness of the HCR. Thus, the uncertainties are limited to those included in the stock assessment. Because the HCR was not assessed in relation to a wide range of uncertainties, SIb does not meet SG100. Blue Ling: The DLS HCR formally considers uncertainty through the inclusion of a Precautionary Buffer (0.8) and an Uncertainty Cap of 20% change in the TAC to address uncertainty or noise in the data and its potential influence on the advice. However, the sources of uncertainty are not explicit and assumed to address a range of observation and process error. Because the HCR is robust to main uncertainties, SIb meets SG80. Blue Ling: There has been no formal evaluation of the impact of a range of uncertainties on the robustness of the HCR. Thus, the uncertainties are limited to the PA buffer and Uncertainty Cap. Because the HCR was not assessed in relation to a wide range of uncertainties, SIb does not meet SG100. Ling, Golden Redfish, Saithe and Tusk: The HCRs for these species was developed based upon Management Strategy Evaluation - style analyses in which the operating model generates “true” future populations in simulations based upon the stock structure assumed in the annual assessment. Uncertainties in parameters estimated in the historical assessment (exploitation pattern, stock numbers, growth, and maturity) were used in long-term stock projections based on either bootstrapping or MCMC (Saithe) simulations of the assessment parameters. Recruitment was projected with random draws either from assessed recruitment or about assumed stock-recruitment functions. Assessment error was based on the estimated error in the historical assessments. Catch was assumed to be known without error. These simulations were used to characterize the uncertainties in the biomass and fishing mortality reference points used in the HCR options. Sensitivity analyses were conducted to evaluate the impact of specific issues on the HCR (e.g. recruitment strength and duration in golden redfish). These explorations indicated that the HCRs were likely robust to the main uncertainties, so SIb meets SG80. Ling, Golden Redfish, Saithe and Tusk: While observation and some process error were included through assessment error, the range of uncertainties was generally constrained to those considered in the assessment. The influence of process error in natural mortality, growth, migration etc was not explored. Other than through sampling of assessed recruitment, there was limited exploration of potential changes in stock-recruitment dynamics, except perhaps in the case of golden redfish. Because the HCR was not assessed		

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
		in relation to a wide range of uncertainties, SIb does not meet SG100.		
c	**HCRs evaluation**			
	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.
Atl. Wolffish		Y	Y	N
Blue Ling		Y	Y	N
Golden Redfish		Y	Y	N
Ling		Y	Y	N
Plaice		Y	Y	N
Saithe		Y	Y	N
Tusk		Y	Y	N
	Justification	All Stocks: The main tool used by MII to implement the HCRs is the TAC, based on the stock assessment and target fishing mortality. For TACs to be effective, they need to be set according to the scientific advice and accurate catch monitoring is required. Since 2013/2014, while there have been some issues, TACs have been set according to the scientific advice. There have been instances in which landings have exceeded the TAC, this particularly being the case for tusk, golden redfish and Atlantic wolffish. This must be considered within the context of multispecies fisheries, in which opportunities to reduce the catch of a single species relative to other species are limited. TAC overages to address foreign catch and inter-species trades are recognized and addressed by the management system. Overall, TACs have been successful in managing landings, generally reducing these from high levels in the mid-late 2000s to the recent low levels in 2017/18. While there appear to be issues in some stocks (i.e. golden redfish), during this period, harvest rates have generally been reduced from above to either close to (ling) or below (tusk, Atlantic wolffish, saithe, plaice and blue ling) target fishing mortality rates. Therefore, the available evidence indicates that the TACs are effective in controlling exploitation of these fisheries. SIc meets SG80. All Stocks: It is clear that TACs have managed landings towards the management plan targets since 2010/11, in the context of multispecies fisheries. TAC overages to address foreign catch and inter-species trades are recognized and addressed by the management system. For instance, small amounts of catch in some areas (e.g. Greenland area of SA 14) are not counted against TACs, as is catch from special research fishing. Fishers are allowed to catch in excess of their quota in the present fishing year, which is subtracted from the next year's quota, to an upper limit of 5%. Fishers are also allowed to catch in excess of quotas in one groundfish species through changing or transferring their quota for some other groundfish species. Species exchange ratios are used in these trades. There is an upper limit of 5% of the total value of the groundfish quotas for the fishing year for all transfers and an upper limit of 1.5% of the total value of the groundfish quotas for transfers into quotas for one species. While the efficacy of this system appears to be good, during 2014/15-2016/17, quota transfers were the main explanation for the catches in excess of allocated quotas of golden redfish; it is not clear how effective these controls are if catch were allowed to exceed the quota during several consecutive years, as was the case with golden redfish. This would be a more significant issue for smaller stocks close to sustainable harvest limits. Because there is evidence that target exploitation may be exceeded in a mixed fishery and management system has not entirely eliminated this problem in the mixed fishery, SIc does not meet SG100.		

PI 1.2.2	There are well defined and effective harvest control rules (HCRs) in place		
References	DLS (2012), Hjörleifsson and Björnsson (2013), ICES (2014, 2016a; 2017a; 2017b; 2017c; 2018a), Lassen et al (2014), Mace (1994), MFRI (2017), MSC (2017), Meyers et al (1999), NWWG (2016), Palsson et al (2007), Plaganyi (2007), Restrepo et al (1998), Tun (2014a; 2014b; 2015; 2017a; 2017b), WGDEEP (2016; 2018), WKFRAME (2012), WKICEMSE (2017), WKLIFE (2012a; 2012b, 2013, 2014), WKREDMP (2014)		
OVERALL PERFORMANCE INDICATOR SCORE:		Atlantic Wolffish	**75**
		Blue Ling	**75**
		Golden Redfish	**80**
		Ling	**85**
		Plaice	**75**
		Saithe	**85**
		Tusk	**85**
CONDITION NUMBER (if relevant):			**1 Wolffish** **2 Plaice** **3 Blue Ling**

PI 1.2.3 Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	**Range of information**			
	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.
Atl. Wolffish		Y	Y	N
Blue Ling		Y	Y	N
Golden Redfish		Y	Y	N
Ling		Y	Y	N
Plaice		Y	Y	N
Saithe		Y	Y	N
Tusk		Y	Y	N
	Justification	All Stocks: Information on vessels and catch is relatively comprehensive for all fisheries within Icelandic waters. All vessels are registered and licensed with registry holding appropriate information about the vessels. Vessels are required to retain VMS equipment on board and use electronic log-books for reporting fishing operations. There are two tracking systems in Iceland covering all vessels. One is mandatory for all vessels and is primarily for safety purposes. The other 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 waters, so all commercial catch is landed and can be monitored. Biology and life history of all the species is well understood, including growth, reproduction, spawning times and locations. Considerable environmental is also collected, which is relevant to the population dynamics of all Iceland stocks, and has been used as an explanation, for example, for changes in growth and recruitment. Because information related to stock structure, productivity and the fleets is sufficient to support the harvest strategy, SG80 is met. All Stocks: Information is comprehensive on fleets and there is considerable environmental information that has often been used to support the stock assessment, even though it has not been directly used in the harvest strategy. However, information is not comprehensive for any stock. Although stock structure is consistent with the available information, information for all stocks is incomplete and stock definitions have been defined at least partly on pragmatic grounds. For some stocks, stock structure is more uncertain than for others (e.g. golden redfish and blue ling have some genetic and/or spawning information that is inconsistent with defined stock structure), but it is not comprehensive for any stock. The lack of information on spatial structure for the populations may also contribute to the lack of information on stock-recruitment relationships (SR), which partly determine stock productivity and are important for determining reference points. Again, the SR used are consistent with available information and may be precautionary, but information on SR		

PI 1.2.3		Relevant information is collected to support the harvest strategy		
		relationship is not comprehensive, which has led to, for example, using B_{loss} as a proxy for the PRI or not yet defining the PRI. Because information on stock structure and productivity is not comprehensive for any stock, SG100 is not 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.
Atl. Wolffish		Y	Y	N
Blue Ling		Y	Y	N
Golden Redfish		Y	Y	N
Ling		Y	Y	Y
Plaice		Y	Y	N
Saithe		Y	Y	N
Tusk		Y	Y	Y
	Justification	All Stocks: The same data collection system is applied for all stocks. The HCR depends upon the stock assessments which estimate abundance relative to reference points are used to set the main exploitation rate control, the TAC. The main data available are the removals data (i.e. landings with negligible discards), sampling of landings and the Icelandic spring (or autumn for blue ling) survey. The surveys provide an annual abundance index, which is sufficient to support annual stock assessments. As well as the abundance index, data include age, length, weight and maturity which can be sued to estimate indicators such as fishing mortality and SSB. Because the data are adequate for the stock assessment methods used, and the stock assessment supports the harvest control rule, SG80 is met. Atlantic Wolffish, Blue Ling, Golden Redfish, Plaice and Saithe: For much of the data (catch, abundance index, biological sampling) used in stock assessment and by extension the HCR, is collected frequently and with high precision, and understanding of the uncertainties associated with these data is good. For these stocks, however there are inconsistencies and uncertainties which are not as well understood. For blue ling, recruitment and depletion of spawning aggregations are issues, and inconsistencies in the data have so far prevented an analytical stock to be accepted. For golden redfish, the stock assessment did not converge properly (although this has reportedly been resolved) and again there have been unresolved issues in interpretation and treatment of data. Age data conflicts with abundance information, and survey indices are often dominated by a few large hauls due to fish aggregations. For saithe, there are inconsistencies in the survey information, perhaps because gear design is not ideal for saithe. For Atlantic wolffish and plaice, documentation is more limited as these are MFRI-assessed stocks. While data are clearly adequate to support the HCR, there insufficient evidence that all information is available, there is a high degree of uncertainty or uncertainties are fully understood, although this may be because full analyses of the data have been conducted yet. Therefore, because for some of the information used by the HCR, information is not available with a high degree of certainty and/or uncertainties are not well understood, SG100 is not met. Ling, Tusk: All information required by the stock assessment is collected frequently and		

PI 1.2.3		Relevant information is collected to support the harvest strategy		
		with high precision and understanding of the uncertainties associated with these data is good. The spring survey is well-suited to these species and different data components appear consistent when carrying out analyses. There is evidence from bootstrap or MCMC simulations that the assessments are robust to these uncertainties and projections of the HCR indicate that management should also be robust to these uncertainties. Because all information is monitored for the HCR with high frequency and a relatively high degree of certainty, and uncertainties are well understood and accounted for in the analysis, SG100 is met.		
c	Comprehensiveness of information			
	Guidepost		There is good information on all other fishery removals from the stock.	
Atl. Wolffish			Y	
Blue Ling			Y	
Golden Redfish			Y	
Ling			Y	
Plaice			Y	
Saithe			Y	
Tusk			Y	
	Justification	This scoring issue refers to all catches taken by fleets beyond the unit of assessment, which would be outside Icelandic waters, because all landings into Iceland are considered to be within the unit of assessment. The vast majority of all catches of these stocks is within the UoA and catches outside the UoA are either negligible (plaice, Atlantic wolffish, saithe, ling) or low (blue ling, golden redfish, tusk). Stocks with non-negligible catches outside Iceland waters are managed through the ICES system. For all stocks, landings from waters outside Iceland (into Norway, Faroes Islands and East Greenland) are recorded, reported and included in relevant stock assessments. In these cases, ICES has not reported any problems with these data and reports discards still being negligible in these cases. Because all removals outside Iceland are well recorded and reported to ICES, removals outside the UoA are good enough to support stock assessment and by extension the HCR, so SG80 is met for all stocks.		
References		NWWG (2018), WGDEEP(2018), Stock Annexes for Saithe, Ling, Blue Ling, Tusk, Golden Redfish, MFRI (2018c), MFRI (2018f), Björnsson et al. 2007		

OVERALL PERFORMANCE INDICATOR SCORE:	Atlantic Wolffish	**80**
	Blue Ling	**80**
	Golden Redfish	**80**
	Ling	**90**
	Plaice	**80**
	Saithe	**80**
	Tusk	**90**
CONDITION NUMBER (if relevant):		

PI 1.2.4 Assessment of stock status

PI 1.2.4		There is an adequate assessment of the stock status		
Scoring Issue		SG 60	SG 80	SG 100
a	**Appropriateness of assessment to stock under consideration**			
	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.
Atl. Wolffish			Y	Y
Blue Ling			Y	N
Golden Redfish			Y	Y
Ling			Y	Y
Plaice			Y	Y
Saithe			Y	Y
Tusk			Y	Y
	Justification	All Stocks: The assessments are based upon landings data with stock trends provided by Icelandic spring, autumn and German East Greenland surveys as appropriate. Consideration has been given to the appropriate stock area, fleet structure and temporal changes in selectivity, as well as survey catchability and selectivity. The assessments take account of the stock and fishery dynamics through modelling (GADGET, ADCAM) and data poor assessment (DLS Cat 3) approaches. The assessments provide the stock indicators used in the HCRs to inform management. Because the assessment is appropriate for the stock and for the harvest control rule, SIa meets SG80. All Stocks except Blue Ling: The assessments use modelling approaches (GADGET and ADCAM) which are very flexible and are able to capture what are deemed by the peer review process to be the key components of the fishery and stock dynamics. Particular consideration in the GADGET assessments (tusk, ling, Atlantic wolffish, golden redfish) is given to modelling the progression of length-based fishing and stock processes through time. Because these assessments account for the major features of the biology of the species and the nature of the fishery, SIa meets SG100. Blue Ling: The assessment relies on interpretation of aggregate (biomass > 39 cm) trends in the Icelandic fall survey and only modestly takes account of age/size-based processes. Being a data poor assessment approach, none of the detailed stock and fishery dynamics are explicitly considered. SIa does not meet SG100.		
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.	
Atl. Wolffish		Y	Y	
Blue Ling		Y	Y	
Golden Redfish		Y	Y	
Ling		Y	Y	
Plaice		Y	Y	

PI 1.2.4		There is an adequate assessment of the stock status		
Saithe		Y	Y	
Tusk		Y	Y	
	Justification	All Stocks except Blue Ling: All models are used to report stock and fishery indicators which are directly comparable to explicitly defined reference points which are based upon the stock's biology and available information. These indicators and reference points form the key components of the HCRs used to inform TAC setting. Because the assessments estimate stock status relative to reference points and these are appropriate for the stock and can be estimated, SIb meets SG80. Blue Ling: The assessment is based upon the >39 cm biomass in the Icelandic survey, on which the F_{MSY} proxy is also based. Comparison of current catch/survey biomass to the F_{MSY} proxy provides that basis of TACs. While a GADGET model was attempted (2012), until reliable aging data are available, the current approach was deemed appropriate to inform management decisions. Because the assessment estimates stock status relative to estimated reference points and is considered appropriate for this stock, SIb meets SG80.		
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.
Atl. Wolffish		Y	Y	N
Blue Ling		Y	Y	N
Golden Redfish		Y	Y	N
Ling		Y	Y	N
Plaice		Y	Y	N
Saithe		Y	Y	N
Tusk		Y	Y	N
	Justification	All Stocks: Through the peer review (particularly benchmarks) process, the major uncertainties in the assessments have been identified. These include the completeness of catch recording (e.g. tusk landings in area XIV), temporal changes in fishery selectivity, spatial coverage and appropriateness of the surveys, temporal changes in growth, and maturity estimation (ling). Because all major sources of uncertainty have been identified in the assessments, SIc meets SG60. All Stocks except Blue Ling: The GADGET and ADCAM assessments model fishery and stock dynamics, taking into account uncertainties in the fishery and survey observations, recruitment and growth dynamics. Model fits are examined through residual and retrospective analyses. Bootstrapping (Tusk and Ling) and MCMC (Saithe) simulations are used to quantify uncertainties in the model's parameters. Sensitivity analyses are conducted as needed to explore the uncertainty in stock and fishery processes on the assessment outputs. The peer review process has considered that the assessments adequately take into account the uncertainties. Because the assessments clearly take account of the uncertainty, SIc meets SG80. While some assessments use bootstrapping and MCMC to characterize parameter uncertainty, these have not extended to the derived quantities (i.e. fishing mortality and spawning stock biomass) used to inform, through the HCRs, TAC setting. No assessment explicitly states stock status relative to reference points in a probabilistic way. Because the stock assessments do not evaluate stock status relative to reference points in a probabilistic way, SIc does not meet SG100.		

PI 1.2.4		There is an adequate assessment of the stock status		
		Blue Ling: The ICES DLS Cat 3 assessment approach is used to determine stock status and thus inform management decisions. This approach was chosen over a modelling approach due to uncertainties uncovered in the stock data and dynamics as part of a GADGET exploration. It was considered that the Icelandic fall survey which covers the depth and distributional range of the stock is a more reliable index of abundance than the spring survey and the GADGET outputs. Uncertainties in stock and fishery dynamics are also included and accounted for through the PA_{BUFFER} and Uncertainty Cap in the HCR. Because the assessment takes account of the uncertainty, SIc meets SG80. The DLS Category 3 assessment approach does not formally model the sources of uncertainty, but takes account of uncertainty in a general manner. A GADGET assessment was conducted (2012) which identified the uncertainties to be resolved before an analytical assessment could be used. However, the assessment does not evaluate status probabilistically, so SIc does not meet SG100.		
d	**Evaluation of assessment**			
	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
Atl. Wolffish				N
Blue Ling				N
Golden Redfish				N
Ling				N
Plaice				N
Saithe				N
Tusk				N
	Justification	All Stocks except Atlantic Wolffish, Blue Ling and Plaice: A limited set of alternate models have been attempted for golden redfish (TSA, SPM) and saithe (XSA, Camera, ADAPT, TSA, SAM). Benchmark reviews have undertaken sensitivity analyses for all assessments to describe the robustness of assessment outputs to model assumptions and design. These reviews have been undertaken over an extended period, rather than being a focused, rigorous, review of alternate hypothesis. Questions have been raised on the utility of the growth modelling algorithm in GADGET. Although all assessments have been tested to some extent and shown to be reasonably robust, it is not clear that alternative hypotheses (such as stock structure) or assessment approaches have been rigorously explored for these stocks. SId does not meet SG100. Atlantic Wolffish, Blue Ling and Plaice: While alternate models have been used on the Wolffish (ADAPT) and Blue Ling (GADGET) stocks, these were not rigorous explorations. No alternate analyses have been attempted for plaice. Sensitivity analyses to explore key uncertainties have not been undertaken on these assessments. Because only limited explorations of alternate models or hypotheses have been undertaken for these stocks, and in the case of plaice, it is not clear how robust the assessment is, SId does not meet SG100.		
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.

PI 1.2.4	There is an adequate assessment of the stock status		
Atl. Wolffish		Y	N
Blue Ling		Y	Y
Golden Redfish		Y	Y
Ling		Y	Y
Plaice		Y	N
Saithe		Y	Y
Tusk		Y	Y
Justification	All Stocks except Atlantic Wolffish and Plaice: Stock assessments are subject to peer review through the ICES WGDEEP and NWWG working groups, with audits carried out and reported in an annex of meeting reports. Because the assessment of stock status is subject to peer review, SIe meets SG80. Following an ICES working group meeting, its report is considered by ACOM who is ultimately responsible for the ICES advice. ICES undertakes in-depth reviews, termed 'benchmarks', of the data and assessments models based upon requirements, which include external experts. Thus, an assessment with a larger set of issues would be the subject of a benchmark assessment, compared to an assessment with fewer issues. Since 2008, benchmark reviews have been conducted on tusk (2010), ling (2015), golden redfish (2012) and saithe (2010) with benchmark reviews planned for golden redfish (2020) and saithe (2019). Because the assessments have been both internally and externally peer reviewed, SIe meets SG100. Atlantic Wolffish and Plaice: Stock assessments are subject to peer review through the Demersal Working group of MFRI, including further internal review by a designated group of MFRI scientists. Because the assessment of stock status is subject to peer review, SIe meets SG80. To date, benchmark reviews that include external experts, have not been conducted for Wolffish and Plaice in 2019. Because the assessments have been externally peer reviewed, SIe does not meet SG100.		
References	Begley and Howell, 2004, Bjornsson and Magnusson (2009), Hjörleifsson and Björnsson, 2013, Plaganyi (2004), Tun (2014a; 2014b; 2015; 2017a; 2017b), WGDEEP (2012; 2018), WKDEEP (2010; 2015), WKICEMSE (2017), WKRED (2012), WKREDMP (2014), WKROUND (2010)		

OVERALL PERFORMANCE INDICATOR SCORE:		
	Atlantic Wolffish	**85**
	Blue Ling	**85**
	Golden Redfish	**90**
	Ling	**90**
	Plaice	**85**
	Saithe	**90**
	Tusk	**90**
CONDITION NUMBER (if relevant):		

PI 2.1.1 Primary species outcome: All Units of Assessment

Note on scoring: This PI is scored with each of the Primary species (Table 15) being a scoring element. The scoring approach outlined in Table 16 is applied to the stock status in Table 17 to derive the species element scores. Species are determined as main or minor based on their resilience and the catch profile (summarized in Tables 8-14 and in full in Catchprofile 2013-17.xlsx spreadsheets).

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.
		Y	Y	P
		Scoring by species element for each UoA is fully documented in Appendix 7 : Full Scoring Table for PI 2.1.1 All UoAs). All UoAs: All main primary species stocks are at least highly likely to be above their PRI, so SG80 is met for all UoAs. For UoAs where Blue ling (North East Atlantic), Atlantic Cod (Iceland), Deepwater redfish (NE Arctic), Ling (Iceland), Haddock (Iceland), Saithe (Iceland) and Tusk (Iceland) are main species, because they are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, these elements meet SG100. For UoAs where Atlantic Wolffish (Iceland), Plaice (Iceland), Deepwater redfish (Icelandic slope stock), Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland and N. Azores), Greenland halibut (Iceland / Greenland), Nephrops (Iceland), Lemon sole (Iceland), Lumpfish, and Witch (Iceland) are main primary species, because these elements are highly likely at or above their PRI, they meet SG80.		

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
				P
		Scoring by species element for each UoA is documented in Appendix 7: Full Scoring Table for PI 2.1.1 All UoAs). Overall, there were a large number of minor primary species associated with each of the 42 UoAs. The majority of these were demonstrably highly above their PRI, which was interpreted as meeting the SG100. In a few cases, where the status could not be determined, the available evidence suggested that the fisheries would not be hindering recovery. In these cases, if the species makes up less than 10% of the UoA landings <u>and</u> the UoA lands less than 30% of the total landings of a species, the UoA is not considered influential in hindering a recovery in a marginal sense (MSC CR 2.0 GSA3.4.6). For longline and handline, bait is considered as primary species. The catch to bait-use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species). A recommendation is made advocating only using sustainable stocks for bait.		

References	http://www.iucnredlist.org; ICCAT 2015; ICCAT 2017; ICES Advice ARU 2018; ICES Advice BLI 2018; ICES Advice CAP 2018; ICES Advice COD 2018; ICES Advice GHL 2018; ICES Advice HAD 2018; ICES Advice HER_Spr 2018; ICES Advice HER_Sum 2018; ICES Advice LIN 2018; ICES Advice MAC 2018; ICES Advice POK 2018; ICES Advice REB_Ice 2018; ICES Advice REG 2016; ICES Advice USK 2018; ICES Advice WHB 2018; ICES REB_NEArctic 2018; MFRI Advice CAA 2018; MFRI Advice CAS 2018; MFRI Advice DAB 2018; MFRI Advice KHG 2018; MFRI Advice LEM 2018; MFRI Advice LUM 2018; MFRI Advice MON 2018; MFRI Advice NEP 2018; MFRI Advice PLA 2018; MFRI Advice PLE 2018; MFRI Advice PRA_Inshore 2018; MFRI Advice PRA_Offshore 2018; MFRI Advice SFV 2018; MFRI Advice WHG 2018; MFRI Advice WIT 2018; Catchprofile 2013-17.xlsx (MFRI, Unpublished Data)

OVERALL PERFORMANCE INDICATOR SCORE:		
Blue ling (Iceland/Greenland/Faroes), Handline	**Main stocks: 1 reaches 100, 2 reach 80** **Minor stocks: 7 reach 100, 2 do not reach 100**	**90**
Blue ling (Iceland/Greenland/Faroes), Longline	**Main stocks: 4 reach 100, 1 reaches 80** **Minor stocks: 14 reach 100, 3 do not reach 100**	**95**
Blue ling (Iceland/Greenland/Faroes), Gillnet	**Main stocks: 2 reach 100, 1 reaches 80** **Minor stocks: 14 reach 100**	**95**

Blue ling (Iceland/Greenland/Faroes), Danish seine	Main stocks: 3 reach 100, 3 reach 80 Minor stocks: 11 reach 100, 1 does not reach 100	95
Blue ling (Iceland/Greenland/Faroes), Bottom trawl	Main stocks: 4 reach 100, 3 reach 80 Minor stocks: 20 reach 100, 1 does not reach 100	95
Blue ling (Iceland/Greenland/Faroes), Nephrops trawl	Main stocks: 3 reach 100, 3 reach 80 Minor stocks: 15 reach 100	95
Atlantic Wolffish (Iceland), Handline	Main stocks: 1 reaches 100 Minor stocks: 19 reach 100, 2 do not reach 100	95
Atlantic Wolffish (Iceland), Longline	Main stocks: 3 reach 100 Minor stocks: 20 reach 100, 3 do not reach 100	95
Atlantic Wolffish (Iceland), Gillnet	Main stocks: 2 reach 100 Minor stocks: 16 reach 100	100
Atlantic Wolffish (Iceland), Danish seine	Main stocks: 2 reach 100, 1 reaches 80 Minor stocks: 15 reach 100, 1 does not reach 100	95
Atlantic Wolffish (Iceland), Bottom trawl	Main stocks: 3 reach 100, 1 reaches 80 Minor stocks: 23 reach 100, 1 does not reach 100	95
Atlantic Wolffish (Iceland), Nephrops trawl	Main stocks: 3 reach 100, 3 reach 80 Minor stocks: 15 reach 100	95
Ling (Iceland), Handline	Main stocks: 2 reach 100, 1 reaches 80 Minor stocks: 16 reach 100, 2 do not reach 100	95
Ling (Iceland), Longline	Main stocks: 3 reach 100 Minor stocks: 20 reach 100, 3 do not reach 100	95
Ling (Iceland), Gillnet	Main stocks: 2 reach 100 Minor stocks: 17 reach 100	100
Ling (Iceland), Danish seine	Main stocks: 4 reach 100, 3 reach 80 Minor stocks: 10 reach 100, 1 does not reach 100	95
Ling (Iceland), Bottom trawl	Main stocks: 3 reach 100, 1 reaches 80 Minor stocks: 23 reach 100, 1 does not reach 100	95
Ling (Iceland), Nephrops trawl	Main stocks: 2 reach 100, 3 reach 80 Minor stocks: 16 reach 100	95
Plaice (Iceland), Handline	Main stocks: 4 reach 100, 2 reach 80 Minor stocks: 7 reach 100, 2 do not reach 100	90
Plaice (Iceland), Longline	Main stocks: 3 reach 100 Minor stocks: 20 reach 100, 2 do not reach 100	95
Plaice (Iceland), Gillnet	Main stocks: 1 reaches 100 Minor stocks: 17 reach 100	100
Plaice (Iceland), Danish seine	Main stocks: 3 reach 100	95

	Minor stocks: 15 reach 100, 1 does not reach 100	
Plaice (Iceland), Bottom trawl	Main stocks: 3 reach 100, 1 reaches 80 Minor stocks: 23 reach 100, 1 does not reach 100	95
Plaice (Iceland), Nephrops trawl	Main stocks: 3 reach 100, 3 reach 80 Minor stocks: 15 reach 100	95
Saithe (Iceland), Handline	Main stocks: 1 reaches 100 Minor stocks: 20 reach 100, 2 do not reach 100	95
Saithe (Iceland), Longline	Main stocks: 3 reach 100 Minor stocks: 20 reach 100, 3 do not reach 100	95
Saithe (Iceland), Gillnet	Main stocks: 1 reaches 100 Minor stocks: 18 reach 100	100
Saithe (Iceland), Danish seine	Main stocks: 3 reach 100, 2 reach 80 Minor stocks: 12 reach 100, 1 does not reach 100	95
Saithe (Iceland), Bottom trawl	Main stocks: 2 reach 100, 1 reaches 80 Minor stocks: 24 reach 100, 1 does not reach 100	95
Saithe (Iceland), Nephrops trawl	Main stocks: 2 reach 100, 3 reach 80 Minor stocks: 16 reach 100	95
Golden Redfish (Iceland / Greenland), Handline	Main stocks: 2 reach 100 Minor stocks: 19 reach 100, 2 do not reach 100	95
Golden Redfish (Iceland / Greenland), Longline	Main stocks: 3 reach 100 Minor stocks: 18 reach 100, 3 do not reach 100	95
Golden Redfish (Iceland / Greenland), Gillnet	Main stocks: 2 reach 100 Minor stocks: 16 reach 100	100
Golden Redfish (Iceland / Greenland), Danish seine	Main stocks: 4 reach 100, 2 reach 80 Minor stocks: 11 reach 100, 1 does not reach 100	95
Golden Redfish (Iceland / Greenland), Bottom trawl	Main stocks: 3 reach 100 Minor stocks: 24 reach 100, 1 does not reach 100	95
Golden Redfish (Iceland / Greenland), Nephrops trawl	Main stocks: 3 reach 100, 2 reach 80 Minor stocks: 16 reach 100	95
Tusk (Iceland / Greenland), Handline	Main stocks: 2 reach 100, 1 reaches 80 Minor stocks: 13 reach 100, 2 do not reach 100	95
Tusk (Iceland / Greenland), Longline	Main stocks: 3 reach 100 Minor stocks: 18 reach 100, 4 do not reach 100	95
Tusk (Iceland / Greenland), Gillnet	Main stocks: 3 reach 100 Minor stocks: 15 reach 100	100
Tusk (Iceland / Greenland), Danish seine	Main stocks: 4 reach 100, 4 reach 80 Minor stocks: 8 reach 100	95

Tusk (Iceland / Greenland), Bottom trawl	**Main stocks: 4 reach 100, 2 reach 80** **Minor stocks: 20 reach 100, 1 does not reach 100**	**95**
Tusk (Iceland / Greenland), Nephrops trawl	**Main stocks: 3 reach 100, 2 reach 80** **Minor stocks: 14 reach 100**	**95**

PI 2.1.2 Primary species management strategy: All Stocks and Gears

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?	Y	Y	Y
	Justification	The following scoring applies to all stocks and gears. For all main primary species of all gears, they are managed by MII through a standard harvest strategy applicable to stocks under significant fishing pressure. This consists of the process described in Principle 1. Standard monitoring procedures provide data for stock assessment. The majority of stock assessments are reviewed by ICES, which provides the scientific advice to MII, specifically the TAC. Stock assessments not reviewed through ICES are conducted by the same scientists and follow the same principles, but apply internal MFRI procedures. The scientific advice has been followed by MII for these stocks, limiting exploitation to sustainable levels. Additional controls are applied, such as seasonal closure of spawning areas. Generic controls, notably mesh size for net gears, 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. For these stocks/gears, all have minor species in their catches which are also managed as above through the Icelandic system informed by scientific advice from ICES. The remaining species are managed by Iceland through advice from MFRI, which follow very similar procedures and processes analogous to the ICES system. The data are collected in the same way using the same system, some sort of assessment is conducted and TAC is adjusted, or closed areas implemented if appropriate. This also constitutes a full 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/stocks.		
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?	Y	Y	N

	Justification	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 MRI and ICES. This constitutes testing of the strategy. For many primary stocks subject to full stock assessment, testing supports high confidence that the harvest strategy will work. For several minor stocks (including common dab, long rough dab, witch, Norway redfish, lemon sole, megrim) 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 primary 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?		Y	Y
	Justification	The evidence for successful implementation consists of landings, which can be compared to TAC, and assessments of abundance. Discards are estimated to be very low (essentially negligible for stock assessment purposes), although discards may not have been 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 stocks, and whether objectives maintaining or rebuilding biomass is being achieved. There is sufficient information to evaluate this for all stocks. This meets SG100.		
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?	Not relevant	Not relevant	Not relevant
	Justification	As for the Principle 1 species (PI 1.2.1.f), the low discards are likely partly the result of management initiatives, but because they are low, SI.e is not scored. Discarding is prohibited and, according to MII, compliance is high, so reviews to further reduce discarding are not necessary beyond monitoring the performance of current initiatives.		

		Monitoring is undertaken by MII and as part of the stock assessment process, which would include in the assessments any significant discarding if it is detected. In such a case, a review would be conducted either as part of or independent of the assessment process.
References		http://www.iucnredlist.org; ICCAT 2015; ICCAT 2017; ICES Advice ARU 2018; ICES Advice BLI 2018; ICES Advice CAP 2018; ICES Advice COD 2018; ICES Advice GHL 2018; ICES Advice HAD 2018; ICES Advice HER_Spr 2018; ICES Advice HER_Sum 2018; ICES Advice LIN 2018; ICES Advice MAC 2018; ICES Advice POK 2018; ICES Advice REB_Ice 2018; ICES Advice REG 2016; ICES Advice USK 2018; ICES Advice WHB 2018; ICES REB_NEArctic 2018; MFRI Advice CAA 2018; MFRI Advice CAS 2018; MFRI Advice DAB 2018; MFRI Advice KHG 2018; MFRI Advice LEM 2018; MFRI Advice LUM 2018; MFRI Advice MON 2018; MFRI Advice NEP 2018; MFRI Advice PLA 2018; MFRI Advice PLE 2018; MFRI Advice PRA_Inshore 2018; MFRI Advice PRA_Offshore 2018; MFRI Advice SFV 2018; MFRI Advice WHG 2018; MFRI Advice WIT 2018; Catchprofile 2013-17.xlsx (MFRI, Unpublished Data)

OVERALL PERFORMANCE INDICATOR SCORE: All Gears	**95**
CONDITION NUMBER (if relevant): **Recommendation 1:** The use and source of bait in handline and longline UoAs be better monitored and managed to ensure they are derived from sustainable sources.	

PI 2.1.3 Primary species information: All Gears

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?	Y	Y	Y
	Justification	Full quantitative information, in the form of landings, to measure the impact of each gear on each stock is available. In addition, there are demersal surveys (*Nephrops*, shrimp, spring and autumn surveys), and catch composition sampling (length, age) for both surveys and commercial catches covering all main species. These data are suitable for quantitative stock assessment and risk-based assessments are not required. These data are sufficient to determine status of these stocks and the impact of each fishing gear (in terms of fishing mortality) with a high degree of certainty, meeting SG100.		
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?			Y
	Justification	All minor species, like the main species, have accurate landings recorded for all gears. This includes species used as bait because purchases are recorded, although information relevant to impact would come from the original first capture fisheries. All 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 stocks and 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.
	Met?	Y	Y	Y
	Justification	Information for main species in all gears is sufficient to support stock assessment, estimate biomass and adjust the TAC accordingly. This is the standard harvest strategy and 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. For bait species, quantities are purchased either from local managed fisheries or imported. These fisheries are not expected to provide any direct information to support the harvest strategy of bait species. Because all primary species have information sufficient to evaluate the harvest strategy, SG100 is met for all stocks and gears.		
References		http://www.iucnredlist.org; ICCAT 2015; ICCAT 2017; ICES Advice ARU 2018; ICES Advice BLI 2018; ICES Advice CAP 2018; ICES Advice COD 2018; ICES Advice GHL 2018; ICES Advice HAD 2018; ICES Advice HER_Spr 2018; ICES Advice HER_Sum 2018; ICES Advice LIN 2018; ICES Advice MAC 2018; ICES Advice POK 2018; ICES Advice REB_Ice 2018; ICES Advice REG 2016; ICES Advice USK 2018; ICES Advice WHB 2018; ICES REB_NEArctic 2018; MFRI Advice CAA 2018; MFRI Advice CAS 2018; MFRI Advice DAB 2018; MFRI Advice KHG 2018; MFRI Advice LEM 2018; MFRI Advice LUM 2018; MFRI Advice MON 2018; MFRI Advice NEP 2018; MFRI Advice PLA 2018; MFRI Advice PLE 2018; MFRI Advice PRA_Inshore 2018; MFRI Advice PRA_Offshore 2018; MFRI Advice SFV 2018; MFRI Advice WHG 2018; MFRI Advice WIT 2018; Catchprofile 2013-17.xlsx (MFRI, Unpublished Data)		
OVERALL PERFORMANCE INDICATOR SCORE (All Gears):				**100**
CONDITION NUMBER (if relevant): **Recommendation 1:** The use and source of bait in handline and longline UoAs be better monitored and managed to ensure they are derived from sustainable sources.				

PI 2.2.1 Secondary species outcome

Note on scoring: There are no main 'in-scope' secondary species for any UoA. There are three 'out of scope' bird species and five 'out of scope' marine mammal species (see Table 25) that are treated as main species. Scoring is by element (species) unless there are no main secondary species (trawls, Danish seine and handline), in which case the scoring issue (a) for main species meets SG100. Because no minor species meets SG100, the standard scoring by issue is applied, so the score for the performance indicator is 90.

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			
	Guidep	Main Secondary species are	Main secondary species are	There is a high degree of

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.		
	ost	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.	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.	certainty that main secondary species are within biologically based limits.

Met?	TB	Y	LL	Y	TB	Y	LL	Y	TB	Y	LL	P
	TN	Y	LH	Y	TN	Y	LH	Y	TN	Y	LH	Y
	SD	Y	GN	Y	SD	Y	GN	P	SD	Y	GN	N

Justification

Species	TB	TN	SD	LL	LH	GN
Cormorant				100		
Harbour porpoise						60
Harp seal						80
Hooded seal						80
Lesser black-backed gull				80		
Razorbill						80
Ringed seal						80
White-beaked dolphin						100

Justification

There are no main in-scope secondary species. For out-of-scope species, where no interactions have been recorded, there is a high degree of certainty that such interactions or subsequent mortality is absent or negligible (Table 19; greyed out above), so these elements effectively meet SG100.

Harbour porpoise / gillnet:

The most recent successful survey for harbour porpoise around Iceland was in 2007, and

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.
		gave a population estimate of 43,000 (median estimate, 95% CIs 32-162,000), with NAMMCO (AEWG) suggesting that this might be an underestimate. The IUCN Redlist assessment puts the species at 'least concern' globally based on a large population size, but this analysis is likewise somewhat old (2008), however the recent (2017) Icelandic redlist also agrees with this analysis. Population trends in the last decade are unknown, although research is underway in Iceland to obtain another population size estimate (close kin analysis; see 3.4.4.3). Taking the above population estimate, and the 1800 /yr as an upper bound for annual gillnet bycatch, as suggested by NAMMCO BYCWG, this provides an upper bound estimate of the annual impact of the fishery on the population of 4.2%. Alternatively, taking the lower 5% CI of the population estimate, an 'upper' bound of 5.7%. Taking the 2014-17 average bycatch estimate of 1353 /yr (Table 19) the figures are 3.1% and 4.3%. These estimates are very uncertain, and according to NAMMCO BYCWG are very likely to be over-estimates; currently, however, they are the best available. ASCOBANS has put forward an estimate of 1.7% as the maximum additional mortality which can be supported by a stable harbour porpoise population – however this estimate was always uncertain, and is derived from the North Sea which is a completely different ecosystem to the Icelandic shelf; there is therefore no guarantee that it applies in this case. Bycatch data is not robust enough to evaluate trends over time, according to MRFI, but since cod gillnet effort has declined significantly over the last 20 years, it is presumed that pressure on the stock from gillnet bycatch (reported by IUCN to be the main source of anthropogenic mortality) has declined since the most recent Icelandic population survey. On that basis, we can argue that the population is 'likely' to still be within biologically-based limits, taking these limits to be the population size at the last survey (since no management target has been set); a population of 32,000 should not have issues with recruitment. On this basis SG60 is met. Given that population data are old and bycatch rates, even if uncertain have apparently been considerable since this time (see Table 19), and given that the pressure on the population remains above the ASCOBANS notional limit, however, it is not possible to say that the population is 'highly likely' to be within biologically-based limits, so the first part of SG80 is not met. In relation to the second part of SG80, we have no evidence of recovery as yet (until the genetic research is published). There is also no management in place which can ensure that the UoA is not hindering recovery or rebuilding – although some measures have been tested (such as pingers), they have not been shown to be successful. SG80 is not met. Seals / gillnet: MFRI estimate some gillnet bycatch of three non-ETP seal species (harp, ringed and hooded), with the highest being 112 /yr for harp seal and bycatch of the other two species estimated at an order of magnitude less. NAMMCO BYCWG, however, expressed the view that it was not likely that species other than harbour and grey seal were taken as bycatch in this fishery, given that these species are present in Icelandic waters only as part of a migratory pathway, and do not come on to land (in Iceland or in fact anywhere); while the gillnet fishery is based around small, coastal vessels and bycatch is mainly of juveniles. According to NAMMCO (https://nammco.no/topics/harp-seal/) Iceland is barely within the distribution of the harp seal, with the species only likely to be present on the north coast. The Greenland Sea stock of harp seal estimated at 627,000 adults; NAMMCO considers the stock status to be 'satisfactory' and removals sustainable. On this basis, SG80 is met, but without more information (e.g. from the NAMMCO stock assessment), SG100 is not met. According to NAMMCO (https://nammco.no/topics/ringed-seal/) Iceland is not within the range of the ringed seal, although vagrants may occur. There is no stock assessment; NAMMCO note that there is 'little evidence of depletion' but express concern about the

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.
		likely impact of climate change on this ice-dependent species. Given that MFRI estimates of bycatch are relatively low (~25 /yr) and that all the evidence suggests that most or all of this is in fact other species, it does not appear likely at all that this fishery will have any stock-level impact on ringed seal. On this basis, SG80 (second, alternative clause) is met. Lacking certainty about the stock size and status as well as the species identification, SG100 is not met. According to NAMMCO (https://nammco.no/topics/hooded-seal/), Iceland is in the range of hooded seal, which however do not haul out on land, being ice-dependent. The Greenland Sea population is estimated at ~70,000 and is estimated to be in poor shape. All hunting (except a very small hunt in Greenland) was stopped in 2007, but the population has continued declining. NAMMCO put forward several hypotheses, including changes in ice cover which has forced a change in breeding grounds (perhaps to areas which are not surveyed), or has made them more vulnerable to predators. Competition with commercial fisheries for prey species may be an issue, but bycatch in fisheries is not mentioned. Given the relatively low estimate of bycatch (~10-15 /yr), the potential for misidentification as discussed above, and the fact that gillnet bycatch is not mentioned as a concern by NAMMCO, the team has concluded that it is not at all likely that the UoA is hindering recovery and rebuilding of this stock; SG80 (second, alternative clause) is met. White-beaked dolphin / gillnet: Bycatch of white-beaked dolphin has not been recorded in the MFRI survey nor by inspectors in the data set starting in 2014. It has, however, been recorded occasionally in logbooks, average ~~1 per year (3 records in total). This species is recorded as 'least concern' by IUCN both globally and in relation to Iceland; SG80 is met. IUCN notes that their abundance is estimated to be >100,000 in the North Atlantic, with no reported population declines or threats noted. On this basis, the team concluded that there was a high degree of certainty that the species is within biologically-based limits; SG100 is met. Razorbill / gillnet: The Icelandic population of razorbills was most recently estimated at 313,000 pairs (2007), and categorised in the 2017 red list as 'near threatened' based on a statistically non-significant declining trend (Table 20). Gillnet bycatch is estimated at ~21 /yr, which is based on a scaled-up estimate of 83 birds in 2015, but no observations in the other three years. Razorbills are a species of auk, which are dependent on sandeels and which have therefore suffered population declines since the collapse in the sandeel population around Iceland in 2004-5; this is a consistent trend regardless of fisheries bycatch. On this basis, while it is not clear whether the species in within biologically-based limits, it seems unlikely that the relatively low level of bycatch is having a population-level impact relative to the large-scale ecological changes in Icelandic seas. SG80 is met. Cormorant / longline: The Icelandic cormorant population almost doubled in the years 1995-2007. It is listed on the 2017 red list as 'least concern' because the population is large, growing and well-dispersed around the coast (Table 20). On this basis, there is a high degree of certainty that the population is within biologically-based limits; SG100 is met. Lesser black-backed gull / longline: The lesser black-backed gull reportedly first arrived in Iceland in the 1930s, and the population grew continuously, reaching ~50,000 pairs, until the 2004-5 sandeel decline, since this is a species significantly dependent on sandeels. The population was estimated in 2016 at 6-8000 pairs. MFRI estimate longline bycatch (approximately) at ~114 /yr. It is highly likely that the population is within biologically-based limits, as well as a very low probability that this fishery is having any significant impact. SG80 is met. It is not clear what 'biologically-based limits' should be for this species, given its highly

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.		
		variable history in Iceland. The most recent estimate of 50,000 pairs in Iceland is assumed to be the maximum in the history of the Icelandic population and the species is evaluated as 'data deficient' by IUCN. There is not therefore a high degree of certainty and SG100 is not met. Other MSC UoAs which may overlap (under SG80 third clause): MSC specify that this should apply to UoAs and species catches are 'considerable', defined as 10% or more of the total UoA catch. Anglerfish gillnets fit these criteria in relation to harbour porpoise. This species does not achieve SG80 in any case, irrespective of cumulative effects. Another potentially overlapping UoA for bycatch of some of the main secondary species (porpoise, harbour seal and grey seal mainly) is lumpfish gillnets, but this UoA is currently suspended (due to by-catch issues).		
b	**Minor secondary species stock status**			
	Guidepost			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?			N
	Justification	All species and gears: status of secondary species is not certain. 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. While there is evidence that Atlantic halibut has been reduced below biologically based limits (its PRI), the stock has been recovering over the last few years. There is 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. Although there is evidence for Atlantic halibut meets SG100, the status of other species cannot be determined, so SG100 is not met.		
References		MFRI 2017; Hammond et al. 2008; NAMMCO 2018a,b; ICES 2018. Report from the Working Group on Bycatch of Protected Species (WGBYC), 1-4 May 2018, Reykjavik, Iceland, ICESCM 2018/ACOM:25.; Skarphéðinsson et al., 2017 ; Birdlife International 2018a ; Kiszka and Braulik 2018; https://www.ni.is/midlun/utgafa/valistar/spendyr/valisti-spendyra - Iceland redlist mammals https://www.ni.is/midlun/utgafa/valistar/fuglar/valisti-fugla - Iceland redlist birds		
OVERALL PERFORMANCE INDICATOR SCORE:				
			Bottom Trawl (TB)	**90**

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.
Nephrops Trawl (TN)	90
Danish Seine (SD)	90
Longline (LL)	85
Handline (HL)	90
Gillnet (GN)	75
CONDITION NUMBER (if relevant):	2.2.1 (gillnet)

PI 2.2.2 Secondary species management strategy

<table>
<tr><td colspan="2">PI 2.2.2</td><td colspan="12">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.</td></tr>
<tr><td colspan="2">Scoring Issue</td><td colspan="4">SG 60</td><td colspan="4">SG 80</td><td colspan="4">SG 100</td></tr>
<tr><td>a</td><td colspan="13">Management strategy in place</td></tr>
<tr><td></td><td>Guidepost</td><td colspan="4">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.</td><td colspan="4">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.</td><td colspan="4">There is a strategy in place for the UoA for managing main and minor secondary species.</td></tr>
<tr><td></td><td>Met?</td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>N</td><td>LL</td><td>N</td></tr>
<tr><td></td><td></td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>N</td><td>LH</td><td>N</td></tr>
<tr><td></td><td></td><td>SD</td><td>Y</td><td>GN</td><td>Y</td><td>SD</td><td>Y</td><td>GN</td><td>N</td><td>SD</td><td>N</td><td>GN</td><td>N</td></tr>
<tr><td></td><td>Justification</td><td colspan="12">Useful definitions (FCRG Table SA8):

A “partial strategy” represents a cohesive arrangement which 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. It may not have been designed to manage the impact on that component specifically.

A “strategy” represents a cohesive and strategic arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome, and which should be designed to manage impact on that component specifically. A strategy needs to be appropriate to the scale, intensity and cultural context of the fishery and should contain mechanisms for the modification fishing practices in the light of the identification of unacceptable impacts

Gillnet:

Cod gillnet effort, and therefore impacts, have reduced in recent years, although bycatch of harbour porpoise by this UoA is still significant overall (~1300 individuals /yr as an upper bound of the estimate), and still exceeds the ASCOBANS ‘limit’ of 1.7% of the population per year (although it is not clear that this limit is relevant to this population) – see figures provided in 2.2.1a. On this basis, despite the measures that have resulted in a significant decrease in overall effort in recent years, additional management measures are necessary. This issue was identified in other assessments and has resulted in a condition.

MFRI has been trialling additional management measures (pingers) but to date these have not been successful at deterring porpoises from the gillnets. Other measures, such as identifying and closing bycatch hotspots in time and/or space, have not been tried. While the population is considered ‘least concern’ and the measures that have reduced effort are expected to maintain or not hinder rebuilding (SG60 is met), an effective partial strategy is not yet in place and SG80 is not met.

Under 2.2.1 harp, ringed and hooded seal and white-beaked dolphin scored 80 or above, on the basis that the populations are highly likely to be within biologically-based limits, and because of limited overlap between the species and the UoA. This means that additional management measures/strategies are not required; SG80 is met.

Under 2.2.1 razorbills scored 80, on the basis that bycatch estimates are relatively low (~21</td></tr>
</table>

<table>
<tr><td colspan="2">PI 2.2.2</td><td colspan="12">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.</td></tr>
<tr><td></td><td></td><td colspan="12">/yr, based on observations in only one year out of four), and population trends are clearly attributable to ecological changes (the sandeel collapse) rather than fisheries impacts. On this basis, the fishery is considered to be unlikely to be hindering recovery of the razorbill population, and hence the nature of the fishery can be regarded as measures; SG60 is met. There is, however, nothing that would constitute a ‘partial strategy’ for bird bycatch (see definition above) SG80 is not met.
Longline:
Under 2.2.1 cormorant and lesser black-backed gull scored 80 or above on the basis that the populations are highly likely to be within biologically-based limits. This means that the nature of the fishery can be regarded as a ‘partial strategy’, given that there is also monitoring in place; SG80 is met.
SG100 for all out-of-scope species:
SG100 requires a strategy for managing bycatch of out-of-scope species. Although some management measures (such as pingers for porpoises) have been tested, there is no clear strategy to minimise bird and mammal bycatch in the fishery. SG100 is not met for any out-of-scope species.
<u>Minor in-scope species</u>: There is no direct strategy for managing mortality of minor species. The current harvest strategy for main species should limit mortality on minor secondary species, but this is not incorporated in the design of the strategy and has not been directly evaluated, so SG100 is not met.
<u>Other gears</u>: As already noted above, there are no main secondary species and no evidence of significant interactions for gears other than those discussed above. On this basis, a partial strategy is not required and SG80 is met.</td></tr>
<tr><td>b</td><td colspan="13">Management strategy evaluation</td></tr>
<tr><td></td><td>Guidepost</td><td colspan="4">The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/species).</td><td colspan="4">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.</td><td colspan="4">Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or species involved.</td></tr>
<tr><td></td><td>Met?</td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>N</td><td>LL</td><td>N</td></tr>
<tr><td></td><td></td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>N</td><td>LH</td><td>N</td></tr>
<tr><td></td><td></td><td>SD</td><td>Y</td><td>GN</td><td>Y</td><td>SD</td><td>Y</td><td>GN</td><td>N</td><td>SD</td><td>N</td><td>GN</td><td>N</td></tr>
<tr><td></td><td>Justification</td><td colspan="12">A score of 80 or above requires an objective basis for confidence that measures are likely to work, based on either a high probability that the species is within biologically-based limits, or the fact of low bycatch rates and low overlap between the species and the UoA. This applies to all gears other than gillnet (SG80 is met for those gears).
Gillnet:
Estimated bycatch rates of harbour porpoise could be quite high (although NAMMCO BYCWG considers them an upper bound), and could be above recommended maximum mortality rates on the population (although this statistic should be used with caution). Since the population has not been successfully surveyed since 2007, recent population trends are unknown. The general measures to reduce overall effort are likely to work to reduce bycatch (SG60 is met). However, to date MFRI testing the additional measures (pingers), show that these have not been successful. SG80 is not met.
The only activity so far which would constitute ‘testing’ as required at SG100 has been the</td></tr>
</table>

<table>
<tr><td colspan="2">PI 2.2.2</td><td colspan="12">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.</td></tr>
<tr><td></td><td></td><td colspan="12">work to evaluate the use of pingers on gillnets to deter harbour porpoises (which were shown, unfortunately, to be ineffective). SG100 is not met.
Minor in-scope species: Because there is no direct strategy on minor species and the effect of the current harvest strategy on them has not been tested, SG100 cannot be met.</td></tr>
<tr><td>c</td><td colspan="13">Management strategy implementation</td></tr>
<tr><td></td><td>Guidepost</td><td colspan="4"></td><td colspan="4">There is some evidence that the measures/partial strategy is being implemented successfully.</td><td colspan="4">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).</td></tr>
<tr><td></td><td></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td></tr>
<tr><td></td><td>Met?</td><td>TB</td><td></td><td>LL</td><td></td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>N</td><td>LL</td><td>N</td></tr>
<tr><td></td><td></td><td>TN</td><td></td><td>LH</td><td></td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>N</td><td>LH</td><td>N</td></tr>
<tr><td></td><td></td><td>SD</td><td></td><td>GN</td><td></td><td>SD</td><td>Y</td><td>GN</td><td>N</td><td>SD</td><td>N</td><td>GN</td><td>N</td></tr>
<tr><td></td><td>Justification</td><td colspan="12"><u>Gillnet</u> does not have a successfully-implemented partial strategy to reduce the harbour porpoise mortality, so SG80 is not met. For <u>longline</u>, there are measures to reduce razorbill mortality that are inherent in how the fishery operates, and hence are implemented by definition. On this basis SG80 is met. For all the other species, measures were not considered to be required under SIa, so SG80 is met by default.

All gears:
There is not considered to be a partial strategy or strategy for any secondary species, so SG100 is not met.</td></tr>
<tr><td>d</td><td colspan="13">Shark finning</td></tr>
<tr><td></td><td>Guidepost</td><td colspan="4">It is likely that shark finning is not taking place.</td><td colspan="4">It is highly likely that shark finning is not taking place.</td><td colspan="4">There is a high degree of certainty that shark finning is not taking place.</td></tr>
<tr><td></td><td>Met?</td><td colspan="4">Y</td><td colspan="4">Y</td><td colspan="4">Y</td></tr>
<tr><td></td><td>Justification</td><td colspan="12">All gears:
There are several species of shark caught in these fisheries (Greenland shark, spiny dogfish, porbeagle, black dogfish). All gears, except pelagic trawl, report landing shark species. Prohibition in discarding would make 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. There is no direct evidence of finning. As a result, there is a high degree of certainty shark finning is not taking place, so SG100 is met.</td></tr>
<tr><td>e</td><td colspan="13">Review of alternative measures to minimise mortality of unwanted catch</td></tr>
<tr><td></td><td>Justification</td><td colspan="4">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.</td><td colspan="4">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</td><td colspan="4">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</td></tr>
</table>

<table>
<tr><td>PI 2.2.2</td><td colspan="13">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.</td></tr>
<tr><td></td><td></td><td colspan="4"></td><td colspan="4">and they are implemented as appropriate.</td><td colspan="4">they are implemented, as appropriate.</td></tr>
<tr><td></td><td rowspan="3">Met?</td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>Y</td><td>LL</td><td>N</td><td>TB</td><td>Y</td><td>LL</td><td>N</td></tr>
<tr><td></td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>Y</td><td>LH</td><td>Y</td></tr>
<tr><td></td><td>SD</td><td>Y</td><td>GN</td><td>Y</td><td>SD</td><td>Y</td><td>GN</td><td>N</td><td>SD</td><td>Y</td><td>GN</td><td>N</td></tr>
<tr><td></td><td>Guide post</td><td colspan="12">Gillnet and longline:
Bird and mammal bycatch in gillnet and longline fisheries is in issue that has come to the fore in Icelandic fisheries in the last decade. MFRI has been working to improve bycatch estimates, and the frequency of surveys of the populations concerned (e.g. seals) has been increased, so that impacts can be evaluated.
A committee has been established to review bird and mammal bycatch in fisheries, with membership from MFRI, MII, the fishing industry and external expert. The remit of the committee has been to evaluate unwanted bird and mammal bycatch and to consider ways that it can be reduced, based on ‘best practice’. The committee is due to report late 2018, and at time of writing the report is not available. This is a review of alternative measures (SG60 is met), but as an ad hoc group, it is not clear that this process is intended to be ongoing or is a one-off. SG80 is not met.
Other gears:
With regards to unwanted catches of minor in-scope species, discarding is not permitted in Icelandic fisheries and review of alternative measures to minimise mortality is addressed within the harvest strategy for all species. Available monitoring indicates that discarding is not significant. If discarding were to be detected, a further review to address this would be conducted. Therefore, a review is conducted routinely by the MFRI alongside all other issues pertinent to controlling fishing mortality. This regular consideration is evident in stock assessments, scientific advice and policy documents and SG100 is met.</td></tr>
<tr><td colspan="2">References</td><td colspan="12">Palsson et al. 2015, 2016; MFRI 2017; Hammond et al. 2008; NAMMCO 2018a,b; ICES 2018. Report from the Working Group on Bycatch of Protected Species (WGBYC), 1-4 May 2018, Reykjavik, Iceland, ICESCM 2018/ACOM:25.; Skarphéðinsson et al., 2017 ; Birdlife International 2018a ; Kiszka and Braulik 2018;
https://www.ni.is/midlun/utgafa/valistar/spendyr/valisti-spendyra - Iceland redlist mammals
https://www.ni.is/midlun/utgafa/valistar/fuglar/valisti-fugla - Iceland redlist birds
Samstarfsnefnd um bætta umgengni um auðlindir sjávar [Co-operation Committee on improved handling of marine resources]</td></tr>
<tr><td colspan="12">OVERALL PERFORMANCE INDICATOR SCORE:</td><td colspan="2"></td></tr>
<tr><td colspan="12">Bottom Trawl (TB)</td><td colspan="2">90</td></tr>
<tr><td colspan="12">Nephrops Trawl (TN)</td><td colspan="2">90</td></tr>
<tr><td colspan="12">Danish Seine (SD)</td><td colspan="2">90</td></tr>
<tr><td colspan="12">Longline (LL)</td><td colspan="2">75</td></tr>
<tr><td colspan="12">Handline (HL)</td><td colspan="2">90</td></tr>
<tr><td colspan="12">Gillnet (GN)</td><td colspan="2">65</td></tr>
<tr><td colspan="12">CONDITION NUMBER (if relevant):</td><td colspan="2">2.2.2
(gillnet &</td></tr>
</table>

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.
	longline)

PI 2.2.3 Secondary species information

PI 2.2.3		Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species.		
Scoring Issue		SG 60	SG 80	SG 100
a	**Information adequacy for assessment of impacts on main secondary species**			
	Guide post	Qualitative information is adequate to estimate the impact of the UoA on the main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main secondary species.	Some quantitative information is available and adequate to assess the impact of the UoA on main secondary species with respect to status. OR If RBF is used to score PI 2.2.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.	Quantitative information is available and adequate to assess with a high degree of certainty the impact of the UoA on main secondary species with respect to status.
	Met?	Y	TB, NT, SD, HL: Y GN & LL: N	N
	Justification	Bottom Trawl, Nephrops Trawl, Danish Seine and Handline: Data on scale and location of activity, with insignificant by-catch of the main secondary (out of scope) species for these gears as reported by MII inspectors, is adequate to assess that there is no direct impact on the status of these species. SG 80 is met. Unobserved mortality from these gears (e.g. from ghost fishing) is not considered likely since gear loss rates are low and the nature of the gears does not result in significant ghost fishing anyway. However, the limited onboard inspector and observer coverage does not provide a high degree of certainty as to direct or indirect mortality. Gillnet & Longline: Some quantitative information is available on bycatch and population size and trends for out-of-scope species (see Table 19 and Table 20). This is adequate to assess the impact of the fishery, at least in a qualitative way; see PI 2.2.1a. SG60 is met. Impact cannot easily be quantitatively evaluated however (e.g. proportion of population removed, trends over time). The potential for unobserved mortality is considered low for the same reasons as set out above. Overall, SG80 is not met.		
b	**Information adequacy for assessment of impacts on minor secondary species**			
	Guide post			Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.

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.		
	Met?			Y
	Justification	All gears: All finfish are considered minor secondary species. There is quantitative information on landings. Discard levels are unknown however, but estimates indicate that they are low. There are strong disincentives to discard and therefore landings are good measures of mortality. Species are also monitored in the surveys, even if this information is not used. For example, 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. Therefore, SG100 is met.		
c	**Information adequacy for management strategy**			
	Guide post	Information is adequate to support measures to manage main secondary species.	Information is adequate to support a partial strategy to manage main secondary species.	Information is adequate to support a strategy to manage all secondary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	TB, NT, SD, HL: Y GN & LL: N	N
	Justification	Bottom Trawl, Nephrops Trawl, Danish Seine and Handline: Information on the scale and extent of the fishery is good and informs the general measures in place manage these fisheries (SG60 is met). Information on interactions with main secondary species is adequate to show that a partial strategy is not required (see 2.2.1a, 2.2.2a). SG80 is met. In relation to SG100, bycatch information is not sufficient to show a 'high degree of certainty', and there is no strategy in place for all secondary species; SG100 is not met. Gillnet and longline: Information on the scale and extent of the fishery is good and informs the general measures in place to manage these fisheries. Information on fishery interactions with main secondary species shows that further measures to address by-catch are required (SG60 is met). Although MII have made significant efforts in recent years to improve fishermen's recording all bycatch, including birds and mammals, logbook data is at best partial. Population size and recent trends are not known, although work is underway to estimate current effective population size. Overall, the available data on bycatch magnitude and trends, population status and bycatch variability in space and time is not adequate for a partial strategy. SG80 is not met. Minor in-scope species: There is no direct strategy to manage minor species. The effect of the current harvest strategy for managing primary species has not been evaluated with respect to minor secondary species, but it is assumed that the impact of the fishery is low. Although there is quantitative catch and survey information, other information on the biology and vulnerability of these species is limited, so it may not be currently possible to develop and evaluate strategies for minor secondary species. So SG100 cannot be met for these species.		
References		As 2.2.2		
OVERALL PERFORMANCE INDICATOR SCORE:				
			Bottom Trawl (TB)	**85**
			Nephrops Trawl (TN)	**85**

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.	
	Danish Seine (SD)	85
	Longline (LL)	70
	Handline (HL)	85
	Gillnet (GN)	70
CONDITION NUMBER (if relevant):		2.2.3 (gillnet & longline)

PI 2.3.1 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	Management does not set any limits for bycatch of any ETP species, so this scoring issue is not relevant.		
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	LL	Y	TB	Y	LL	P	TB	N	LL	N
	TN	Y	LH	Y	TN	Y	LH	Y	TN	N	LH	Y
	SD	Y	GN	Y	SD	Y	GN	P	SD	Y	GN	N

Justification

Species	**TB**	**TN**	**SD**	**LL**	**LH**	**GN**
Atlantic puffin						80
Black guillemot						60
Brünnich guillemot						80
Common eider						80
Common guillemot						60
Common loon						60
Great black-backed gull				60		
Grey seal	80	80				80
Harbour seal	80	80				60
Northern fulmar				60		60
Northern gannet	80	80		80		80

The figures below are taken from Table 19 and Table 20, except as otherwise indicated.

Harbour seal (gillnet, bottom trawl):

Based on MFRI estimates and the analysis of NAMMCO BYCWG, the bycatch of harbour

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
		seal in the gillnet fishery could be in the range 10-100 animals per year (see Section 0). Bycatch in the trawl fishery is estimated at ~20 /yr, based on one observation only. The harbour seal population was most recently surveyed in 2016 and estimated to be 7652 adults; a significant decline since the last survey in 2011, a 77% decline since 1980 and below the management target of 12,000. (Note, however, that according to NAMMCO BYCWG the gillnet bycatch is mainly of juveniles (<1 year), which are not included in the survey total. Given some level of natural mortality, the impact on the overall population will be lower than if mortality were mainly of breeding-age individuals.) Bycatch of harbour seals is also considerably higher in the lumpfish gillnet fishery (most recent MFRI estimate >1000 /yr on average 2014-17) – the lumpfish fishery was MSC-certified but at time of writing is suspended for this reason. There is also hunting of seals, which is unregulated, and with no requirement to report catches. At the site visit, MFRI and other stakeholders were of the view that hunting of seals was potentially a big (and unquantified) problem for the population. Best evidence suggests that other impacts are more likely to be hindering recovery and rebuilding of harbour seals than the cod gillnet fishery or the trawl fishery. The take from hunting is thought by stakeholders to be higher (although is not estimated), while the estimated bycatch from the lumpfish fishery is 10 times higher than the maximum estimate in this fishery (likely to be an upper bound, based on the same logic as applied to harbour porpoise by NAMMCO BYCWG – see 2.2.1a). On this basis, SG60 is met. For the gillnet fishery, given uncertainty in bycatch estimates and seal species identification, and the poor state of the harbour seal stock, it cannot be said that it is 'highly likely' (defined as 80% probability for this PI; FCRG Table SA9) that the fishery is not having an impact on the population; SG80 is not met for the gillnet UoA. For the trawl fishery, although the estimate of annual bycatch from MFRI is actually higher than for the gillnet fishery, this is a function of observer coverage; both estimates are based on one single observation. Proportional observer coverage is higher in the gillnet fishery, so when the one observation is scaled up to give an estimate for the whole fleet, the gillnet estimate is lower. For the trawl fishery, however, there is not the source of uncertainty relating to the identification of bycatch as other seal species (which gives a much higher upper bound to the estimate). MFRI scientists (see Table 24) report that catching a seal in a demersal trawl is in practice a rather rare event. On this basis, the team concluded that it is highly likely that this UoA is not impacting the harbour seal population; S80 is met. There is not, however, a 'high degree of confidence', so SG100 is not met. Grey seal / gillnet and trawl: MFRI do not estimate any grey seal bycatch in the cod gillnet fishery, but based on NAMMCO BYCWG discussion regarding misidentification of juvenile seals, some is possible, to a maximum upper bound of ~~60 /yr (see Section 0). Trawl bycatch is lower, with MFRI rough estimates of ~15 /yr based on one single observation by an inspector over four years. The situation for grey seals is similar to harbour seals in relation to other sources of anthropogenic mortality; MFRI estimates of bycatch in the lumpfish fishery are very similar (>1,000 /yr) and there is also unquantified hunting. The most recent published survey data (2012) estimated the adult population at 4,200; marginally above the management target of 4,100. A new survey was conducted in 2017 – results are not at the time of writing, but at the site visit MFRI reported that it shows an increase in the population to ~~6,000 adults. Note that the new red listing for grey seal (which lists it as endangered) were done before the results of this most recent survey were available; the red list also responds to criteria other than just trends in population size (e.g. if populations are concentrated in a few areas; cf gannets). On this basis, the population is highly likely to be within biologically-based limits (the management target), hence the fishery is not hindering recovery and rebuilding; SG80 is

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
		met. Until the results of the 2017 survey are published, there will not be a 'high degree of certainty' about the population status, so SG100 is not met. Northern fulmar: The Icelandic fulmar population is large (1.2 million pairs estimated in 2017) but is declining quite rapidly (~2% per year; perhaps faster) (see Section 0). This would currently correspond to a decline of ~48,000 adult birds /yr. This is high compared to MFRI's estimate of the overall bycatch from this fishery (across all UoCs) of ~2600 birds /yr, although if the fishery is impacting adults when they are foraging for young during nesting, it may have an impact in terms of chick survival over and above the impact from directly-observed mortality. Fulmar are a sandeel-dependent species, so it is supposed that the decline is mainly explicable by a crash in their food supply (Kristinn Skarphéðinsson, pers. comm.). In relation to gillnets, the MFRI bycatch estimate is ~1436 birds /yr. NAMMCO BYCWG noted in passing that this estimate, derived mainly from the annual survey, was very high compared to other data sources (inspectors), and MFRI scientists noted that unlike on commercial vessels, they gut fish on deck, and hence most likely attract more seabirds than a commercial vessel. This may mean that this is an over-estimate of the gillnet bycatch of fulmars; unfortunately, we have no means of knowing for sure. Under PI 2.3.1, the terms 'likely' and 'highly likely' have been quantitatively defined by MSC to be a 70% and 80% probability, respectively (Table SA9). Although no such quantitative analysis is possible in this case, we note that a 30% probability of hindering recovery, corresponding to SG60, is a relatively low bar. Given that the gillnet bycatch estimates correspond to ~3% of the overall estimated decline in adult birds each year (or ~5.4% if both relevant UoAs are evaluated together), the team concluded that SG60 is met, but the data does not allow for confidence that highly likely is met and so SG80 is not met. For longline, estimated annual bycatch is similar to (slightly lower than) gillnet (~1148 /yr). The same argument applies – SG60 is met but SG80 is not met. Common guillemot: Guillemots depend on sandeels as their main food supply. The most recent estimate of the Icelandic common guillemot population was 690,000 pairs in 2006-8, and it is thought to be declining at ~1.6% per year, which would mean that it is now ~575,000 pairs, with an annual reduction in the adult population of ~20,000 birds. The MFRI bycatch estimate for common guillemot in the gillnet fishery is ~470 /yr, although based on the same argument as for fulmar, this may be an over-estimate, but conversely there may also be unobserved impacts on chick survival. Based on a (very approximate and assumption-laden) estimate that the fishery accounts for ~2-3% of the annual reduction in the population, the logic is the same as for fulmars; i.e. SG60 is met, but SG80 is not met. Northern gannet: Gannets do not depend on sandeels. The Icelandic population size was estimated at 37,000 pairs in 2013-14, and has been increasing, although the population is still categorised in the Icelandic red list as vulnerable, based on the fact that there are only 5 nesting sites in Iceland. Bycatch is estimated at ~141 /yr for the gillnet UoA, ~354 /yr for the longline UoA and 36 /yr for the trawl UoA. Based on the fact that the population is increasing, none of the UoAs (nor all three combined) is impacting the population significantly. SG80 is met. Given that i) bycatch estimates are uncertain and ii) the population is still categorised as vulnerable, there is not a 'high degree of certainty' in this conclusion; SG100 is not met. Common eider: Eider do not depend on sandeels. The Icelandic over-wintering population is estimated at 850,000 pairs, but not all of these breed in Iceland. Since ~2000, the population has been

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
		declining at ~1.5% /yr, corresponding to a reduction of ~25,000 birds /yr. MFRI's bycatch estimate (for the gillnet UoA) is ~79 /yr. On this basis, it is highly unlikely that the fishery is having any impact on the population; SG80 is met. Based on a lack of certainty around bycatch estimates and the vulnerability of the population, SG100 is not met. Common loon: Loons mainly breed in freshwater, but overwinter next to coasts. The Icelandic population of loons is small (estimated minimum 2-300 pairs) although according to the Icelandic redlist assessment, it seems to have been increasing gradually. Their population centre is in North America, where they breed all across Canada and Alaska, with some breeding in Greenland, Iceland and Svalbard as outlying populations. They are highly migratory, and overwinter on both coasts of North America, as far south as Mexico, and in NW Europe as far south as Spain. Globally, IUCN categorise the species as 'least concern', based on a large, stable population and a large range. The species is highly migratory and there is no evidence that the birds breeding in Iceland and Greenland are separate from the larger North American population (Kristinn H Skarphéðinsson, pers. comm.). However, some organisations do consider these populations separately (e.g. Wetlands International, 2019), although they are at least connected to the larger North American population. On this basis, the gillnet bycatch (estimated 46 /yr, based on limited data) is likely to not be hindering recovery; SG60 is met. However, given the possibility of some population distinctiveness, there remains a risk of impact. SG80 is therefore not met. Atlantic puffin: Puffins are highly sandeel dependent, and the Icelandic population is declining rapidly, at ~4% per year, with the population projected at current rates of decline to reach <10% of 20th century levels by 2068. Nevertheless, the population at present is still relatively large – estimated at ~2 million pairs in 2014 (corresponding to 1.6-1.7 million now at the estimated rate of decline). MFRI bycatch estimates in the gillnet fishery are ~10 per year, making it highly likely that the fishery is not hindering recovery. Given the uncertain bycatch estimates, however, there is not a high degree of confidence; SG80 is met but SG100 is not met. Great black-backed gull: The Icelandic population is estimated at ~6-8,000 pairs (2016), which is approximately half what it was in the 1970s (corresponding to a rate of decline of ~~1.7% /yr or 240 birds /yr currently). Great black-backed gulls feed on sandeels but also a wide range of other species of fish, invertebrates, other seabirds, chicks, eggs, terrestrial animals and garbage; reportedly they visit cities and gardens in Iceland more than formerly, perhaps because of a shortage of natural food. Considering the NW Europe population more widely, it is categorised as 'least concern' since it is large and widely distributed. Local declines are observed in some areas, but IUCN note that they tend to be 'short-term adjustments' which stabilise after a few years; declines in some areas may be balanced by increases in other areas – possibly reflecting the opportunistic and plastic behaviour of this species. Longline bycatch is estimated by MFRI at ~52 /yr, which could account for ~20% of the decline. Given IUCN's observations on the population dynamics of this species, however, it is not considered 'likely' that the longline fishery is significantly responsible for population trends (SG60 is met). However, it cannot be said to be 'highly likely' (SG80 is not met). Black guillemot: Black guillemot bycatch has not been recorded since 2014 either in the cod gillnet survey nor by the inspectors, but is recorded in gillnet logbook data, to an average of ~13 /yr. It is curious that it is not recorded in the survey data at all, since April is the peak month for auk abundance – see Figure 22 – so if anything it would be expected to be over-represented

<table>
<tr><td colspan="2">PI 2.3.1</td><td colspan="12">The UoA meets national and international requirements for the protection of ETP species
The UoA does not hinder recovery of ETP species</td></tr>
<tr><td></td><td></td><td colspan="12">in the survey relative to the logbook data.
The population size of black guillemot is uncertain; the species is difficult to survey because it nests in small groups dispersed among other seabirds, rather than in large, easy-to-find colonies. From the data in the Icelandic red list, a decline of ~2.2% /yr from a population of ~~25,000 adults in 2000 results in a current population of ~~8,500 pairs and an annual reduction of ~~350 birds (this is highly uncertain but the best we can do with the figures available). A potential annual bycatch of 13 individuals, therefore, corresponds very approximately to ~3.5% of the annual population reduction. The redlist assessment notes the main threats as the lumpfish fishery and potentially mink predation. On this basis, SG60 is met. Given the uncertainty in the above estimates and the poor state of the population, SG80 is not met.
Brünnich's guillemot:
Brünnich's guillemot is also only recorded in gillnet logbook data, and only an average of ~one per year, with no records in the survey or by inspectors. On this basis, it is highly unlikely that this UoA is having a significant impact on this stock; SG80 is met. Uncertainty means that SG100 is not met.</td></tr>
<tr><td>c</td><td colspan="13">Indirect effects</td></tr>
<tr><td></td><td>Guidepost</td><td colspan="4"></td><td colspan="4">Indirect effects have been considered and are thought to be highly likely to not create unacceptable impacts.</td><td colspan="4">There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.</td></tr>
<tr><td></td><td>Met?</td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>N</td><td>LL</td><td>N</td></tr>
<tr><td></td><td></td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>N</td><td>LH</td><td>N</td></tr>
<tr><td></td><td></td><td>SD</td><td>Y</td><td>GN</td><td>Y</td><td>SD</td><td>Y</td><td>GN</td><td>Y</td><td>SD</td><td>N</td><td>GN</td><td>N</td></tr>
<tr><td></td><td>Justification</td><td colspan="12">Unobserved mortality (such as chick mortality associated with mortality of foraging breeding adults) is considered by MSC as 'direct mortality'. Potential indirect effects on mammals and birds from this fishery are considered to be i) physical disturbance, ii) noise and iii) pollution.
In relation to physical disturbance, there may be some (e.g. if a vessel is operating close to seabird colonies), but both the UoAs concerned (gillnet and longline) are made up of relatively small vessels, and make up a small proportion of the overall Icelandic fishing fleet, so this is not thought to be significant. The same argument applies to noise. Plastic and contaminants are not permitted to be discharged at sea in Iceland; waste must be brought back to land and discharged following normal rules (including recycling). Indirect effects are therefore considered to be highly unlikely to create unacceptable impacts on any of the above species. There is not, however, a high degree of confidence based on formal data or analysis – SG100 is not met.
For the other gear types, there is no evidence from MFRI or MII observers of significant interactions with ETP species, except for minor interactions with seals from the trawl UoA (see 2.3.1). There is no evidence of significant indirect effects – the most important bird and seal foraging areas (e.g. fjords) are fished by smaller vessels, while the largest vessels are operating further offshore. On this basis, SG80 is met. SG100 is not met.</td></tr>
<tr><td colspan="2">References</td><td colspan="12">MFRI 2017; NAMMCO 2018a; Þorbjörnsson et al. 2017 ; Skarphéðinsson et al., 2017 ; Birdlife International 2018b,c ; Wetlands International, 2019
https://www.ni.is/midlun/utgafa/valistar/spendyr/valisti-spendyra - Iceland redlist mammals
https://www.ni.is/midlun/utgafa/valistar/fuglar/valisti-fugla - Iceland redlist birds</td></tr>
</table>

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**	
OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom Trawl (TB)	**80**
	Nephrops Trawl (TN)	**80**
	Danish Seine (SD)	**90**
	Longline (LL)	**75**
	Handline (HL)	**90**
	Gillnet (GN)	**75**
CONDITION NUMBER (if relevant):		**2.3.1 (gillnet and longline)**

PI 2.3.2 ETP species management strategy

<table>
<tr><td colspan="2">PI 2.3.2</td><td colspan="12">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.</td></tr>
<tr><td colspan="2">Scoring Issue</td><td colspan="4">SG 60</td><td colspan="4">SG 80</td><td colspan="4">SG 100</td></tr>
<tr><td rowspan="4">a</td><td colspan="13">Management strategy in place (national and international requirements)</td></tr>
<tr><td>Guidepost</td><td colspan="4">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.</td><td colspan="4">There is a strategy in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.</td><td colspan="4">There is a comprehensive strategy in place for managing the UoA's impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.</td></tr>
<tr><td>Met?</td><td colspan="4">(Not relevant)</td><td colspan="4">(Not relevant)</td><td colspan="4">(Not relevant)</td></tr>
<tr><td>Justification</td><td colspan="12">There are no formal requirements under Icelandic or international legislation for any of these species so the scoring issue is not relevant.</td></tr>
<tr><td rowspan="8">b</td><td colspan="13">Management strategy in place (alternative)</td></tr>
<tr><td>Guidepost</td><td colspan="4">There are measures in place that are expected to ensure the UoA does not hinder the recovery of ETP species.</td><td colspan="4">There is a strategy in place that is expected to ensure the UoA does not hinder the recovery of ETP species.</td><td colspan="4">There is a comprehensive strategy in place for managing ETP species, to ensure the UoA does not hinder the recovery of ETP species</td></tr>
<tr><td></td><td colspan="4"></td><td colspan="4"></td><td colspan="4"></td></tr>
<tr><td>Met?</td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>Y</td><td>LL</td><td>N</td><td>TB</td><td>N</td><td>LL</td><td>N</td></tr>
<tr><td></td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>N</td><td>LH</td><td>N</td></tr>
<tr><td></td><td>SD</td><td>Y</td><td>GN</td><td>Y</td><td>SD</td><td>Y</td><td>GN</td><td>N</td><td>SD</td><td>N</td><td>GN</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="12">A "comprehensive strategy" (applicable only for ETP component) is a complete and tested strategy made up of linked monitoring, analyses, and management measures and responses.

Gillnet / seals:
Under 2.3.1 harbour seal scored 60 for gillnet, on the basis that the fishery was not likely to be impacting recovery and rebuilding, but given the uncertainty in bycatch numbers and species identification for the gillnet UoA, we could not state that this was 'highly unlikely'. The focus of bycatch reduction efforts for seals in Iceland has been in the lumpfish fishery, where seal bycatch is far higher than in this fishery. It is therefore reasonable to consider that the nature of this fishery (with lower although uncertain bycatch rates) constitutes 'measures' which mean that it is not likely to be hindering recovery and rebuilding of the harbour seal stock. On this basis, SG60 is met.
SG80 requires a 'strategy' to ensure that the fishery is not hindering recovery of harbour seal (see definition of 'strategy' under 2.2.2). Given that we cannot be sure at the level of SG80 ('highly likely') that the gillnet fishery is not having an impact on the harbour seal population, a strategy would be required to put measures in place which are responsive to</td></tr>
</table>

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.											
		the level of bycatch and the state of the stock. This is not the case here, so SG80 is not met. Gillnet and Longline / birds: For the longline fishery, there are some seabird bycatch mitigation measures which are in use in the Icelandic fishery; vessels must either use bird scaring lines or sound a gas alarm before the line is shot. However, fulmar, guillemot, great black-backed gull and black guillemot scored 60 under 2.3.1b, on the basis of higher uncertainty in the estimate of bycatch impacts. Likewise for gillnet, although bycatch is lower than in the lumpfish fishery (see discussion for seals above), it remains problematic for some species (see 2.3.1 above). Under these circumstances, additional measures in the gillnet and longline fisheries are required, including improved bycatch data is needed to better evaluate impacts. MFRI have followed this strategy – noting the significant improvement in bycatch data between this report and the previous assessment – however, bycatch rates remain uncertain for various reasons (see Section 3.4.4.5). On this basis, the team concluded that SG60 is met but SG80 is not met. Other gears: For the trawl fishery, significant impacts are not considered at all likely (see 2.3.1b), while zero interactions have been detected for the other gears. Given this fact, the strategy can consist of the nature of operation of the fishery, plus bycatch monitoring, on the basis that the fishery could respond if bycatch levels change. Such monitoring is in place, and although estimates are uncertain, they are improving, and MFRI is trying to make the best use of available information. On this basis, SG80 is met for the trawl fishery. There is not a 'comprehensive strategy' (as defined above) so 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?	TB	Y	LL	Y	TB	Y	LL	N	TB	N	LL	N
		TN	Y	LH	Y	TN	Y	LH	Y	TN	N	LH	N
		SD	Y	GN	Y	SD	Y	GN	N	SD	N	GN	N
	Justification	All UoA: There is a plausible argument that the UoAs are not likely to be impacting recovery and rebuilding of any of the ETP species, based on an evaluation of available bycatch and population data (see 2.3.1). SG60 is met for all species and gears. Gillnet & longline: For harbour seals, a plausible argument can be made that the 'measures' (the nature of the fishery) are likely to work, based on i) bycatch is estimated at a maximum of 100 /yr (probably lower; see NAMMCO BYCWG and Table 19), which is an order of magnitude											

<table>
<tr><td colspan="2">PI 2.3.2</td><td colspan="3">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.</td></tr>
<tr><td></td><td></td><td colspan="3">lower than the lumpfish fishery; hunting was also considered by MFRI scientists to have a higher impact than this fishery; ii) bycatch is reported to be made up of juveniles (according to NAMMCO) which would have a lower population-level impact than adults; iii) taking the maximum likely bycatch of ~100, this constitutes 1.3% of the population /yr (leaving aside the fact that the population estimate is of adults only), which is not a high enough impact to have contributed significantly to the collapse in harbour seal numbers seen between 2011 and 2016. On this basis, SG60 is met.

In relation to SG80, for the gillnet UoA, lacking more quantitative data on bycatch numbers and population trends, SG80 is not met. For the trawl UoA, the low estimate of bycatch and the statement by stakeholders that seal bycatch in demersal trawls is rare provides an objective basis for confidence that the UoA is not having a significant impact. SG80 is met.

<u>Fulmar (gillnet and longline), common guillemot (gillnet), loon (gillnet), great black-backed gull (longline), black guillemot (gillnet)</u>: For these species, the evaluation that impacts are sustainable (see 2.3.1b) is more uncertain, and on that basis, the data available for these species, while constituting a ‘plausible argument’ (see 2.3.1b), do not provide an objective basis for confidence that the measures are working; SG80 is not met for these gears.

All other gears:

Because the bycatch and population data provide an objective basis for confidence that the measures in all UoAs (i.e. the nature of the fishery) are working to keep impact within sustainable levels, SG80 is met.

All gears:

Since there is no strategy, and quantitative analysis, although attempted, is highly uncertain, so SG100 is not met for all gears.</td></tr>
<tr><td rowspan="4">d</td><td colspan="4">Management strategy implementation</td></tr>
<tr><td>Guidepost</td><td></td><td>There is some evidence that the measures/strategy is being implemented successfully.</td><td>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).</td></tr>
<tr><td>Met?</td><td></td><td>Y</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3">All gears:

The ‘measures’ in place are i) the nature and operation of the fishery and ii) the improved bycatch data collection (see Section 3.4.4.6). They are being implemented successfully, so SG80 is met. Lacking a strategy, SG100 is not met.</td></tr>
<tr><td rowspan="2">e</td><td colspan="4">Review of alternative measures to minimize mortality of ETP species</td></tr>
<tr><td>Guidepost</td><td>There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.</td><td>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.</td><td>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.</td></tr>
</table>

<table>
<tr><td colspan="2">PI 2.3.2</td><td colspan="12">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.</td></tr>
<tr><td rowspan="4"></td><td rowspan="3">Met?</td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>Y</td><td>LL</td><td>N</td><td>TB</td><td>Y</td><td>LL</td><td>N</td></tr>
<tr><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>Y</td><td>LH</td><td>Y</td></tr>
<tr><td>SD</td><td>Y</td><td>GN</td><td>Y</td><td>SD</td><td>Y</td><td>GN</td><td>N</td><td>SD</td><td>Y</td><td>GN</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="12">Gillnet & longline:
Bird and mammal bycatch in gillnet & longline fisheries is an issue that has come to the fore in Icelandic fisheries in the last decade. MFRI has been working to improve bycatch estimates, and the frequency of surveys of the populations concerned (e.g. seals) has been increased, so that impacts can be evaluated.
A committee has been established to review bird and mammal bycatch, with membership from MFRI, MII, the fishing industry and external expert. The remit of the committee has been to evaluate unwanted bird and mammal bycatch and to consider ways that it can be reduced, based on ‘best practice’. The committee is due to report late 2018, and at time of writing the report is not available. This is a review of alternative measures (SG60 is met), but as an ad hoc group, it is not clear that this process is intended to be ongoing or is a one-off. SG80 is not met.
Other gears:
With regards to unwanted catches of minor in-scope species, discarding is not permitted in Icelandic fisheries and review of alternative measures to minimise mortality is addressed within the harvest strategy for all species. Therefore, a review is conducted routinely by the MFRI alongside all other issues pertinent to controlling fishing mortality. This regular consideration is evident in stock assessments, scientific advice and policy documents and SG100 is met.</td></tr>
<tr><td colspan="2">References</td><td colspan="12">MFRI 2017; NAMMCO 2018a; Þorbjörnsson et al. 2017 ; Skarphéðinsson et al., 2017; Birdlife International 2018b,c; ISF Iceland Cod, PCR, VTun 2017c.
https://www.ni.is/midlun/utgafa/valistar/spendyr/valisti-spendyra - Iceland Redlist mammals
https://www.ni.is/midlun/utgafa/valistar/fuglar/valisti-fugla - Iceland Redlist birds
Samstarfsnefnd um bætta umgengni um auðlindir sjávar [Co-operation Committee on improved handling of marine resources]</td></tr>
</table>

OVERALL PERFORMANCE INDICATOR SCORE:	
Bottom Trawl (TB)	**85**
Nephrops Trawl (TN)	**85**
Danish Seine (SD)	**85**
Longline (LL)	**65**
Handline (HL)	**85**
Gillnet (GN)	**65**
CONDITION NUMBER (if relevant):	**2.3.2 (gillnet and longline)**

PI 2.3.3 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			
	Guide post	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	TB, NT, SD, HL: Y GN & LL: N	N
	Justification	Bottom Trawl, Nephrops Trawl, Danish Seine and Handline: Data on scale and location of activity, as well by-catch of the ETP species for these gears, is adequate to assess that there is no direct impact on the status of these species. SG 80 is met. Unobserved mortality from these gears (e.g. from ghost fishing) is not considered likely since gear loss rates are low and the nature of the gears does not result in significant ghost fishing anyway. However, the limited observer coverage does not provide a high degree of certainty. SG100 ia not met. Gillnet & Longline: Some quantitative information is available on bycatch and population size and trends for out-of-scope and ETP species (see Table 19 and Table 20). This is adequate to assess the impact of the fishery, at least in a qualitative way; see PI 2.2.1a. SG60 is met. Impact cannot easily be quantitatively evaluated however (e.g. proportion of population removed, trends over time). The potential for unobserved mortality is considered low for the reasons set out above. Overall, SG80 is not met.		
b	Information adequacy for management strategy			
	Guide post	Information is adequate to support measures to manage the impacts on ETP species.	Information is adequate to measure trends and support a strategy to manage impacts on ETP species.	Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.

<table>
<tr><td colspan="2">PI 2.3.3</td><td colspan="3">Relevant information is collected to support the management of UoA impacts on ETP species, including:
Information for the development of the management strategy;
Information to assess the effectiveness of the management strategy; and
Information to determine the outcome status of ETP species.</td></tr>
<tr><td rowspan="2"></td><td>Met?</td><td>Y</td><td>TB, NT, SD, HL: Y
GN & LL: N</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3">All gears:
The bycatch and population estimates are sufficient to be able to evaluate in general terms the likely impact of the UoAs on the ETP populations (see 2.3.1b). Measures are in place, consisting of the nature and operation of the fishery, as well as a major push to improve bycatch data (see Section 3.4.4.6). SG60 is met.
Gillnet and longline:
A strategy to manage fishery impacts on ETP species (or on seabirds and marine mammals) is not in place for the gillnet fishery and the longline fishery (see 2.3.2), and it is not clear that information is sufficient to support such a strategy at present, although it is improving. For example, for the gillnet UoA, it is not clear that bycatch estimates based on the gillnet survey can be accurately scaled up to reflect total bycatch from the commercial fishery (as per the argument made by NAMMCO BYCWG for seals and fulmars). It is also not possible as yet to measure trends in total bycatch and bycatch rates in the fishery over time, since MFRI consider that uncertainty in estimates require the use of multi-year averages rather than annual estimates. NAMMCO BYCWG refused to endorse estimates of seal bycatch, stating concerns about conflicting data from different sources as well as species identification. For the longline fishery, while there are a range of well-tested mitigation measures which could be put in place, the inability to measure trends in bycatch over time make it hard to establish whether this strategy is i) necessary and ii) working.
On this basis, SG80 is not met for either the gillnet or the longline UoA.
Other gears:
For the other UoAs, there is no evidence of any significant impacts from bycatch of seabirds or mammals, and on this basis, information is sufficient to support the current strategy and infer that additional measures are not required. SG80 is met.
All gears:
There is not sufficient information to inform a comprehensive strategy to manage impacts on ETP species and SG100 is not met.</td></tr>
<tr><td colspan="2">References</td><td colspan="3">MFRI 2017; NAMMCO 2018a; Þorbjörnsson et al. 2017 ; Skarphéðinsson et al., 2017 ; Birdlife International 2018b,c ;
https://www.ni.is/midlun/utgafa/valistar/spendyr/valisti-spendyra - Iceland Redlist mammals
https://www.ni.is/midlun/utgafa/valistar/fuglar/valisti-fugla - Iceland Redlist birds</td></tr>
<tr><td colspan="4">OVERALL PERFORMANCE INDICATOR SCORE:</td><td></td></tr>
<tr><td colspan="4" align="right">Bottom Trawl (TB)</td><td>80</td></tr>
<tr><td colspan="4" align="right">Nephrops Trawl (TN)</td><td>80</td></tr>
<tr><td colspan="4" align="right">Danish Seine (SD)</td><td>80</td></tr>
<tr><td colspan="4" align="right">Longline (LL)</td><td>60</td></tr>
<tr><td colspan="4" align="right">Handline (HL)</td><td>80</td></tr>
<tr><td colspan="4" align="right">Gillnet (GN)</td><td>60</td></tr>
<tr><td colspan="4">CONDITION NUMBER (if relevant):</td><td>2.3.3</td></tr>
</table>

<table>
<tr><td>PI 2.3.3</td><td colspan="2">Relevant information is collected to support the management of UoA impacts on ETP species, including:
Information for the development of the management strategy;
Information to assess the effectiveness of the management strategy; and
Information to determine the outcome status of ETP species.</td></tr>
<tr><td colspan="2"></td><td>(gillnet and longline)</td></tr>
</table>

PI 2.4.1 Habitats outcome

<table>
<tr><td colspan="2">PI 2.4.1</td><td colspan="12">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="4">SG 60</td><td colspan="4">SG 80</td><td colspan="4">SG 100</td></tr>
<tr><td>a</td><td colspan="13">Commonly encountered habitat status</td></tr>
<tr><td></td><td>Guidepost</td><td colspan="4">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="4">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="4">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></td><td>Met?</td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>Y</td><td>LL</td><td>Y</td><td>TB</td><td>N</td><td>LL</td><td>Y</td></tr>
<tr><td></td><td></td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>Y</td><td>LH</td><td>Y</td><td>TN</td><td>N</td><td>LH</td><td>Y</td></tr>
<tr><td></td><td></td><td>SD</td><td>Y</td><td>GN</td><td>Y</td><td>SD</td><td>Y</td><td>GN</td><td>Y</td><td>SD</td><td>Y</td><td>GN</td><td>Y</td></tr>
<tr><td></td><td>Justification</td><td colspan="12">Each of the six gears is treated as an element.
TB Bottom trawl (80): Commonly encountered habitats by this gear tend to be coarse sediments, varying from sandy mud to gravel and pebbled areas (Ragnarsson & Steingrímsson, 2003; see also MSC SGB classification in Table 22 Section 3.4.6.4). They tend to be resilient, more dynamic areas and it is highly unlikely that this gear will reduce their structure and function to the point where there would be serious irreversible harm The current effort by the bottom trawl fishery is considerably less intensive than it used to be (ICES 2017, ecosystem overview), which means that the impact bottom trawl gear has 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). Research shows, 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). 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 effects could be detected on total abundance or on multivariate structure (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. SG60 and SG80 is 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, nor are there long term deeper water studies. The 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. SG100 is not met.
TN Nephrops trawl (80): Commonly encountered habitats tend to be soft ground, usually soft mud that provides good burrowing habitat for Nephrops (see also MSC SGB</td></tr>
</table>

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.**
		classification in Table 22 Section 3.4.6.4). Typically, such habitat does not foster vulnerable fauna. Furthermore, studies on the impact of Nephrops trawling indicate that fishing intensity is the major factor controlling long-term negative trends in the benthos, rather than the direct impact from passage of the gear (Ball et al. 2000). . Nephrops trawling takes place at depths of 100 - 500m, which is shallower than the depth range at which seapens occur (average depth found at 800m, Ólafsdóttir et al. 2014), and the fishing grounds are mainly located to the north and southwest of Iceland (see Nephrops trawl effort mapped in Section 0 and Figure 29). Burrowing megafauna including burrowing crustaceans, small polychaetes and bivalves will be found in Nephrops habitats (Ball et al., 2000).The Nephrops trawl used in Icelandic waters has a ground rope but is not fitted with bobbins or tickler chain (Client information site visit Oct 2018), 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. The team considers that in the long term (within 20 years), the commonly encountered habitat, i.e. the structure, biological diversity, 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, including: Gear design – no bobbins or tickler chain on the ground rope thus reducing penetration into sediment Productivity levels - 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. Decline in fishing effort - 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 (ICES 2017). The team considers that recovery of these areas would be facilitated by recruitment from nearby unimpacted areas. Therefore, it is highly unlikely that the fishery will reduce key habitat forming species to a point where there would be serious or irreversible harm, SG 60 and SG80 is met. There is no evidence, in the form of long term studies, that this is highly unlikely, SG100 is not met. **SD Danish seine (100)**: The commonly encountered habitat ranges from coarse sediments to muddy sands, this gear cannot be used on rough ground, it is 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. 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. SG100 is met.

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.
		LL Longlines (100): Static fishing gear, such as set nets, handline and longlines do not affect large areas of seabed and are not thought to cause serious or irreversible harm to habitat structures (Clark et al 2015; Baer et al 2010; Fossa et al 2002), the commonly encountered habitat being sand and gravelly sediments. Clark et al (2015) reviewed the impact of fishing gear on deep water benthic communities. They found that static gears, such as longlines and traps have lower impacts than mobile gear types. However, in certain conditions, for example during retrieval, static gear may move laterally across the seabed, resulting in impacts to the habitat and biota. Chuenpagdee et al. (2003) rank the relative impact of demersal longlines on marine ecosystems at 30/100 - better than all other methods of demersal fishing. Conversely, this means that scientific resources have not in most places been invested in trying to quantify habitat impacts of longlining, including in Iceland. There have been efforts however for the New Zealand Ross Sea toothfish longline fishery, for example, to evaluate in a systematic way the spatial footprint of the fishery on key vulnerable taxa such as corals (Sharp et al. 2009; as mentioned under VMEs, SIb). The distribution and effort (Figure 39) of longline fishing is known and can be related to available common habitat distribution map (Figure 24) Following on from the information presented here, the team concluded that it is highly unlikely that longlines reduce habitat structure and function of commonly encountered habitats to a point where there would be serious or irreversible harm. SG80 is met. In relation to 'evidence' SG100, the team considered that although there is no direct information from Iceland, and although Sharp et al. (2009) was carried out in a different biogeographic zone, the results were at least qualitatively comparable, and this combined with the limited spatial overlap suggests a risk level well below 20%, as required for SG100. SG100 is met. **LH Handlines (100)**: The commonly encountered habitats for LH are coarse sediments and hard sandy areas, if the bottom of the line touches the ground at all. Static fishing gear, such as set nets, handline and longlines do not affect large areas of seabed and are not thought to cause serious or irreversible harm to habitat structures (Clark et al 2015, 2014; Baer et al 2010; Fossa et al 2002), SG80 is met. Scientific evidence indicates that it is highly unlikely that handlines reduce habitat structure and function to a point where there would be serious or irreversible harm (Ball et al. 2000; Thorarinsdóttir et al. 2010; Clark et al 2014, 2015). SG100 is met. **GN Gillnets (100)**: Gillnet (cod type) fishing efforts in Iceland are concentrated in areas characterised by hard bottoms and coarse sediments. Static fishing gear, such as set nets, handline and longlines do not affect large areas of seabed and are not thought to cause serious or irreversible harm to habitat structures (Jennings et al., 2001; Baer et al 2010; Fossa et al 2002), Bottom structures or exposed sedentary benthos may be snagged when gillnets are set or retrieved (Grieve et al., 2014), but demersal gillnets are known to have only relatively limited impacts on benthic habitats since the nets are not towed and will only move over small distances due to wave or current action, limiting the gear's spatial footprint (Chuenpagdee et al. 2003) Due to the characteristics of gillnet 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. SG80 is met. A recent study on the impact of the Danish seine on benthos showed that it had limited negative impact on benthic habitats in the study area (Thorarinsdóttir et al. 2010; see above under 'seine nets'). The team considered that habitat impacts of gillnets are likely to be less since gillnets are not dragged over the bottom. There is thus evidence that the UoA is highly unlikely to reduce structure and function of the commonly encountered

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.**
	habitats, although such habitats may suffer some reversible changes. SG100 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	LL	Y	TB	Y	LL	Y	TB	N	LL	Y
	TN	Y	LH	Y	TN	Y	LH	Y	TN	N	LH	Y
	SD	Y	GN	Y	SD	Y	GN	Y	SD	N	GN	Y

Justification	Maerl Beds	Modiolus reefs	Lophelia reefs	Coral gardens	Sponges	Hydrothermal vents
TB			80	80	80	80
TN				80	80	80
SD	80	80				
LL	100	100	100	100	100	100
LH	80	80		80		80
GN	100	100				100

Bottom trawl (TB)

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

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

***Lophelia* reefs** (80): In Icelandic waters, most fishing with otter trawls (around 70%) takes place at depths between 100 and 500m, and as this is a mixed fishery with several target species, the vessels are operating in that depth range. *Lophelia* reefs are found at depths of 200-1,400 m, but are concentrated between 400 – 800m, thus there is the potential for overlap between bottom trawl gear and *Lophelia* reefs between 200 and 500m, with the highest potential for overlap at 400 - 500m. The slope areas off the south coast of Iceland are steep, with depths descending from around 400m to more than 1500m within a few nautical miles, making parts of the slope areas difficult for trawling (Client interview, pers. comm. Oct 2018). 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 (see also Section 3.4.6.4). Permanent area

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.**
		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. Detailed habitat mapping has so far concentrated on the areas most at risk from trawling or other threats. Ongoing habitat mapping expeditions may identify further areas and the intention is to protect these (see Section 0). The effort of the trawl fishery as a whole has been decreasing since the early 1990s (ICES 2017, ecosystem overview), with fewer vessel fishing over a smaller area. No new areas are opened for fishing (MFRI pers. Comm. Oct 2018). Overall, based on the overlap of the UoA with known distribution of *Lophelia* reefs, including encounterability (depth profile overlap, as well as accessibility – steep slopes), together with the network of closed areas (both for protection of and the reduction in fishing effort and consequent fishing area, it is considered highly 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. SG80 is met (risk of damage 30% or less). In order to meet SG100, benthos mapping through multi-beam projects together with benthos-bycatch recording would need to be more advanced over a wider area, to qualify as 'evidence'. **Coral gardens** (80): These are mainly deep-water habitats (OSPAR 2010b; see Section 0 for more detailed description). Their main characteristic is a relatively dense aggregation of colonies or individuals of one or more coral species belonging to different taxonomic groups, found on a wide range of soft and hard seabed structures. Taxonomic groups that make up coral garden habitats in Icelandic waters are found primarily in the depth range of approx. 500-1700 m, there is thus potential for limited overlap with the fisheries under assessment. Studies as part of the BIOICE project looked at the distribution of *Gorgonacea* corals and seapens around Iceland in relation to bottom trawling and showed little overlap (Garcia et al 2006). It is concluded that it is highly unlikely that bottom trawling would reduce the structure and function of Coral garden habitats to a point where there would be serious or irreversible harm. SG80 is met. As yet there is not enough 'evidence', as the benthos-bycatch recording and evaluation projects have not been running for long enough to provide enough data. SG100 is not met. **Sponges** (80): This habitat occurs in the depth range 300-1300m around Iceland (Garcia et al. 2006; Klitgaard and Tendal 2004), giving an overlap with the fishery in the shallower part of its depth range. A comparison of the known distribution of sponges in Icelandic waters (Section 0) 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 permanent, seasonal and annual closures to bottom trawling exist which might have beneficial effects on any sponge habitats occurring there. Ongoing habitat mapping expeditions may identify further areas of sponge aggregations. In addition, bycatch recording and monitoring projects have been implemented during the annual autumn groundfish survey since 2015, this work is conducted by MFRI as part of the survey. All invertebrates in the trawl catches observed are identified by benthologists (about half of the trawls carried out). This data provides in depth information on benthos to species level, including corals, sponges, soft corals etc. The information is collated by MFRI, and an internal report on corals and sponges has been made available to the assessment team (Olafsdottir 2017 – Status report). This recording and analysis programme is being expanded across the fisheries. The client fishery is actively participating in this work, triggered as conditions on the first MSC certificate of Golden

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.
		Redfish, Saithe and Ling. These conditions have been closed out over the duration of the first certificate. The effort of the trawl fishery as a whole has been decreasing since the early 1990s (ICES 2017, ecosystem overview), with fewer vessel fishing over a smaller area. No new areas are opened for fishing (MFRI pers. comm. Oct 2018). Overall, based on the limited overlap of the UoA with known distribution of sponge areas, including encounterability (depth profile overlap), together with the network of temporary or permanently closed areas, and the reduction in fishing effort and consequent fishing area, it is considered highly unlikely that bottom trawling would reduce the structure and function of sponge habitats to a point where there would be serious or irreversible harm. SG80 is met (risk of damage 30% or less). As yet there is not enough 'evidence', as the benthos-bycatch recording and evaluation projects have not been running for long enough to provide enough data. SG100 is not met. **Hydrothermal vents** (80): The depth profile and distributions of trawl fishing and hydrothermal vent fields overlap, and trawling is known to take place in the vicinity of hydrothermal vent fields (see map of trawling effort superimposed on vent field distribution Figure 33 in Section 0). However, hydrothermal vents are protected areas, see close up map of Steinahóll presented in that Section, a closed area since 1994. Furthermore, the effort of the trawl fishery as a whole has been decreasing since the early 1990s (ICES 2017, ecosystem overview), with fewer vessel fishing over a smaller area. No new areas are opened for fishing (MFRI pers. comm. Oct 2018). 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. SG80 is met. Mapping of hydrothermal vent areas, as well as other habitat types, is ongoing and a long term project. Although the likelihood of encountering such vents is small, until the whole area is mapped, there is not enough 'evidence' to say that the fishery is highly unlikely to impact hydrothermal vent habitats. SG 100 is not met. TN Nephrops Trawl **Maerl beds (NR)**: Since coralline algae require light for photosynthesis maerl beds are generally only found at depths to about 40m; Icelandic maerl beds have rarely been reported below 20m depth. Nephrops trawling does not take place in waters shallower than 100m depth and is not allowed within a certain distance from land (generally around 12 nm) in Iceland (DF and MFRI, pers. comm). There is thus no potential overlap between this UoA and the distribution of maerl beds in Icelandic waters. ***Modiolus* reefs (NR)**: *Modiolus* reefs have been reported at depths ranging from 5 - 50m in Icelandic waters. Nephrops trawling does not take place in waters shallower than 100m depth and is not allowed within certain distance from land (generally around 12 nm) in Iceland (DF and MFRI, pers. comm). There is thus no potential overlap between this UoA and the distribution of horse mussel beds in Icelandic waters. ***Lophelia* reefs (NR)**: Nephrops trawling does not take place on hard substrata where *Lophelia* reefs are found. **Coral gardens (80)**: These are mainly deep-water habitats (OSPAR 2010b; see Section 0 for more detailed description). Their main characteristic is a relatively dense aggregation of colonies or individuals of one or more coral species belonging to different taxonomic

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.**
		groups, found on a wide range of soft and hard seabed structures. Taxonomic groups that make up coral garden habitats in Icelandic waters are found primarily in the depth range of approx. 500-1700 m, there is thus potential for limited overlap with the fisheries under assessment. Studies as part of the BIOICE project looked at the distribution of *Gorgonacea* corals and seapens around Iceland in relation to Nephrops trawling and showed little overlap (Garcia et al 2006). Pennatulaceans – seapens - are mainly restricted to waters deeper than 500m depth, in fact the average depth where these anthozoans are found is 800m (Ólafsdóttir et al. 2014). Nephrops trawling on the other hand takes place at depths of 100 - 500m, It is concluded that it is highly unlikely that Nephrops trawling would reduce the structure and function of Coral garden habitats to a point where there would be serious or irreversible harm. SG80 is met. As yet there is not enough 'evidence', as the benthos-bycatch recording and evaluation projects have not been running for long enough to provide enough data. SG100 is not met <u>Sponges (80)</u>: 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. Fishing with Nephrops trawls in Icelandic waters primarily takes place in shallower waters at depths above 500m; 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. 300-1300m, and a comparison of the known distribution of sponges in Icelandic waters with known fishing grounds of Nephrops trawl (Section 0 spatial distribution of catches by gear type, and biomass of sponge bycatch 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, as habitat mapping is incomplete. SG100 is not met. <u>Hydrothermal vents (80)</u>: 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). The hydrothermal vents at Steinahóll are situated inside a closed area for any demersal 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; 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 (SD): <u>Maerl Beds (80)</u>: Although the distribution of Danish seine fishing effort (see spatial distribution of catches by gear type, Section 3.4.6.5) overlaps with areas where maerl habitats are found (see Section 0), in particular inside fjords along the northern coast of Iceland, Danish seine can only be used in areas of relatively smooth bottom. Also, Icelandic maerl beds have rarely been reported below 20 m depth, and Danish seine fishing generally at greater depth (40-60m). A 2010 study on the impact of the Danish seine on benthos showed that it has limited negative impact on benthic habitats (Thorarinsdóttir et al. 2010). 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. There

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.**
		needs to be 'evidence', such as greater resolution VMS for example, to show this. SG100 is not met. *Modiolus* reefs (80): Although the distribution of Danish seine fishing effort (see spatial distribution of catches by gear type, Section 3.4.6.5) appears to overlap with areas where Modiolus reefs are found (Section 0). Danish seine can only be used in areas of relatively smooth bottom. Also, 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. Fishers are highly likely to 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 Modiolus reefs 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 a greater resolution of VMS of Danish seine fishery distribution SG100 is not met. *Lophelia* reefs (NR): 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. Coral gardens (NR): 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. Sponges (NR): 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. Hydrothermal vents (NR): 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. Longline (LL): Maerl beds (100): The distribution of longline fishing effort (see spatial distribution of catches by gear type, Section 3.4.6.5) appears to show some overlap with areas where maerl habitats are found (see Section 0) appear to overlap off the north-western coast of Iceland. Although longline fishing from small vessels may occasionally take place close to the shore, this gear is generally used at depths below 50m and maerl beds are found at depths of less than 20m in Icelandic waters. Moreover, static fishing gear, such as longlines, does not affect large areas of seabed and is not thought to cause serious or irreversible harm to habitat structures (Jennings et al. 2001). Chuenpagdee et al. (2003) rank the relative impact of demersal longlines on marine ecosystems at 30/100 - better than all other methods of demersal fishing. Moreover, maerl beds have been found to be resilient to the impacts of fishing since some fragmentation by fishing gear will in fact lead to the generation of new recruits (Barbera et al., 2017). Due to the characteristics of longline fishing, the overall limited potential for overlap between the UoA and maerl habitats, and the known resilience of maerl habitat to some fishing impacts, the team considered that there is evidence that this 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 100 is met. *Modiolus* reefs (100): The distribution of longline fishing effort (see spatial distribution of catches by gear type, Section 3.4.6.5) appears to show some overlap with areas where *Modiolus* reefs are found (see Section 0) off the western coast of Iceland. Although longline fishing from small vessels may occasionally take place close to the shore, this gear is generally used at depths below 50m and *Modiolus* reefs have been recorded at depths of up to 50m in Icelandic waters. Moreover, static fishing gear, such as longlines, does not affect large areas of seabed and is not thought to cause serious or irreversible harm to habitat structures (Jennings et al. 2001). Chuenpagdee et al. (2003) rank the relative

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.
		impact of demersal longlines on marine ecosystems at 30/100 - better than all other methods of demersal fishing. Due to the characteristics of longline fishing, the overall limited overlap between the UoA and *Modiolus* reefs, the team considered that there is evidence that this UoA is highly unlikely to reduce structure and function of the Modiolus reefs to a point where there would be serious or irreversible harm. SG 100 is met. *Lophelia* reefs (100): Longlines are primarily used at depths of 50 - 300m in Icelandic fisheries, and therefore generally in waters which are shallower than *Lophelia* reef habitats. The distribution of longline fishing effort (see spatial distribution of catches by gear type, Section 3.4.6.5) appears to show some overlap with areas where *Lophelia* reefs are found (see Section 0) off the south-western coast of Iceland. Static fishing gear, such as longlines, does not affect large areas of seabed and is not thought to cause serious or irreversible harm to habitat structures (Jennings et al. 2001). Chuenpagdee et al. (2003) rank the relative impact of demersal longlines on marine ecosystems at 30/100 - better than all other methods of demersal fishing. There have been efforts, for example the New Zealand Ross Sea toothfish longline fishery, to evaluate in a systematic way the spatial footprint of the fishery on key vulnerable taxa such as corals (Sharp et al. 2009). As part of this study an impact matrix was compiled, where impacts were considered at the scale of individual cold water coral colonies, and assigned to one of three categories, (i) no impact, (ii) non-lethal impact, and (iii) lethal impact. The study concluded that less than 1% of all coral colonies occurring within the spatial extent of the footprint of a typical longline deployment event were lethally impacted (Sharp et al. 2009). Therefore, it is concluded that the habitat structure and function is not impacted to such an extent that it would not be able to recover to at least 80% of its unimpacted structure within 5-20 years if fishing were to cease entirely. Taking into account both the proven limited impacts of longline fishing gear on sensitive coral species, and the fact that there is only limited overlap between the UoA and *Lophelia* reef habitats, the team concluded that there is evidence that it is highly unlikely that longlines reduce habitat structure and function of *Lophelia* reef habitats to a point where there would be serious or irreversible harm. SG 100 is met. Coral garden (100): Longlines are primarily used at depths of 50 - 300m in Icelandic fisheries, which tends to be deeper than 500m. The distribution of longline fishing effort (see spatial distribution of catches by gear type, Section 3.4.6.5) appears to show some overlap with areas where coral gardens are known to occur (Section 0). Static fishing gear, such as longlines, does not affect large areas of seabed and is not thought to cause serious or irreversible harm to habitat structures (Jennings et al. 2001). Chuenpagdee et al. (2003) rank the relative impact of demersal longlines on marine ecosystems at 30/100 - better than all other methods of demersal fishing. There have been studies to evaluate the spatial footprint of this gear type on key vulnerable taxa such as corals (Sharp et al. 2009). That study concluded, based on the New Zealand toothfish fishery, that less than 1% of all coral colonies occurring within the spatial extent of the footprint of a typical longline deployment event were lethally impacted (Sharp et al. 2009). As such it cannot be concluded that the habitat structure was impacted to such an extent that it would not be able to recover to at least 80% of its unimpacted structure within 5-20 years if fishing were to cease entirely. Taking into account both the proven limited impacts of longline fishing gear on sensitive species such as seapens and gorgonid corals, and the fact that there is only limited overlap between the UoA and coral garden habitats, the team concluded that there is evidence that it is highly unlikely that longlines reduce habitat structure and function of coral garden habitats to a point where there would be serious or irreversible harm. SG 100 is met. Sponges (100): Longlines are primarily used at depths of 50 - 300m in Icelandic fisheries, and therefore generally in waters which are shallower than deep-water sponge habitats (250-1300m). The distribution of longline fishing effort (see spatial distribution of catches by gear type, Section 3.4.6.5) appears to show some overlap with areas where sponges are

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.**
		known to occur (Section 0). The impact of longline as a static gear is the same as described for the elements under longline above – so not repeated here. Similar to the reasoning for corals and coral gardens, the team concluded that there is evidence that it is highly unlikely that longlines reduce habitat structure and function of deep-water sponge habitats to a point where there would be serious or irreversible harm. SG 100 is met. Hydrothermal vents (100): Longlines are primarily used at depths of 50 - 300 m in Icelandic fisheries, which overlaps with the known depth distribution of hydrothermal vent fields in Icelandic water, 65-400m. The distribution of longline fishing effort (see spatial distribution of catches by gear type, Section 3.4.6.5) appears to show some overlap with areas where hydrothermal vents are known to occur (Section 0, although there is no overlap with those on the Reykjanes ridge to the SW of Iceland. The impact of longline as a static gear is the same as described for the elements under longline above – so not repeated here. Similar to the reasoning for corals and coral gardens, the team concluded that there is evidence that it is highly unlikely that longlines reduce habitat structure and function of hydrothermal vents to a point where there would be serious or irreversible harm. SG 100 is met. Handline (HL) (80): This is predominantly a pelagic gear which may be weighted, where the weight may or may not touch the ground. Ground contact would be a point contact. The gear is predominantly used in shallower water around Iceland (see Figure in Section 3.4.2.4), therefore the gear does not overlap with deep-sea sponges and Lophelia reefs, which occur in deeper water and further offshore (NR for both these elements. The spatial footprint on benthic habitats is limited, and does not affect large areas of seabed, as has been shown in studies by Clark et al 2015, and 2016. The distribution of handline fishing overlaps with areas where hydrothermal vents are located – in the North of Iceland, some of the locations where coral garden species have been recorded, as well as some seeming overlap with those shallower habitat elements of maerl beds and *Modiolus* reefs. It can be inferred from the design of the gear and the low intensity of the gear deployment that it is highly unlikely that handlines reduce habitat structure and function to a point where there would be serious or irreversible harm – SG80 is met. No evidence in the form of research studies could be found to demonstrate this, SG100 is not met. Gillnet (GN): Maerl beds (100): The distribution of gillnet fishing effort (see spatial distribution of catches by gear type, Section 3.4.6.5) appears to show some overlap with areas where maerl habitats are found (see Section 0) in a few places in the north west of Iceland. However, static fishing gear, such as set nets, does not affect large areas of seabed and is not thought to cause serious or irreversible harm to habitat structures (Jennings et al. 2001). Bottom structures or exposed sedentary benthos may be snagged when gillnets are set or retrieved (Grieve et al., 2014), but demersal gillnets are known to have only relatively limited impacts on benthic habitats since the nets are not towed and will only move over small distances due to wave or current action, limiting the gear's spatial footprint (Chuenpagdee et al. 2003). Moreover, maerl beds have been found to be resilient to the impacts of fishing since some fragmentation by fishing gear will in fact lead to the generation of new recruits (Barbera et al., 2017). Due to the characteristics of gillnet fishing, the overall limited overlap of the UoA and maerl habitats, and the known resilience of maerl habitat to some fishing impacts, the team considers that there is evidence that this UoA is highly unlikely to reduce structure and function of the maerl habitats to a point where there would be serious or irreversible harm. SG100 is met. *Modiolus* reefs (100): The distribution of gillnet fishing effort (see spatial distribution of

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.		
		catches by gear type, Section 3.4.6.5) appears to show some overlap with areas where *Modiolus* reefs are found (see Section 0), in particular off the south-western coast of Iceland. However, static fishing gear, such as set nets, does not affect large areas of seabed and is not thought to cause serious or irreversible harm to habitat structures (Jennings et al. 2001). Bottom structures or exposed sedentary benthos may be snagged when gillnets are set or retrieved (Grieve et al., 2014), but demersal gillnets are known to have only relatively limited impacts on benthic habitats since the nets are not towed and will only move over small distances due to wave or current action, limiting the gear's spatial footprint (Chuenpagdee et al. 2003). Given the limited overlap of the UoA with this VME and the characteristics of gillnet fishing, the team considers that there is evidence that it is highly unlikely that the structure and function of the Modiolus reefs are reduced to a point where there would be serious or irreversible harm. SG100 is met. *Lophelia* reefs (NR): Fishing with (cod) gillnets takes place at depths of up to 100m, and therefore in waters which are too shallow for *Lophelia* reefs to be encountered (see also spatial distribution of catches by gear type, Section 3.4.6.5). Coral gardens (NR): Fishing with (cod) gillnets takes place at depths of up to 100 m, and therefore in waters which are too shallow for coral gardens to be encountered. Sponges (NR): Fishing with (cod) gillnets takes place at depths of up to 100 m, and therefore in waters which are too shallow for deep-sea sponge communities to be encountered. Hydrothermal vents (100): Based on the known distribution of gillnet fishing effort (see spatial distribution of catches by gear type, Section 3.4.6.5) this gear is deployed in Eyjafjörður, where a hydrothermal vent field is located (See Section 0). Static fishing gear, such as set nets, does not affect large areas of seabed and is not thought to cause serious or irreversible harm to habitat structures (Jennings et al. 2001). Bottom structures or exposed sedentary benthos may be snagged when gillnets are set or retrieved (Grieve et al., 2014), but demersal gillnets are known to have only relatively limited impacts on benthic habitats since the nets are not towed and will only move over small distances due to wave or current action, limiting the gear's spatial footprint (Chuenpagdee et al. 2003). Given the limited overlap of the UoA with this VME and the characteristics of gillnet fishing, the team considers that there is evidence that it is highly unlikely that the structure and function of the hydrothermal vents are reduced to a point where there would be serious or irreversible harm. SG100 is met.		
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.
	Met?			N
	Justification	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, such as particular combinations of sediments, lava outcrops, dropstones, etc. 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. SG100 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; Ragnarsson &		

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.**	
	Steingrímsson 2003; Thorsteinsson 1996	
OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom Trawl (TB)	**80**
	Nephrops Trawl (TN)	**80**
	Danish Seine (SD)	**85**
	Longline (LL)	**95**
	Handline (HL)	**85**
	Gillnet (GN)	**95**
CONDITION NUMBER (if relevant):		**-**

PI 2.4.2 Habitats management strategy

PI 2.4.2		There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	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?	All gears: Y All VME elements: Y	All gears: Y All VME elements: Y	All gears: N All VME elements: N
	Justification	All gears and all habitat elements There are measures in place that are expected to achieve the Habitat Outcome at SG80, these measures include closed areas and habitat mapping. SG60 is met 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 (see also map in Section 3.4.2.4; OSPAR 2013). There continue to be developments in gear technology and deployment with regards to trawl gear, with many fishermen now operating with semi-pelagic trawl doors, which do not touch the bottom. This technique reduces resistance and thus promotes handling efficiency and reduces fuel consumption – with fishing practices being monitored based on fish per kg of fuel (Fishers interviews at site visit Oct 2018, and on board observation of stored trawl doors). Other developments relate to the MFRI working with the MII on the feasibility of adoption and implementation of a form of move on rule when any coral and other VME indicator species are noted in the nets (ISF, pers. comm.). The practicality and oversight of such a rule have been reviewed, and it was decided that for the time being the move -on rule was unenforceable, nor is there 200% observer coverage. It is considered a priority to improve on the details of habitat information in Icelandic waters and continue with detailed habitat mapping programmes, in order to allow scientifically based implementation of further closed areas with buffer zones. Under the current procedure, existing closed areas are clearly marked on maps used by all vessels, surrounded by buffer zones, and any infringement triggers an alarm at Compliance, using VMS position of the vessel (Coast Guard, pers.com. Oct 2018). As part of the first certificate on these fisheries, the client has been working on a number of measures to help improve the management of habitats. The client is introducing a joint project 'Botnlæg þekking skipstjórnarmanna_drög' (roughly translated as 'specific		

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.
		knowledge of naval officers' [courtesy of Google translate], between ISF member fisheries and MFRI. The project is interview based, conducting qualitative research by working with captains in order to map their knowledge and understanding of the different types of benthos they encounter in fishing areas, as well as interaction with the ecosystem on different fishing grounds. The presentation of this project has begun among the fisheries and has received positive feedback (Client and MFRI interview Oct 2018). *Samstarfsnefnd um bætta umgengni um auðlindir sjávar* [Co-operation Committee on improved access to marine resources]– the Ministry of Fisheries has established a Joint Committee to explore ways to minimize the effects of fisheries on the ecosystem. It has appointed as members different stakeholders within fisheries, such as general fisheries, from small boat fisheries, the Ministry, MFRI and from the Association of Icelandic Captains and Vessel Manager. The committee was scheduled to complete its recommendations by June 2018 but asked the Ministry for an extension until November 2018 (NB: the document was not available at time of writing, Jan 2019). There are thus a raft of measures in place, both at a practical and a management level, which constitute a partial strategy that is expected to achieve the Habitat Outcome 80 Recommendation 1: The progress of this Joint Committee for the improved handling of Marine Resources (an approximate translation from the Icelandic) will be monitored as part of the continued certification of the fisheries. The client is encouraged to contribute to the success of this committee. Recommendation 2: The newly introduced project to interview fishers as part of habitat mapping will be monitored as part of the fishery audit. The client is encouraged to continue the implementation of this project. Bottom and Nephrops Trawls (TB, TN): (80, 80) The Icelandic partial 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. The trawl fisheries are actively contributing to benthos mapping programmes by recording all benthos bycatch to species level where relevant, in cooperation with researchers at MFRI. The client fishery is also implementing a project based on interviews of relevant fishers which taps into the practical knowledge on fishing areas overlaying benthos type. 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 are currently informal, and not part of a formal code of conducts, until it is clear how best such rule can be monitored effectively (ISF, pers. comm., site visit Oct 2019).A number of practical steps encourage avoidance of VMEs, including local knowledge, avoidance of damage to the gear, buffer zones around closed areas avoiding straying, contributing towards habitat mapping programmes to improve knowledge on distribution of VME indicator species and concentrations, considerable reduction of trawl gear effort since the early 1990s to fewer locations, no new fishing areas opened up. This represents a partial strategy for all habitat including VME elements of Lophelia reefs, coral gardens, sponges, hydrothermal vents, maerl beds and Modiolus reefs. SG80 is met. It is not a full strategy with a comprehensive management plan supported by a comprehensive impact assessment and based upon full EEZ habitat mapping. SG 100 is not

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.		
		met This score is harmonised with recently (2019) audited ISF fisheries (ISF Iceland saithe ling, Atlantic wolffish, plaice; and ISF Iceland golden redfish, blue ling and tusk). Danish seine, gillnet, longline, handline (SD, GN, LL, LH) (80 all) 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. Given the low impact of these gears on bottom habitats, as described in Sections 3.4.6.4 and 3.4.6.5, no specific strategy is considered necessary in these cases and thus they meet SG80. 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. SG 100 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/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?	All gears: Y	All gears: Y	All gears: N
	Justification	Bottom and Nephrops Trawls (TB, NT): the measures in place for cold water corals and some of the hydrothermal vent areas, in particular the closed areas for bottom gears, are well proven to be effective, providing objective evidence that the partial strategy will work. This partial strategy is currently being expanded on to include all VME habitats such as soft corals and sponges (see 2.4.1a above). SG80 is met. However, it is not a full strategy with a comprehensive management plan, SG100 is not met. Danish seine, gillnet, longline, handline (SD, GN, LL, LH): 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. This is considered to be a partial strategy for all six VME elements, SG80 is met. However, it is not a full strategy with a comprehensive management plan based upon full EEZ habitat mapping, SG100 is not met. Scoring has been harmonised with previous MSc assessments of these gears, including the recent (2019) audits on ISF fisheries (ISF Iceland saithe ling, Atlantic wolffish, plaice; and ISF Iceland golden redfish, blue ling and tusk). The Recommendations placed under a) above also apply here.		
c	Management strategy implementation			
	Guidepost		There is some quantitative evidence that the measures/partial strategy is	There is clear quantitative evidence that the partial strategy/strategy is being

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.		
			being implemented successfully.	implemented successfully and is achieving its objective, as outlined in scoring issue (a).
	Met?		All gears: Y	All gears: 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 benthic habitats). There is also clear evidence, through time series data available, that effort by gear type has been decreasing since the early 1992, a gradual change of managing fisheries having an effect on habitat impacts – see Section 3.4.6.5 for detailed graphs. This is of particular value to benthos touching gears, meaning that the actual impact on benthos has reduced in general since the 1990 through effort reduction. It is considered that there is thus some quantitative evidence that the partial strategy is being implemented successfully, especially for Lophelia reefs and hydrothermal vents. 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) and ISF lemon sole 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 measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.	There is **clear quantitative evidence** that the UoA complies with both its management requirements and with protection measures afforded to VMEs by other MSC UoAs/non-MSC fisheries, where relevant.
	Met?	All gears: Y	All gears: Y	All gears: N
	Justification	Bottom and Nephrops Trawls (TB, NT): 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. The client fishery has initiated and implemented a number of projects to improve on the management of such VMEs as sponges and soft corals, together with MFRI and other relevant Ministry departments (e.g. setting up of Joint Committee for the improved handling of marine resources). 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, haddock, halibut, lemon sole,) 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, gillnet, longline, handline (SD, GN, LL, LH): Given the known levels of effort,		

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.
		and the low levels of observed impact on habitats, this achieved SG 80. However, there is no clear quantitative evidence that this, or other similar MSC UoAs (e.g. Icelandic cod, haddock halibut, anglerfish, lemon sole) 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, ISF cod and haddock (Icelandic UoAs) and ISF lemon sole fishery assessments.
References		Ministry of Environment 2010; OSPAR 2008a; OSPAR 2008b; OSPAR 2013; Directorate of Fisheries (Icelandic version for February 2016: http://www.fiskistofa.is/fiskveidistjorn/veidibann/reglugerdarlokanir/) Ministry of Fisheries 2004; Ólafsdóttir & Burgos 2012; *Samstarfsnefnd um bætta umgengni um auðlindir sjávar* [Co-operation Committee on improved handling of marine resources]

OVERALL PERFORMANCE INDICATOR SCORE:	
Bottom Trawl (TB)	**80**
Nephrops Trawl (TN)	**80**
Danish Seine (SD)	**80**
Longline (LL)	**80**
Handline (HL)	**80**
Gillnet (GN)	**80**
CONDITION NUMBER (if relevant):	-
Recommendation 1: The client is encouraged to contribute to the implementation of the Joint Committee for the improved handling of Marine Resources (an approximate translation from the Icelandic) recommendation. **Recommendation 2:** The client is encouraged to continue the implementation of the project to interview fishers as part of habitat mapping.	

PI 2.4.3 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. OR If CSA is used to score PI 2.4.1 for the UoA: Qualitative information is adequate to estimate the types and distribution of the main habitats.	The nature, distribution and vulnerability of the main habitats in the UoA area are known at a level of detail relevant to the scale and intensity of the UoA. OR If CSA is used to score PI 2.4.1 for the UoA: Some quantitative information is available and is adequate to estimate the types and distribution of the main habitats.	The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.
	Met?	Y	Y	N
	Justification	The Icelandic system for the management and collection of data on the distribution of habitats and fishing effort does not vary in its general form according to habitat type, gear or fishery, the team concluded that it would not make sense to break down the scoring into habitat elements, as well as gears. The scoring rationale therefore considered the information available in general, covering all types of habitat and all gears. 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; Gudmundsson and Helgason, 2014). 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 were 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		

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.**		
		between fish and cold water coral habitats: Iceland has been part of the EU funded CoralFISHproject (http://eu-fp7-coralfish.net/) and https://cordis.europa.eu/project/rcn/89331/reporting/en. One study compared fish communities inside and outside coldwater coral habitats based on longline catches (Ragnarsson and Burgos 2018[23]), and another examining bottom fishing activities. A coral habitat classification scheme 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 (MFRI, pers. comm, 2018 at site visit); In 2018 - ongoing, several potential vent sites on the Reykjanes Ridge are planned for survey (MFRI, pers.comm. 2018, at site visit); Since 2014, as part of the conditions of the first certification period, the client has been implementing several measures on board the relevant vessels to collect and record benthos bycatch data. This is being done in collaboration with relevant MFRI researchers and is contributing to the benthos information database (Client, site visit 2018, and final surveillance audit of Saithe); To date ca. 12% of the entire Iceland EEZ habitats has been mapped in detail using multibeam echo-sounders (Burgos et al., 2014), and the intention is to map the entire EEZ by 2026. In order to supplement research data models have been developed to predict the distribution of corals on the Icelandic shelf (Burgos et al, 2014). Overall, the team considers that the 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. SG 100 is not met.		
b	Information adequacy for assessment of impacts			
	Guidepost	Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. OR **If CSA is used to score PI 2.4.1 for the UoA:** Qualitative information is adequate to estimate the consequence and spatial attributes of the main habitats.	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. OR **If CSA is used to score PI 2.4.1 for the UoA:** Some quantitative information is available and is adequate to estimate the consequence and spatial attributes of the main habitats.	The physical impacts of the gear on all habitats have been quantified fully.

[23] Ragnarsson SA, Burgos,J 2018. Associations between fish and cold-water coral habitats on the Icelandic shelf Article. *in* Marine Environmental Research · January 2018 DOI: 10.1016/j.marenvres.2018.01.019

<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>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td></td><td>Justification</td><td colspan="3">All gears:
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 3.4.2.4 – Spatial distribution of fishing gear types), 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 UoAs' footprints can thus be identified.
Catches of VME indicator organisms are monitored in scientific surveys carried out annually by the MFRI, detailed benthos by-catch recording has been implemented in the client fishery in collaboration with MFRI (see also Olafsdottir 2017 – status report), and closed areas have been established to protect certain VMEs (see Section 3.4.2.4). 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>
<tr><td>c</td><td colspan="4">Monitoring</td></tr>
<tr><td></td><td>Guidepost</td><td></td><td>Adequate information continues to be collected to detect any increase in risk to the main habitats.</td><td>Changes in habitat distributions over time are measured.</td></tr>
<tr><td></td><td>Met?</td><td></td><td>Y</td><td>Y</td></tr>
<tr><td></td><td>Justification</td><td colspan="3">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. Habitat mapping by MFRI is ongoing, whereby bycatch recording and monitoring projects have been implemented during the annual autumn groundfish survey since 2015, this work is conducted by MFRI as part of the survey. All invertebrates in the trawl catches observed are identified by benthologists (about half of the trawls carried out). This data provides in depth information on benthos to species level, including corals, sponges, soft corals etc. The information is collated by MFRI, and an internal report on corals and sponges has been made available to the assessment team (Olafsdottir 2017 – Status report). This recording and analysis programme is being expanded across the fisheries. The client fishery is actively participating in this work, triggered as conditions on the first MSC certificate of Golden Redfish, Saithe and Ling. These conditions have been closed out over the duration of the first certificate. SG80 is met.
Together with studies on the ecological function of vulnerable habitats (e.g. CoralFISH project, 2008), these data, as described above, 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.</td></tr>
<tr><td colspan="2">References</td><td colspan="3">Meißner et al. 2014; Ministry of Fisheries, 2004; Gudmundsson and Helgason, 2014; Burgos et al, 2014; Garcia et al. 2006; Steingrímsson and Einarsson 2004; Thorarinsdóttir et al. 2010; Olafsdottir 2017.</td></tr>
<tr><td colspan="4">OVERALL PERFORMANCE INDICATOR SCORE: All gears</td><td>85</td></tr>
<tr><td colspan="4">CONDITION NUMBER (if relevant):</td><td>-</td></tr>
</table>

PI 2.5.1 Ecosystem outcome

<table>
<tr><td colspan="2">PI 2.5.1</td><td colspan="3">The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="4">a</td><td colspan="4">Ecosystem status</td></tr>
<tr><td>Guidepost</td><td>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.</td><td>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.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3">All gears are considered together.

The Ecosystem component addresses system-wide issues, primarily impacted indirectly by the fishery, including ecosystem structure, trophic relationships and biodiversity (MSC CRv2.0 GSA3.16). A number of components, which are part of the overall marine ecosystem in which the fishery operates, and the impact the fishery may have on these, have already been scored elsewhere (under target species, bycatch, ETPs and habitat). The annual TAC for each target species is set by fisheries management and is based not only on stock information and recruitment (see P1), but also includes natural mortality such as predation (by for e.g. marine mammals as well as finfish). The setting of the TAC for each target species thus incorporates ecosystem considerations in fisheries management which includes the precautionary approach of stocks management when setting reference points thus covering removal of target-as-prey. Other key elements underlying the ecosystem structure and function include oceanographic components, climate change and accompanying water salinity and temperature changes, foodweb from phytoplankton productivity to top predators such as cetaceans, and benthos.

The bulk of the Icelandic fisheries, both pelagic and demersal, occurs at depths less than 500 m. There has been an overall reduction since 2005 in fishing effort for fisheries using trawl, longline, gillnet, seine and Danish seine, but an increase in the effort for pelagic trawl and jiggers (ICES 2017 ecoregion overview). A decrease of F has a corresponding decrease of impact on the foodweb-based ecosystem components, some of which has already been addressed under habitats and bycatch (ETP and others).

Significant ecosystem variations are more probable to be a result of climatic variation and subsequent ocean currents changes e.g. North Atlantic Oscillation (NAO) and more recently the overall trend towards warmer water and salinity changes around Iceland. Around the mid-1990s a rise in both temperature and salinity was observed in the Atlantic water to the south of Iceland. The positive trend has continued ever since and west of Iceland it amounts to an increase of temperature of about 1°C and a salinity of 0.1 salinity units. The increase of temperature and salinity north of Iceland in the last 10 years is on average about 1.5°C and 1.5 salinity units (ICES 2008). From this it can be inferred that the UoAs are highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm. SG80 is met.

Although modelling of the Icelandic marine ecosystem is currently being developed (Atlantis for example, Sturludottir et al 2018; Ecopath Ecosim, Ribeiro et al 2018), these primarily simulate fisheries as a top predator within the ecosystem. The absence of explicit evidence as to where fisheries fit within the overall ecosystem in terms of weighting of impact on structure and function of key elements, means that SG100 is not met.</td></tr>
<tr><td colspan="2">References</td><td colspan="3">ICES 2017 ecoregion overview; ICES 2008 Book 2 Greenland and Iceland Ecosystem overview; Sturludottir E et al, 2018.; Ribeiro JPC et al. 2018</td></tr>
</table>

PI 2.5.1	The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.	
OVERALL PERFORMANCE INDICATOR SCORE: All gears		80
CONDITION NUMBER (if relevant):		-

PI 2.5.2 Ecosystem management strategy

<table>
<tr><td colspan="2">PI 2.5.2</td><td colspan="3">There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="4">a</td><td colspan="4">Management strategy in place</td></tr>
<tr><td>Guidepost</td><td>There are measures in place, if necessary, which take into account the potential impacts of the fishery on key elements of the ecosystem.</td><td>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.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>Justification</td><td colspan="3">All gears are considered together (100):

The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. The Icelandic strategy is composed of several main measures:

(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 target species are being understood and integrated into fisheries management planning by applying the precautionary approach of stocks management when setting reference points thus covering removal of target-as-prey.

(3) Ecosystem considerations include discard and other mortality (managed through gear restrictions such as mesh size etc., for e.g.), 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.

(4) 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.

The plan is implicit in the strategy, and can be evaluated, for example by looking at F, which has reduced across several gears and target species (see ICES 2017 ecoregion overview), and the spatial distribution of effort has concentrated over a smaller area between 2000 and 2014 (ICES 2017)

SG100 is met.</td></tr>
<tr><td rowspan="2">b</td><td colspan="4">Management strategy evaluation</td></tr>
<tr><td>Guidepost</td><td>The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ ecosystems).</td><td>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</td><td>Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or ecosystem involved</td></tr>
</table>

<table>
<tr><td colspan="2">PI 2.5.2</td><td colspan="3">There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.</td></tr>
<tr><td></td><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td></td><td colspan="4"></td></tr>
<tr><td></td><td>Justification</td><td colspan="3">All gears are considered together.

Measures are in place to identify and avoid or reduce ecosystem impacts of the fishery where possible (through e-logs, VMS, recording of all bycatch including benthic species bycatch, closed areas to protect juvenile and spawning fish as well as vulnerable habitats). A full suite of management measures are applied as part of multi-species stock management and key target species management (which includes species of key importance to the ecosystem foodweb such as capelin and cod), including quota system, vessel permits, and effort limitation, as well as technical control measures on gears and vessels. These measures are widely adopted and proven methods in fisheries management. SG60 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 regularly 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.

Testing in this context would include simulation modelling to evaluate management structures. Although there have been studies evaluating the impacts of the gears (all) fishing on benthic habitats in Icelandic waters, there has been no testing of the strategy in place to manage all ecosystem impacts of these gears, simulation models are currently being researched. It therefore cannot yet be concluded that there is high confidence that the current strategy will work. SG 100 is not met.</td></tr>
<tr><td>c</td><td colspan="4">Management strategy implementation</td></tr>
<tr><td></td><td>Guidepost</td><td></td><td>There is some evidence that the measures/partial strategy is being implemented successfully.</td><td>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).</td></tr>
<tr><td></td><td>Met?</td><td></td><td>Y</td><td>N</td></tr>
<tr><td></td><td>Justification</td><td colspan="3">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, strictly implemented, real time quotas for key species. Control and enforcement of these measures is also strong, with widespread use of VMS, at sea and port surveillance and controls, with resultant levels of high compliance. Clear evidence is provided in the form of regular stock assessments, MCS review and compliance levels. There is thus some evidence that the strategy is being implemented successfully. SG 80 is met.</td></tr>
</table>

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.	
		Clear evidence that the strategy is being implemented successfully and is achieving its objectives is not available. The strategy is focused 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, and benthos interactions. SG 100 is not met.	
References		ICES 2017 ecoregion overview; ICES 2008 Book 2 Greenland and Iceland Ecosystem overview; Sturludottir E et al, 2018.; Ribeiro JPC et al. 2018	
OVERALL PERFORMANCE INDICATOR SCORE:			**85**
CONDITION NUMBER (if relevant):			**-**

PI 2.5.3 Ecosystem information

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	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 (80) 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 water's 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 multispecies modelling (e.g. GADGET models, EwE model, Atlantis model; see Section 3.4.1.5 of main report). 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. SG80 is met.		
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 (80) 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. Although there is increasing spatial and temporal information on most forms of fishing and captures, it cannot be said that all the main interactions have 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

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.		
				ecosystem are understood.
	Met?		Y	N
	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 none of the UoA species are a key ecosystem element in Icelandic waters, their biology and ecology is well known (see fishbase.org). 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 met for all gears. In order to meet SG100, the main functions of these components (target species, primary and secondary species, ETPs and habitats) also have to be understood. Although research projects are increasing understanding of individual elements and their interaction (e.g. study on deep sea sponge communities and coral gardens, Rix et al 2018), the knowledge gap is too big to be confident about 'understood'. There are few time series studies in these latitudes to be able to differentiate between background ecological variation and actual impacts of either UoA and/or oceanographic changes due to climate change, for example. SG100 is not 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 for the ecosystem to be inferred.	Adequate information is available on the impacts of the UoA on the components and elements to allow the main consequences for the ecosystem to be inferred.
	Met?		Y	Y
	Justification	All gears (100) 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 and recording on by-catch of secondary and ETP species has improved considerably 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 on trophic interactions, the impact of climatic and other abiotic factors and ecosystem modelling (see main report, section 3.4.1 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
	Justific	All gears (80)		

PI 2.5.3		There is adequate knowledge of the impacts of the UoA on the ecosystem.
	ation	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 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 monitoring catch levels of juvenile fish, and such information is utilised to implement realtime 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. 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, increasingly the information available is lagging behind fluctuating oceanographic ecosystem components, such as water temperature and currents impacting the availability of foodweb components, as these fluctuations are occurring more frequently and less predictably. In order to address this ecological variability, large scale simulation models, such as the integrated end -to-end modelling framework Atlantis, may assist more effectively in the development of strategies to manage ecosystem impacts (see for example Bossier et al 2018). SG100 is not met.
References		Ribeiro et al 2018; Sturludottir et al 2018; Desjardins 2015; Pálsson 1997, Stefánsson and Pálsson 1998, Stefánsson 2003, Barbaro et al. 2008; Ministry of the Environment 2010; Rix et al 2018; Bossier et al 2018.
OVERALL PERFORMANCE INDICATOR SCORE:		**85**
CONDITION NUMBER (if relevant):		**-**

PI 3.1.1 Legal and/or customary framework

<table>
<tr><td colspan="2">PI 3.1.1</td><td colspan="3">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.</td></tr>
<tr><td colspan="2">Scoring Issue</td><td>SG 60</td><td>SG 80</td><td>SG 100</td></tr>
<tr><td rowspan="4">a</td><td colspan="4">Compatibility of laws or standards with effective management</td></tr>
<tr><td>Guidepost</td><td>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</td><td>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.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>Justification</td><td colspan="3">The fisheries operate in Icelandic waters, but the stock boundaries of the following species extend beyond Icelandic waters (see section 3.3.4.1 on stock structure) and therefore involve other fishing nations in stock management:
• Blue Ling and Tusk include East Greenland (subarea 14).
• Golden redfish is widely distributed (subareas 5, 6, 12 and 14).
These species are shared stocks and co-operation with other parties is required. All are contracting parties of the North East Atlantic Fisheries Commission (NEAFC, 1980) and have ratified the UN Fish Stocks Agreement (UN, 1995). As a signatory Iceland is obligated to co-operate with relevant parties on shared stocks.
Blue ling and Tusk: As stated in the latest ICES assessment (ICES, 2018x), there is no joint management plan for Blue ling, but there is an Icelandic management plan for tusk. Historically the Greenlandic catch has only amounted to around 1% of the total, but in 2016/17 this proportion did increase. There is a joint Icelandic-Greenlandic Fisheries Commission that meets regularly (at least annually) to review the state of shared stocks and agree necessary management measures. The parties also discuss their involvement and activities with NEAFC. These activities exemplify that Iceland’s binding procedures governing co-operation are being followed to deliver appropriate management outcomes and SG100 is met.
Golden Redfish: The geographic distribution of the stock is shared between Iceland, Faroes and Greenland. More than 90% of the catch is taken in the Icelandic EEZ where the TAC is set and managed by Icelandic authorities. There is Management Plan in place for Golden Redfish developed jointly by these three governments, which was reviewed by ICES in 2014 and considered precautionary (ICES, 2014). This represents binding co-operative procedures and SG100 is met.
For the other species (Atlantic Wolffish, Ling, Plaice and Saithe) the stocks are entirely within the Icelandic EEZ and the co-operation described above does not apply.
Iceland has a well-established system for fisheries management in place, codified in the 1990 Fisheries Management Act, amended in 2006. 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</td></tr>
</table>

		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. The Ministry of Industries and Innovation – which has two ministers: one for Industry and Commerce 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. The Directorate of Fisheries 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, which is a civilian law enforcement agency under the Ministry of the Interior. 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 the Icelandic EEZ is regulated by the 1996 Act on Fishing outside of Icelandic Jurisdiction Through the Fisheries Management Act, other relevant acts and regulations issued by the Ministry and the Directorate, binding procedures for cooperation with other fishing nations are in place where necessary and able to provide management outcomes that are consistent with MSC Principles 1 and 2. (SG100 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 3.1.2), e.g. to clear out disagreement and conflict among users and between users and authorities.		
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 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	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

		the objectives of MSC Principles 1 and 2.	objectives of MSC Principles 1 and 2.	consistent with the objectives of MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	While the FCR (SA4.3.5) identifies the focus of this scoring issue is on indigenous peoples (and no indigenous minority groups are identified in Iceland), Iceland and its people are highly dependent on fisheries and this scoring issue is relevant to Iceland. 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 3.1.3), 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.		
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. 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. Golden Redfish Fishery Management Plan https://www.government.is/news/article/?newsid=e747dac7-fb88-11e7-9423-005056bc4d74 ICES (2014). Iceland, Faroe Islands, and Greenland request to ICES on evaluation of a proposed long-term management plan and harvest control rule for golden redfish (Sebastes marinus). In Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 2, Section 2.2.3.1. Minority Rights: https://minorityrights.org/country/iceland/ NEAFC (1980) North-East Atlantic Fisheries Commission Convention on multi-lateral co-operation https://www.neafc.org/convention/1980-signed-version UN Fish Stocks Agreement, 1995. http://www.un.org/Depts/los/convention_agreements/Background%20paper%20on%20UNFSA.pdf UN Law of the Sea Convention, 1982.		
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 3.1.1 a), governance functions are split between the Ministry of Fisheries & Agriculture, the Directorate of Fisheries, the Marine Freshwater Research Institute (MFRI) and the Coast Guard. Different user groups are well integrated in the management process; see 3.1.2 b). 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.		
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 consensus-based system for fisheries management and a long tradition of continuous consultation and close cooperation between government agencies and user-group organizations. Much consultation takes place informally between representatives of user groups and authorities. At a more formal level, all major interest organizations are regularly invited to sit on committees established for regular consultations with the Ministry, the Directorate and the Parliament's (Althing) Permanent Committee for Fisheries and Agriculture. These include, but are not restricted to, Iceland Fisheries (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) and the Fisheries Association of Iceland (which also incorporates the two latter as well as the Federation of Owners of Small Fishing Vessels, the Icelandic Seamen's Federation and others). Also, local authorities are actively engaged in fisheries management and have easy access to the management		

<table>
<tr><td></td><td></td><td colspan="3">system.
Major international NGOs that usually engage actively in discussions about fisheries management, such as Greenpeace and WWF, do not have offices in Iceland. Birdlife International is the most active and is working with the Icelandic fishing industry on addressing by-catch issues. Local NGOs are more focused on land-based nature protection.
Consultation processes cover policies and regulatory issues, and also include discussions of the annual scientific recommendations by the MFRI. 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.
Stakeholders report that consultation processes are inclusive and transparent. Management authorities do consider the information obtained from stakeholders (SG 80 is met). The authorities do often explain how information is used or not used via direct informal communication. However, there were instances cited to the assessment team where stakeholders received no such explanation. This lack of transparency for some stakeholders within the consultation process indicates SG100 is not met.</td></tr>
<tr><td rowspan="4">c</td><td colspan="4">Participation</td></tr>
<tr><td>Guidepost</td><td></td><td>The consultation process provides opportunity for all interested and affected parties to be involved.</td><td>The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement.</td></tr>
<tr><td>Met?</td><td></td><td>Y</td><td>Y</td></tr>
<tr><td>Justification</td><td colspan="3">As follows from 3.1.2 b), the consultation processes provide ample opportunity for all interested and affected parties to be involved in discussions about fisheries management in Iceland. Authorities invite relevant stakeholders to meetings and seminars and actively seek their opinion on management measures. The level of active encouragement is considered appropriate to the scope and context of the fishery. The timing and locations of meetings are set by authorities in conjunction with fishing representatives in order to facilitate their effective engagement. SG 100 is met.</td></tr>
<tr><td colspan="2">References</td><td colspan="3">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, Icelandic Sustainable Fisheries and the Ministry of Industry and Innovation 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/</td></tr>
<tr><td colspan="4">OVERALL PERFORMANCE INDICATOR SCORE:</td><td>95</td></tr>
<tr><td colspan="4">CONDITION NUMBER (if relevant):</td><td></td></tr>
</table>

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	N
	Justification	The objective of Icelandic fisheries management, as stated in the Fisheries Management Act (Art. 1), is to ensure conservation and efficient utilization of marine living resources in the Icelandic EEZ. The precautionary approach is not mentioned explicitly in the Act, but the requirement to protect marine resources and take the best scientific knowledge into account (Art. 3), e.g. through the use of reference points, equals the requirements of the precautionary approach, as laid out in the FAO Code of Conduct. The Icelandic government's statement on responsible fisheries (2007) confirms that "Conformity between the scientific fisheries advice and the authorities' decisions on the TAC is a principal factor for ensuring responsible fisheries management. The authorities' decisions on the maximum catch are based on social and economic factors, yet always focused on ensuring the long-term renewal of the fish stocks. The Icelandic authorities have implemented a utilization strategy with the long-term objective of ensuring sustainable fisheries." The Fisheries Management Act and the additional clarifications provided by this statement show that these objectives are explicit within management policy and SG80 is met. However, the Act does not commit to these requirements within management policy and SG100 is not met.		
References		Act on Fisheries Management No. 38/1999, amended as Act No. 116/2006. FAO Code of Conduct for Responsible Fisheries, 1995. Icelandic Statement on Responsible Fisheries (2007) https://www.government.is/news/article/2018/05/15/Fisheries/ UN Fish Stocks Agreement, 1995.		
OVERALL PERFORMANCE INDICATOR SCORE:				80
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	Partial
	Justification	Four of the species have specific management plans (golden redfish, ling, saithe and tusk). The other three species (Atlantic wolffish, Blue ling and plaice) do not have fishery-specific management plans, but still operate under a fishery-specific management system, which respond to annual stock advice to ensure outcomes consistent with P1 and have the same objectives in place to address the impact of Icelandic fisheries on the wider ecosystem (P2). 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 these Icelandic fisheries, such as the overarching objective to maintain fish stocks at sustainable levels and the specific objectives defined in the management plans for these fisheries. The stated level of F to be achieved in the fishery is the fishery-specific objective relating to P1. These are consistent with UN commitments to sustainable stocks such as the Sustainable Development Goal 14 including a commitment to MSY. Objectives related to P2 issues exist (For example the Ministry of the Environment has developed a National Strategy Plan for the preservation of biological diversity (Ministry of Environment 2010 and the management objectives related to commercial species). An amendment to Act No 79/1997 on Fishing in Iceland's Exclusive Economic Zone provides for the prohibition of fishing activities with bottom-contacting gear to especially protect vulnerable benthic habitats. There are also seasonal closures imposed on vessels using certain gears to reduce sea bird by-catch. P2-related acts and management measures are referenced by the fishery-specific management plans, but are also explicit within the fishery-specific management system for those species without a specific management plan (SG80 is met for all UoAs). These P2 aspects are, however, less well defined and measurable, resulting in a partial score for this PI at SG100.		
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. Fishery-specific Management plans and stock advice: Atlantic Wolffish https://www.hafogvatn.is/static/extras/images/Steinbitur_2018729531.pdf Blue Ling: https://www.hafogvatn.is/static/extras/images/Blalanga_2018729178.pdf		

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.**	
	Golden Redfish: https://www.government.is/news/article/2014/04/01/FisheriesManagement-Plan-Golden-Redfish/ Ling: http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/Special_requests/Iceland.2017.09.pdf Plaice: https://www.hafogvatn.is/static/extras/images/Skarkoli_2018729536.pdf Saithe: https://www.government.is/news/article/2013/06/10/FISHERIES-MANAGEMENT-PLAN-ICELANDIC-SAITHE/ Tusk: http://ices.dk/sites/pub/Publication%20Reports/Advice/2017/Special_requests/Iceland.2017.10.pdf	
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 developed and measures taken to achieve the fishery-specific objectives. This applies to Icelandic fisheries overall and these specific fisheries; see 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. These decision-making processes apply to all the UoA fisheries, irrespective of whether a management plan is in place or whether the stock assessment is by ICES or MFRI: the procedures are consistent and result in measures to achieve the fishery-specific objectives (SG80 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 interviews during the site visit, the established decision-making procedures at national level in Iceland respond to what the authorities consider to be 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. 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. Stakeholders feel that the authorities' response on fisheries management aspects 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. SG80 is met. As identified under P2 above, it is less evident that there is the same level of response and timeliness on decisions relating to environmental management (e.g. closure of areas due to VME identification). Even though the recent standing committee report on Code of Conduct is a positive move, it is an ad hoc arrangement that is providing recommendations that may or may not be implemented by MII. Therefore, the response to all issues expected at SG100 is not evident and SG100 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 MFRI, as well as assessments by MFRI and ICES. ICES evaluated the Icelandic management plans and these were assessed as being precautionary (ICES, 2017). National legislation requires the use of the precautionary approach (see 3.1.3), and the approach to assessment of category 3 species by MFRI has been suggested by ICES to be consistent with the precautionary principle. The decision-making processes, whether MFRI or ICES led, are based on the best available information and are assessed as being precautionary (SG80 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 MFRI produce annual reports that are available to the public on request and via their website. 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. SG80 is met. Formal reporting is focused on the performance of fisheries in relation to commercial species. The same is not evident for the reporting of information and management actions in relation to by-catch and other ecosystem elements and therefore SG100 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. The recent fisheries strike (Dec 2016-Feb 2017) was an industrial dispute related to wage levels within the sector rather than a dispute between management and the sector. On the		

		occasions when the management authority has been taken to court by fishing companies, it 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.
References		Act on Fisheries Management No. 38/1999, amended as Act No. 116/2006. Fiskistofa Arsskyrsla Directorate of Fisheries Annual Report (e.g. 2017 http://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_2017.pdf) ICES (2017) Review of Ling and Tusk management plans http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/Special_requests/Iceland.2017.09.pdf
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 detailed in section 3.5.5 of this report. Fishing vessels are required to keep a logbook and report catches to the Directorate of Fisheries on a daily basis. Some vessels have electronic logbooks, but not all. 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. 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. VMS data enables effective oversight of whether area restrictions are observed. Overall this equates to a comprehensive MCS system that is demonstrably effective and SG80 is met. The DoF adopts a risk-based approach, which informs its targeted enforcement effort. This does, however, mean that there is a reliance on self reporting, such as the recently implemented e-logbook system and inspection levels are low, which makes it difficult to demonstrate a consistent ability to enforce relevant measures, strategies or rules. SG100 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 described in section 3.5.5 of the main report. Based on information in the annual report of the Directorate of Fisheries and information gained through interviews during the site visit indicate that sanctions are consistently applied. The reporting against the comprehensive enforcement regime combined with the high level of compliance stated by stakeholders mean that sanctions are considered to provide effective deterrence and therefore SG80 is met. However, there is no evidence demonstrating that these are consistently applied in relation to the self-reporting requirements for non-commercial by-catch and ETP species and SG100 is not met.		

<table>
<tr><td rowspan="4">c</td><td colspan="4">Compliance</td></tr>
<tr><td>Guidepost</td><td>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.</td><td>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.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3">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. The Directorate of Fisheries produces detailed overviews of compliance levels among Icelandic fisheries, in aggregate form in its annual reports and on a running basis on its website.
The DoF annual report gives the total number and nature of violations across the Icelandic fleet. In 2015 75% were logbook offences. Following a warning, 0.6% of cases resulted in a loss of license.
In addition to the detailed sanctioning system (see 3.2.3 b)), the social control that exists in a relatively small fishing community as Iceland, as well as the legitimacy of regulations due to the high degree of user-group involvement, contribute to the high level of compliance in the fishery as reported by all stakeholders. SG80 is met.
The site visit highlighted the differences in interpretation of information requirements for bycatch reported in logbooks, creating a gap between what may be expected to be recorded and what is provided. This suggests that there is not yet 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 and SG100 is not met.</td></tr>
<tr><td rowspan="4">d</td><td colspan="4">Systematic non-compliance</td></tr>
<tr><td>Guidepost</td><td></td><td>There is no evidence of systematic non-compliance.</td><td></td></tr>
<tr><td>Met?</td><td></td><td>Y</td><td></td></tr>
<tr><td>Justification</td><td colspan="3">The Directorate of Fisheries control department reporting shows no evidence of systematic non-compliance in the fishery, which was confirmed through interview with its staff and other stakeholders. The assessment team has not received any information indicating that there is systematic non-compliance. SG80 is met</td></tr>
<tr><td colspan="2">References</td><td colspan="3">Act on Fisheries Management No. 38/1999, amended as Act No. 116/2006.
Act concerning the Treatment of Commercial Marine Stocks No. 57/1996.
Annual reports for the Directorate of Fisheries, 2014 and 2015.
http://www.fiskistofa.is/english/fisheries-management/
http://www.responsiblefisheries.is/seafood-industry/management-and-control-system/
Email correspondence with representatives of the Directorate of Fisheries.
Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industry and Innovation during the site visit.
Regulation No. 224, 14 March 2006, on Weighing and Recording of Catch
Website of the Icelandic Coast Guard (www.lhg.is).</td></tr>
<tr><td colspan="4">OVERALL PERFORMANCE INDICATOR SCORE:</td><td>80</td></tr>
<tr><td colspan="4">CONDITION NUMBER (if relevant):</td><td></td></tr>
</table>

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. This is exemplified by the 2018 regulatory review by the Fisheries Committee. Key aspects of the fisheries management system 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 scientific approach to category 3 stocks follows the ICES approach, which has been evaluated by ICES. The financial aspects of the management system is reviewed by the Icelandic National Audit Office and there has been review of the regulations by the Fisheries Committee. Therefore, key parts of the management system are subject to review and SG80 is met, but there is no holistic evaluation of the management system as such. SG100 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	As follows from 3.2.4 above, key parts of the fishery-specific management system are subject to regular internal review both within the directorate of fisheries and by the Ministry within which the Directorate operates. Assessment and advice relating to those species assessed by MFRI is regularly reviewed internally by the MFRI‘s TAC committee. There has also been review of assessments and management plans by ICES at the request the Icelandic government (e.g. ICES, 2017). The approach adopted by MFRI is the same as ICES, which is subject to internal and external peer review. This provides some independent external review of the methods applied in the fishery management system, although this does not cover all aspects of the management system. Iceland's National Audit Office (Ríkisendurskoðun) undertakes regular review of public sector performance and spending at the request of parliament. Therefore, with the Icelandic Government's internal review of its activity, external review by the National Audit Office and further external review of fishery specific management performance by the Fisheries Committee (reporting in 2019), SG80 is met. However, it is difficult to conclude that there is a regular external evaluation of the Icelandic system for management of these species specifically. Therefore, SG100 is not met.		
References		Iceland Fisheries Standing Committee Review of Regulation & Management (draft) *Samstarfsnefnd um bætta umgengni um auðlindir sjávar* [Co-operation Committee on improved handling of marine resources]		

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.**	
	ICES (2017) Review of Ling and Tusk management plans http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/Special_requests/Iceland.2017.09.pdf	
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).

However, having established the availability of catch profiles and information on populations and stock assessment, the team decided to not use the RBF approach. Stakeholder notice of the eventual application of RBF was issued.

Appendix 1.3: Conditions, Recommendations and Client Action Plan

Nine conditions and two recommendations are made. Those have been forwarded to the Client who has submitted a plan of action to address those during the potential certification period. Progress of all conditions and recommendations will be monitored as a part of the forthcoming surveillance program for the ISF Iceland multi-species demersal fishery.

Conditions

Note: Conditions 1 to 6 are carried over from the previous certificate. Conditions 7, 8 and 9 on ETP species replicate conditions 4,5 and 6 for secondary species and are introduced as some species that were previously considered as secondary species under the previous certificate conditions are now defined as ETP species.

The milestones for these conditions are aligned with the previous ones, recognizing that some progress has been made on these issues.

Condition 1: PI 1.2.2 – Harvest control rules and tools: Atlantic Wolffish

Performance Indicator(s) & Score	**PI number**	**Scoring Issue & scoring guidepost**	**Score**
	PI 1.2.2 – Harvest control rules and tools	Scoring Issue a “Harvest control rules design and application.”	75
Rationale	There is no well-defined HCR should the stock fall below the trigger reference point and approach the limit reference point, For additional details on the rationale, please see the Scoring Justification for PI 1.2.2a Atlantic Wolffish		
Condition 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.		
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 planning for the reassessment of the harvest control rule, which includes evaluation of biomass and fishing mortality limit and target reference points. Score 75. **Year 2-3**: Evidence is available indicating reassessment of the harvest control rule is underway with intent to implement in the fishery. 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 Action: Means of Verification:	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.		
Year 2-3 Action: Means of	Follow up on results of engagement in year 1 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		

Verification:	control rule, either through MFRI or internal options as set out above. The actions in year 2 are dependent on outcomes in previous year. 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.
Year 4 Action: Means of Verification:	Implement measures developed and evaluated in years 2 and 3. 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.
Consultation on Condition	Consultation is needed with MII as it will be the Ministry's to initiate a preparation for an HCR at MFRI.

Condition 2 PI 1.2.2 – Harvest control rules and tools: Plaice

Performance Indicator(s) & Score	**PI number**	**Scoring Issue & scoring guidepost**	**Score**
	PI 1.2.2 – Harvest control rules and tools	<u>Scoring Issue a</u> "Harvest control rules design and application."	75
Rationale	There is no well-defined HCR should the stocks fall below the trigger reference point and approach the limit reference point. For additional details on the rationale, please see the Scoring Justification for PI 1.2.2a for Plaice		
Condition 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.		
Milestones	It is understood 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 planning for the reassessment of the harvest control rule, which includes evaluation of biomass and fishing mortality limit and target reference points. Score 75. Year 2-3: Evidence is available indicating reassessment of the harvest control rule is underway with intent to implement in the fishery. 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 Action: Means of Verification:	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.
Year 2-3 Action: Means of Verification:	Follow up on results of engagement in year 1 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 2 are dependent on outcomes in previous year. 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.
Year 4 Action: Means of Verification:	Implement measures developed and evaluated in years 2 and 3. 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.
Consultation on Condition	Consultation is needed with MII as it will be the Ministry's to initiate a preparation for an HCR at MFRI.

Condition 3 PI 1.2.2 – Harvest control rules and tools: Blue Ling

Performance Indicator(s) & Score	**PI number**	**Scoring Issue & scoring guidepost**	**Score**
	PI 1.2.2 – Harvest control rules and tools	<u>Scoring Issue a</u> "Harvest control rules design and application."	75
Rationale	There is no well-defined HCR should the stocks fall below the trigger reference point and approach the limit reference point. For additional details on the rationale, please see the Scoring Justification for PI 1.2.2a Blue ling.		
Condition 3	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.		
Milestones	It is understood 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 planning for the reassessment of the harvest control rule, which includes evaluation of biomass and fishing mortality limit and target reference points. Score 75. Year 2-3: Evidence is available indicating reassessment of the harvest control rule is underway with intent to implement in the fishery. 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 Action: Means of Verification:	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.
Year 2-3 Action: Means of Verification:	Follow up on results of engagement in year 1 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 2 are dependent on outcomes in previous year. 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.
Year 4 Action: Means of Verification:	Implement measures developed and evaluated in years 2 and 3. 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.
Consultation on Condition	Consultation is needed with MII as it will be the Ministry's to initiate a preparation for an HCR at MFRI.

Condition 4 PI 2.2.1 – Secondary species outcome: Gillnet

Performance Indicator(s) & Score	**PI number**	**Scoring Issue & scoring guidepost**	**Score**
	2.2.1 – Gillnet	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.	75
Rationale	Given that population data on harbour porpoise are old and are not robust enough to evaluate trends over time, and that bycatch rates, even if uncertain have apparently been considerable since this time (and given that the pressure on the population remains above the ASCOBANS notional limit, however, it is not possible to say that the population is 'highly likely' to be within biologically-based limits There is no management in place, although some measures have been tested. For additional details on the rationale, please see the Scoring Justification for PI 2.2.1 Gillnet.		
Condition 4	All species of seabirds and marine mammals taken as bycatch must be shown to be 'highly likely' to be above biologically based limits or there is evidence of recovery or a demonstrably effective partial strategy must be put in place for gillnet such that the UoA does not hinder its recovery and rebuilding.		
Milestones	**At the End of Year 1:** Develop a partial strategy that ensures that the (gillnet) UoA does not hinder any recovery and rebuilding of seabird and marine mammal bycatch species. Consult with industry and all stakeholders on the proposed strategy and amend accordingly. Resulting score: 75		

	At the End of Year 2: Formally commit to the new strategy and, with industry, commence its implementation. Resulting score: 75 **At the End of Year 3**: Demonstrate that the adopted strategy has been fully adopted and is being fully implemented. Resulting score: 75 **At the End of Year 4:** Provide data to show that the fishery is not hindering the recovery of or having significant impacts on the populations of out-of-scope secondary species. Resulting score: 80
Client Action Plan	
Year 1 Action: Means of Verification:	***Improve on board logging:*** Continue engagement with fishery operators to ensure adequate logbook recording bycatch. ***Evaluate need for partial strategy:*** Continue engagement with the Directorate of Fisheries and the Marine Research Institute to promote monitoring harbour porpoise bycatch in the fishery and to determine if logbook recording and monitoring is adequate. ***Evaluate need for partial strategy:*** Continue consultation with the Marine Research Institute (MRI) and/or other institutions with the objective to continue evaluating the risk to harbour porpoise in the fishery or continue engagement with independent parties to continue evaluation of the risk to harbour porpoise in the fishery. ***Evaluate impacts:*** Present a preliminary assessment of measures that could be included in a partial strategy to prevent the fishery from posing a risk of serious or irreversible harm to harbour porpoise, if necessary.
Year 2 Action: Means of Verification:	***Improve on board logging:*** Prepare a written report (or commission such a report) during Year 2 on the reliability of logbook recordings and monitoring. ***Evaluate need for partial strategy:*** Present a draft plan for addressing impacts on harbour porpoise, if necessary depending on research results. ***Evaluate impacts:*** Present evidence of ongoing consultation with relevant parties to address problems and areas for further action, e.g. work with the Small boat association and net locations and with MRI on same matter. In year 2 ISF will have a report from the industry on what has been done and success of it.
Year 3 Action: Means of Verification:	The strategies drafted and worked on in year 2, could be finalised and established in year 3, if necessary. ISF will meet with MFRI to evaluate the progress, meet with the MII to discuss progress and the commitment to the implemented strategies, to be able to present a summary of actions from the strategies.
Year 4 Action: Means of Verification:	In year 4, ISF keeps track of effectiveness of plans, actions and strategies which are developed and implemented in previous years to fulfil the condition.
Consultation on Condition	Consultation with MII and MFRI.

Condition 5 PI 2.2.2 – Secondary species management strategy: Gillnet & longline

	PI number	Scoring Issue & scoring guidepost	Score
Performance Indicator(s) & Score	2.2.2 – Gillnet & longline	a. (gillnet) There is a partial strategy in place for managing secondary species that is designed to maintain or to not hinder rebuilding of secondary species. b. (gillnet) 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. c. (gillnet) There is some evidence that the measures/partial	65 (gillnet) 75 (longline)

		strategy is being implemented successfully. d (gillnet and longline) There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch	
Rationale	**<u>Gillnet</u>** SIa: While the population of harbour porpoise is considered 'least concern' and the measures that have reduced effort are expected to maintain or not hinder rebuilding, an effective partial strategy is not yet in place. There is no 'partial strategy' for bird bycatch, including for razorbills. SIb: Although the general measures to reduce overall fishing effort are likely to work to reduce bycatch. to date MFRI testing of the particular measures (e.g. pingers), show that these have not been successful. SIc: Gillnet does not have a successfully-implemented partial strategy to reduce the harbour porpoise mortality. SId: There is a review of alternative measures through an ad hoc group, but it is not clear whether this process is intended to be ongoing or is a one-off. **<u>Longline:</u>** SId: There is a review of alternative measures through an ad hoc group, but it is not clear whether this process is intended to be ongoing or is a one-off.		
Condition 5	A demonstrably effective partial strategy should be put in place such that the (gillnet) UoA does not hinder recovery and rebuilding of any species of seabird or marine mammal. A demonstrably effective partial strategy should also be put in place for the gillnet fisheries to ensure that seabird or marine mammal populations are maintained at levels which are highly likely to be within biologically based limits. Strategies should include a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species (which includes all seabird or marine mammal bycatch species) and they are implemented as appropriate (gillnet and longline).		
Milestones	**At the End of Year 1:** Develop a partial strategy that ensures that the (gillnet) UoA does not hinder any recovery and rebuilding of seabird and marine mammal bycatch species. Consult with industry and all stakeholders on the proposed strategy and amend accordingly. Initiate a regular review process to identify and evaluate alternative measures that would reduce unwanted catch in both the gillnet and the longline fishery. Resulting score for gillnet: 65 Resulting score for longline: 75 **At the End of Year 2:** Formally commit to the new strategy and review process and, with industry, commence its implementation. Resulting score: 70 (gillnet), 75 (longline) **At the End of Year 3**: Demonstrate that the adopted strategy has been fully adopted and is being fully implemented. Demonstrate that at least one review (of a regular process) to reduce unwanted catch has taken place. Resulting score: 75 (gillnet), 80 (longline) **At the End of Year 4:** Provide data to show that the fishery is not hindering the recovery of or having significant impacts on the populations of out-of-scope secondary species Resulting score: 80 (gillnet), 80 (longline)		
Client Action Plan			
Year 1 Action: Means of Verification:	***Improve on board logging:*** Engage with fishery operators in order to improve logbook recording of marine mammals and seabird species bycatch. ***Evaluate need for partial strategy***: Consult with the Directorate of Fisheries and the Marine Research Institute and/or other parties with the objective to determine if recording and		

	monitoring of secondary species bycatch is at a level that is sufficient to detect increased risk to the population. ***Evaluate impacts:*** Consult with the Directorate of Fisheries, the Marine Research Institute and/or other institutions with the objective of evaluating the risk to marine mammals bycatch in the fishery. ISF will call for recommendations for methods from the fishermen and the industry to a secondary species coming to the gillnets and long line.
Year 2 Action: Means of Verification:	***Improve on board logging:*** Continue engagement with fishery operators to ensure adequate logbook recording interaction & bycatch. ***Evaluate need for partial strategy:*** Continue engagement with the Directorate of Fisheries and the Marine Research Institute to promote monitoring secondary species bycatch in the fishery and to determine if logbook recording and monitoring is adequate. ***Evaluate need for partial strategy:*** Continue consultation with the Marine Research Institute (MRI) and/or other institutions with the objective to continue evaluating the risk to secondary species in the fishery. ***Evaluate impacts:*** Present a preliminary assessment of measures that could be included in a partial strategy to prevent the fishery from posing a risk of serious or irreversible harm to secondary species populations, if necessary. In year 2 ISF will have a report from the industry what have been done and success of it.
Year 3 Action: Means of Verification:	***Improve on board logging:*** Prepare a written report (or commission such a report) during Year 3 on the reliability of logbook recordings and monitoring. ***Evaluate need for partial strategy:*** Present a draft plan for addressing impacts on secondary species as bycatch, if necessary depending on research results. ***Evaluate impacts:*** Present evidence of ongoing consultation with relevant parties to address problems and areas for further action.
Year 4 Action: Means of Verification:	The strategies established in year 3 shall be in implementation by year four, if necessary. ISF will meet with MRI to evaluate the progress, meet with the MII to follow up on MRI findings and discuss progress and the commitment to the implemented strategies. In year 4, ISF is monitoring the effectiveness of plans, actions and strategies implemented in first 4 years, and base further actions on results from previous years, to fulfil the condition
Consultation on Condition	Consultation with MII and MFRI

Condition 6 PI 2.2.3 – Secondary species information: Gillnet & longline

Performance Indicator(s) & Score	**PI number**	**Scoring Issue & scoring guidepost**	**Score**
	2.2.3 – Gillnet and Longline	a. Some quantitative information is available and adequate to assess the impact of the UoA on main secondary species with respect to status. c. Information is adequate to support a partial strategy to manage main secondary species.	70
Rationale	The available data on bycatch magnitude and trends, population status and bycatch variability in space and time is not adequate for a partial strategy [for gillnet and longline]. For additional details on the rationale, please see the Scoring Justification for PI 2.2.3 gillnet		
Condition 6	By the fourth surveillance audit, there is sufficient quantitative information on seabird or marine mammal bycatch, bycatch trends and populations to evaluate the impact of the gillnet and longline fishery on the status of main secondary species, and to support a partial strategy.		
Milestones	**At the End of Year 1:** There shall be evidence of the Client's plan to encourage and enable fishing vessels to record all seabird or marine mammal bycatch in electronic logbook systems. The Client will support research as necessary to evaluate bycatch, as well as population size and trends in main secondary species. Score 70		

	At the End of Year 2: There shall be evidence of implementation of the Client's plan to encourage and enable fishing vessels to record all seabird or marine mammal bycatch in electronic logbook systems. The Client will support research as necessary to evaluate bycatch, as well as population size and trends in main secondary species. Score 70 **At the End of Year 3:** There shall be evidence of implementation of the Client's plan to encourage and enable fishing vessels to record all seabird or marine mammal bycatch in electronic logbook systems. There shall be evidence of improvement in bycatch reporting rates in the Client gillnet and longline fleet. The Client will support research as necessary to evaluate bycatch, as well as population size and trends in main secondary species. Score 70 **At the End of Year 4:** There shall be sufficient quantitative information, from logbooks, observers or other sources such that the rate and trends in bycatch of main secondary species can be evaluated. There shall be sufficient data on populations that impacts of the fishery can be evaluated. Score 80
Client Action Plan	
Year 1 Action: Means of Verification:	Data recording: Consult with the Directorate of Fisheries, the Marine Research Institute and/or other institutions to improve reporting in to the e-logbooks on both seabird bycatch and marine mammal interaction.
Year 2 Action: Means of Verification:	Data collection: Continue engagement with the Directorate of Fisheries and the Marine Research Institute to promote monitoring of seabird bycatch and mammal interaction in the fishery and to determine if logbook recording and monitoring is adequate.
Year 3 Action: Means of Verification:	Data collection: Prepare a written report (or commission such a report) during Year 3 on the reliability of logbook recordings and monitoring.
Year 4 Action: Means of Verification:	Data collection: Prepare and provide a written report on actions and results form increased effort to improve logbook recordings and monitoring efforts.
Consultation on Condition	Consultation with MII, which oversees the process and initiates actions at relevant authorites.

Condition 7 PI 2.3.1 – ETP species outcome: Gillnet & longline

Performance Indicator(s) & Score	**PI number**	**Scoring Issue & scoring guidepost**	**Score**
	2.3.1 – Gillnet & longline	b. Known direct effects of the UoA are highly likely to not hinder recovery of ETP species.	70
Rationale	Harbour seal (GN): Given uncertainty in seal bycatch estimates and seal species identification, and the poor state of the harbour seal stock, it cannot be said that it is 'highly likely' that the fishery is not having an impact on the population. Seabirds Fulmar (GN, LL): Given that the gillnet bycatch estimates correspond to ~3% of the overall estimated decline in adult birds each year (or ~5.4% if both relevant UoAs are evaluated together the data does not allow for confidence that is is 'highly likely' that the UoA does not hinder recovery. Guillemots (GN): Based on a (very approximate and assumption-laden) estimate that the fishery accounts for ~2-3% of the annual reduction in the population, the logic is the same as for fulmars Loons (GN): The gillnet bycatch is likely to not be hindering recovery of the wider population; SG60 is met. However, given the possibility of some population distinctiveness for Iceland/Greenland breeders, there remains a risk of impact. SG80 is therefore not met.		

	<u>Black guillemot (GN):</u> Given the uncertainty in the black guillemot bycatch estimates and the poor state of the population, it is not possible to say with confidence that the UoA is 'highly likely' to not hinder recovery of this species Great black backed gulls (LL): Although it is not considered 'likely' that the longline fishery is significantly responsible for population trends, it cannot be said to be 'highly likely' to not hinder recovery. For additional details on the rationale, please see the Scoring Justification for PI 2.3.1b
Condition 7	All species of seabirds and marine mammals taken as bycatch must be shown to be 'highly likely' to be above biologically based limits or there is evidence effects of the gillnet and longline UoAs are highly likely not to hinder recover of ETP species.
Milestones	**At the End of Year 1 (fourth surveillance audit):** Develop and propose a strategy that ensures that the (gillnet) UoA does not hinder any recovery and rebuilding of seabird and marine mammal bycatch species. Resulting score: 75 **At the End of Year 2 (re-assessment):** Consult with industry and all stakeholders on the proposed strategy and amend accordingly. Resulting score: 75 **At the End of Year 3 (first surveillance audit):** Formally commit to the new strategy and, with industry, commence its implementation. Resulting score: 75 **At the End of Year 4 (second surveillance audit)**: Demonstrate that the adopted strategy has been fully adopted and is being implemented in an effective manner. Resulting score: 80
Client Action Plan	
Year 1 Action: Means of Verification:	ISF will consult with MII to review current actions being prepared to mitigate effects of longline and gillnet fisheries on marine mammals and seabirds. A collection of means will be pulled into a coherent and proposed as a strategy. At end of year one, ISF will present an overview of different measures in place or in preparation. ***Improve on board logging:*** Continue engagement with fishery operators to ensure adequate logbook recording bycatch. ***Evaluate need for partial strategy:*** Continue engagement with the Directorate of Fisheries and the Marine Research Institute to promote monitoring seabird and marine mammal bycatch in the fishery and to determine if logbook recording and monitoring is adequate. ***Evaluate need for partial strategy:*** Continue consultation with the Marine Research Institute (MRI) and/or other institutions with the objective to continue evaluating the risk to seabird and marine mammal in the fishery or continue engagement with independent parties to continue evaluation of the risk to seabird and marine mammal in the fishery. ***Evaluate impacts:*** Present a preliminary assessment of measures that could be included in a partial strategy to prevent the fishery from posing a risk of serious or irreversible harm to seabird and marine mammal, if necessary.
Year 2 Action: Means of Verification:	ISF continues to consult with MII and advocate for a presentation of the strategy and offer to become a part of the presentation stage to discover improve areas and issues. ISF will ask client group members for a feedback on the strategy and provide indications at end of year two. ***Improve on board logging:*** Prepare a written report (or commission such a report) during Year 2 on the reliability of logbook recordings and monitoring. ***Evaluate need for partial strategy:*** Present a draft plan for addressing impacts on seabird and marine mammal, if necessary depending on research results. ***Evaluate impacts:*** Present evidence of ongoing consultation with relevant parties to address problems and areas for further action, e.g. work with the Small boat association and net locations and with MRI on same matter. In year 2 ISF will have a report from the industry on what has been done and success of it.
Year 3 Action: Means of Verification:	In year three, ISF consults with MII and communicates the strategy to client members and stresses its necessity and importance. At year end a strategy should have been introduced to the fisheries.

Year 4 Action: Means of Verification:	At year four, ISF will consult with MII and follow up on how well the industry is responding to and picking up on the strategy which is meant to show that the fisheries do not hinder recovery or rebuilding of seabird and marine mammal species.
Consultation on Condition	ISF consults with MII.

Condition 8 PI 2.3.2 – ETP species management strategy: Gillnet & longline

Performance Indicator(s) & Score	**PI number**	**Scoring Issue & scoring guidepost**	**Score**
	2.3.2 – Gillnet & longline	b. There is a strategy in place that is expected to ensure the UoA does not hinder the recovery of ETP species. c. 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. e. There is a regular review of the potential effectiveness and practicality of alternative measures.	65
Rationale	SIb Harbour seal GN): Given that we cannot be sure at the level of SG80 ('highly likely') that the gillnet fishery is not having an impact on the harbour seal population, a strategy would be required to put measures in place which are responsive to the level of bycatch and the state of the stock. This is not the case here, Seabirds (GN, LL): Although several management improvements have been implemented over the last few years, bycatch rates remain uncertain for various reasons and it is thus not clear whether the strategy is ensuring that the UoA does not hinder recovery of ETPs SIc GN fulmar, common and black guillemot, loon LL: fulmar, great black-backed gull, Overall the evaluation that impacts are sustainable is uncertain, as the data available for these species do not provide an objective basis for confidence that the measures are working SIe; There is a review of alternative measures through an ad hoc group, but it is not clear whether this process is intended to be ongoing or is a one-off		
Condition 8	A demonstrably effective strategy should be put in place such that the (gillnet and longline) UoA does not hinder recovery and rebuilding of any species of seabird or marine mammal, and with an objective basis for evaluation that it is working. The strategy should include a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species (which includes all seabird or marine mammal bycatch species) and they are implemented as appropriate.		
Milestones	**At the End of Year 1:** Develop a strategy that ensures that the (gillnet and longline) UoA does not hinder recovery and rebuilding of seabird or marine mammal bycatch stocks. Consult with industry and all stakeholders on the proposed strategy and amend accordingly. Initiate a regular review process to identify and evaluate alternative measures that would minimize UoA-related mortality in both the gillnet and the longline fishery. Resulting score for gillnet: 65 Resulting score for longline: 65 **At the End of Year 2:** Formally commit to the new strategy and review process and, with industry, commence their implementation. Resulting score: 65 **At the End of Year 3**: Demonstrate that the adopted strategies have been fully adopted and is being fully implemented. Demonstrate that at least one review (of a regular process) to reduce		

	unwanted catch has taken place. Resulting score: 75 **At the End of Year 4:** Provide data to show that the fishery is the strategy is ensuring that the fishery does not hinder the recovery of ETP species. Resulting score: 80
Client Action Plan	
Year 1 Action: Means of Verification:	***Improve on board logging:*** Engage with fishery operators in order to improve logbook recording of marine mammals and seabirds bycatch. ***Evaluate need for partial strategy***: Consult with the Directorate of Fisheries and the Marine Research Institute and/or other parties with the objective to determine if recording and monitoring of marine mammals and seabirds bycatch is at a level that is sufficient to detect increased risk to the population. ***Evaluate impacts:*** Consult with the Directorate of Fisheries, the Marine Research Institute and/or other institutions with the objective of evaluating the risk to marine mammals and seabirds bycatch in the fishery or engage with independent parties to evaluate the risk to marine mammals and seabirds by the fishery.
Year 2 Action: Means of Verification:	***Improve on board logging:*** Continue engagement with fishery operators to ensure adequate logbook recording interaction & bycatch. ***Evaluate need for partial strategy:*** Continue engagement with the Directorate of Fisheries and the Marine Research Institute to promote monitoring marine mammals and seabirds bycatch in the fishery and to determine if logbook recording and monitoring is adequate. ***Evaluate need for partial strategy:*** Continue consultation with the Marine Research Institute (MRI) and/or other institutions with the objective to continue evaluating the risk to marine mammals and seabirds in the fishery or continue engagement with independent parties to continue evaluation of the risk to marine mammals and seabirds in the fishery. ***Evaluate impacts:*** Present a preliminary assessment of measures that could be included in a partial strategy to prevent the fishery from posing a risk of serious or irreversible harm to marine mammals and seabirds, if necessary. In year 2 ISF will have a report from the industry what have been done and success of it.
Year 3 Action: Means of Verification:	***Improve on board logging:*** Prepare a written report (or commission such a report) during Year 3 on the reliability of logbook recordings and monitoring. ***Evaluate need for partial strategy:*** Present a draft plan for addressing impacts on marine mammals and seabirds species as bycatch, if necessary depending on research results. ***Evaluate impacts:*** Present evidence of ongoing consultation with relevant parties to address problems and areas for further action.
Year 4 Action: Means of Verification:	Measures established in year 3 shall be in implementation by year four, if necessary. ISF will meet with MRI to evaluate the progress, meet with the DF to follow up on MRI findings and discuss progress and the commitment to the implemented strategies. In year 4, ISF is monitoring the effectiveness of plans, actions and strategies implemented in first 4 years, and base further actions on results from previous years, to fulfil the condition.
Consultation on Condition	Consultation takes place through MII.

Condition 9 PI 2.3.3 – ETP species information: Gillnet & longline

Performance Indicator(s) & Score	**PI number**	**Scoring Issue & scoring guidepost**	**Score**
	2.3.3 – Gillnet and Longline	a. 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. b. Information is adequate to measure trends and support a strategy to manage impacts on ETP species.	60

Rationale	SIa (GN,LL): The impact of the fishery on bycatch and population trends for ETP species cannot be quantitatively evaluated.(e.g. proportion of population removed, trends over time).. SIb (GN, LL): A strategy to manage fishery impacts on ETP species (or on seabirds and marine mammals) is not in place for the gillnet fishery and the longline fishery The inability to measure trends in bycatch over time make it hard to establish whether this strategy is i) necessary and ii) working.
Condition 9	By the fourth surveillance audit, there is sufficient quantitative information on seabird or marine mammal bycatch, bycatch trends and populations to evaluate whether the fishery is a threat to protection and recovery of ETP species, and to support a strategy to manage impacts.
Milestones	**At the End of Year 1:** There shall be evidence of the Client's plan to encourage and enable fishing vessels to record all seabird or marine mammal bycatch in electronic logbook systems. The Client will support research as necessary to evaluate bycatch, as well as population size and trends of ETP species. Score 70 **At the End of Year 2:** There shall be evidence of implementation of the Client's plan to encourage and enable fishing vessels to record all seabird or marine mammal bycatch in electronic logbook systems. The Client will support research as necessary to evaluate bycatch, as well as population size and trends of ETP species. Score 70 **At the End of Year 3:** There shall be evidence of implementation of the Client's plan to encourage and enable fishing vessels to record all seabird or marine mammal bycatch in electronic logbook systems. There shall be evidence of improvement in bycatch reporting rates in the Client gillnet and longline fleet. The Client will support research as necessary to evaluate bycatch, as well as population size and trends of ETP species. Score 70 **At the End of Year 4:** There shall be sufficient quantitative information, from logbooks, observers or other sources such that the rate and trends in bycatch of ETP species can be evaluated. There shall be sufficient data on populations that impacts of the fishery can be evaluated. Score 80
Client Action Plan	
Year 1 Action: Means of Verification:	<u>Data recording</u>: Consult with the Directorate of Fisheries, the Marine Research Institute and/or other institutions to improve reporting in to the e-logbooks on both seabird and marine mammal bycatch.
Year 2 Action: Means of Verification:	<u>Data collection</u>: Continue engagement with the Directorate of Fisheries and the Marine Research Institute to promote monitoring of seabird bycatch and mammal interaction in the fishery and to determine if logbook recording and monitoring is adequate.
Year 3 Action: Means of Verification:	At the Year 3 audit and in future audits, ETP interactions/bycatch data should be coming in and analysis to be presented, per gear; a review of the usefulness of this data collection is commendable but should be a client internal audit of the logbook system with the view to providing improved information at MSC audits.
Year 4 Action: Means of Verification:	By year four, there should be a considerably better accuracy of logbooks for secondary species on board the vessels and the discrepancy between logging of secondary species with inspectors present or not, should deliver similar results.
Consultation on Condition	Consultations are through MII.

Recommendations

Recommendation 1:
PI 2.1.2 – Primary species management strategy: Longline & handline
PI 2.1.3 – Primary species information: Longline & handline

Performance Indicator(s)	**PI 2.1.2 Primary Species Management Strategy** **PI 2.1.3 Primary Species Information**
Purpose	For longline and handline, bait is considered as a primary species. The catch to bait-use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account the fact that several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. It is not possible to determine the status of the stocks that are used to supply bait.
Recommendation 1	It is recommended that only stocks identified as sustainable should be used as a source of bait where ever possible. It is also recommended that the bait used and the source of that bait be better documented in the longline and handline fisheries.
Client Action Plan	ISF will communicate with client members who operate longliners and encourage implementation of the recommendation. ISF will further survey to understand bait sources.
Consultation on Recommendation	Fisheries operating longliners.

Recommendation 2:
PI 2.4.2 – Habitats management strategy: All gears

Performance Indicator(s)	**PI 2.4.2 Habitats Management Strategy**
Purpose	Habitat mapping projects and initiatives are being implemented (involving interviews with fishers, and self-reported recording of benthos intrawl for example) and this Recommendation is designed to follow up on these fledgling projects at future audits
Recommendation 2	The progress of the Joint Committee for the improved handling of Marine Resources (an approximate translation from the Icelandic) will be monitored as part of the continued certification of the fisheries. The client is encouraged to contribute to the success of this committee. The newly introduced project to interview fishers as part of habitat mapping will be monitored as part of the fishery audit. The client is encouraged to continue the implementation of this project.
Client Action Plan	ISF continues the cooperation project to map the ocean floor with MFRI and client members, specifically captains of vessels using bottom trawls. MFRI stores the information and produces reports.
Consultation on Recommendation	ISF client group members operating bottom trawlers and MFRI.

Appendix 2: Peer Review Reports

Report from Peer Reviewer 1

Question	Yes/No	**Peer Reviewer Justification (as given at initial Peer Review stage).** Peer Reviewers should provide brief explanations for their 'Yes' or 'No' answers in this table, summarising the detailed comments made in the PI and RBF tables.	**CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)**
Is the scoring of the fishery consistent with the MSC standard, and clearly based on the evidence presented in the assessment report?	Yes	Although there are some scoring rationales that are questionable or require further clarification, and there are a few reference to the previous assessment report, in general the scoring is consistent with the MSC standard based on the evidence provided in this assessment report.	See responses to detailed comments below
Are the condition(s) raised appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCP v2.1, 7.18.1 and sub-clauses]	Yes	The conditions raised are appropriate to achive the SG80 outcome within the specified timeframe, although further conditions may arise from this review.	
Is the client action plan clear and sufficient to close the conditions raised? [Reference FCR v2.0, 7.11.2-7.11.3 and sub-clauses]			

Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)	N/A	The report is drafted in a way that is extremely dificult to follow each species specific harvest strategy and HCR, as it is a common text for all species. It would be clearer if at least the HCR section would have actual separate section per stock, detailing at a minimum if there is a management plan agreed in law, and if the HCR is used by the Ministry of Industry to set the TAC for each stock. Fishing effort is not the same as fishing mortality and thus should not be used interchangeable. Fisihing effort is the amount of effort (days, hours, hooks, etc) spent fishing while fishing mortality depends on effort and capacity of the fishing vessel and for example the ability and experience of the skipper. For example one can limit or even reduce fishing effort without changing fishing mortality. The text should be edited consistently to avoid this missunderstanding. The report seems to perceive ICES/MFRI as a management body, stating that ICES/MFRI implements harvest strategies or HCRs. For example, "the (harvest strategy) objective is generally achieved through the ICES approach to fisheries management" or "The HCRs that MFRI uses to set Atlantic Wolffish and Plaice TACs were..." ICES is a scientific body, as is also IMFR, and as such have no management role. Advise is taken by management bodies and decisions are taking from there. So the HS objectives are reached when decision making follows scientific advice and not trough the advice being provided, and TACs are set by the management body. These concepts should also be amended throughout the report. Finally, based on the information collect through the DiscardLess Project (chapter 1 & 18 https://www.springer.com/us/book/9783030033071), there are no at-sea observers programmes in Iceland. In Iceland normal at-sea inspection work includes the collection of biological samples, but this does not make them an observer programme. Observers programmes, even if they have a Monitoring Control & Surveillance component, have different sampling startegies, assumptions and limitations while collecting different data than an inspection boarding, and thus have different uses and value in the estimation of discarded quantites. Therefore, reference to observers should be amended throughout the report. Lastly, Table 18 - what is the unit sampled? hauls or trips?	Report Formating: Edits have been made to the Harvest Strategy (HS) section and scoring rationales to address the concerns. Throughout In the Development and Objectives subsection, the management authority of the HS for each species and its development history, has been added. In the Harvest Control Rule section, a separate subsection on the HCR for each species has been added. Fishing Effort and Fishing Mortality: The text has been edited to differentiate between mortality and effort. The former is more in use in the sections associated with Principle 1 where overall stock and fishery processes are considered while the latter is more associated with Principle 2 where specific gear activities are considered. The Management Bodies: The assessment team is well aware of the respective roles of management and scientific agencies both in Iceland and elsewhere. To address any ambiguities in the roles of these agencies that may be present, edits to clarify the distinction have been made throughout the report. Observer Program: Section 3.4.3.3 outlines the DF-run observer scheme, which was described by DF and corroborated by MFRI. There are also MII observers that are placed onboard to record ETP interactions and bycatch. One quote from ch.18 (the reference authored by the PR) is "Nevertheless, none of the countries referred to above have an independent large scale at-sea monitoring program, where discards quantities can be audited and verified." This is different to suggesting there is no observer scheme in Iceland. The issue appears to be what the PR considers to be an 'observer scheme'. As there is no official definition of what an observer scheme is or is not; to distinguish it from the at sea inspections conducted by DF; and because this is the term used by DF and Icelandic stakeholders call it, we will retain the term 'observer scheme'.

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
Wolffish	All gears	1.1.1	No (scoring implications unknown)	Yes	Wolffish - The RPs refere to Bmsy estimates, and so Table 1.1.1b should be amended as to state that for this stock 2*Bpa was not used to score it. It is unclear however how the estimate of Bmsy was achieved, while the information provided online at https://www.hafogvatn.is/en/harvesting-advice does not provide further information. It is stated that "harvestable biomass has been relatively stable and averaged about 30 kt which is interpreted here as biomass associated with this (MSY) reference point". However this stock has only been exploited below MSY levels since 2013 while biomass is increasing. Further information is needed.	The scoring of this species was undertaken consistent with that of the previous MSC assessment with the additional consideration of a B_{MSY} proxy consitsent with the estimated biomass resulting from F_{MSY} applied over the last 15 years. The catch has been in the general range of 10-15 kt annually for the last 30 years. Since the 1980s, catch rates have been stable with biomass in general constant or increasing, and since 2000 have fluctuated around 30 kt. The harvest strategy in place is limiting catches in recent years and fishing mortality has been declining since 2005. Tun (2017b) concluded that it was possible to assume that the level of biomass observed in the last 15 years was consistent with B_{MSY}. The Tun assessment team agreed with this evaluation. Since 2005, recruitment has been relatively stable while fishing mortality has fluctuated around F_{MAX}, the F_{MSY} proxy. During this period, contrary to the situation with plaice, harvestable biomass has been relatively stable and has averaged about 30 kt, interpreted by the Tun assessment team as biomass associated with MSY. As with plaice, the stock is currently undergoing a benchmark review during which biomass and fishing mortality reference points will be developed for a full HCR. The stock status and reference points background sections as well as the scoring rationale have been edited to reflect the above clarifications. The score of SIa and SIb remain unchanged at SG80.	Not accepted (no score change)
Plaice	All gears	1.1.1	No (scoring implications unknown)	Yes	Plaice - The RPs refere to Bmsy estimates, and so Table 1.1.1b should be amended as to state that for this stock it was not 2*Bpa used to score it. Like Wolffish it is unclear however how the	The scoring of this species was undertaken consistent with that of the previous MSC assessment with the additional consideration of a B_{MSY} proxy. Tun (2017b) noted that $F_{0.1}$ is a conservative proxy of the real F_{MSY} and determined that fishing mortality has been at or below the real F_{MSY} since at least 2001 (i.e. real F_{MSY} ~ 0.30). Considering a generation	Accepted (non-material score reduction)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
					estimate of Bmsy was achieved, while the information provided online at https://www.hafogvatn.is/static/extras/images/Skarkoli_2018729536.pdf shows Fmsy at 0.22. It is stated that "Harvestable biomass during this period has ranged 32 – 47 kt,on average being about 40 kt which is interpreted as biomass associated with Fmsy.". However this stock has only been exploited below MSY levels since 2012 (Figure 17) while biomass is increasing since 2000. Further information is needed.	time of 7 years, it was determined that fishing mortality has been below the real F_{MSY} for at least two generations, meeting the SG80 requirement of GSA2.2.4. The Tun assessment team evaluated this determination and, other than correcting the calculation of T_{GEN} = 8.2 years and noting that fishing mortality has likely been below the real F_{MSY} since 2004, agreed with the previous team's determination. Since 2004, biomass has ranged 32-47 kt, averaging about 40 kt, which is the basis of the B_{MSY} proxy in this report. SSB is estimated to be around 31000t, and appears to have stabilised (or slightly declining) since 2015, and recruitment shows no trend for the period that it has been estimated. Therefore, based on the analytical stock assessment, the stock appears to have increased and be currently around the MSY level (i.e. biomass consistent with F_{MSY}). This was our judgement based on the information provided. On reflection however, the Tun assessment team considered that this BMSY proxy estimation is not strictly necessary, so a more precautionary scoring has been applied without such a strong dependence on an estimate B_{MSY} using GSA 2.2.4. This means that estimates of uncertainty, that are generally lacking from current assessments, have effectively been increased reflecting more precautionary scoring. Note that the stock is currently undergoing a benchmark review during which biomass and fishing mortality reference points will be developed for a full HCR. The stock status and reference points background sections as well as the scoring rationale have been edited to reflect the above clarifications. The score of SIa was reduced from SG100 to SG80 while that of SIb remained unchanged at SG80.	

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
Golden redfish	All gears	1.1.2	Yes	No (material score reduction expected to <80)	Golden redfish SIb - The evidence provided is based on simulations carried out in 2014. However the simulations are limited by their assumptions, namelly on recruitment and TAC implementation and no catch error, and recover the stock to a biomass in the lower range of Bmsy. All of the assumptions may not be correct, as recruitment may not stay constant, TACs are not implemented due to flexibility in the ITQ system, discards may indeed be ocurring, and is recovering to a value on the lower range of Bmsy, but not to Bmsy. Furthermore, there is evidence that shows that the management system is not working to reduce fishing mortality to its target. Biomass has indeed increased, but driven mainly by recruitment, while it is clear that the TAC is not reducing fishing mortality below its target and has never done so in the past. So the stock is recovering but it is not due to the rebuilding startegies and is recovering to a lower range of Bmsy while is decreasing in the most recent years. So there is at least conflicting information that may render SG80 not reached, but considering real evidence SG80 is not reached.	The 2014 simulations considered a range of data and stock processes and error, which ICES judged to be appropriate and providing a sound basis for the HCR that is now part of the formal management plan. The evidence in recent assessments that rebuilding can and is occuring consistent with the simulations needs to take into account the error uncovered in the 2018 assessment which caused previous assessments to estimate higher biomass than what was the case, resulting in TACs set higher than would be the case at F_{MSY}. If there had been no error, fishing mortality since 2010 would have been close to F_{MSY} with biomass currently in the order of 350 kt, close to the 400 kt median SSB indicated by the simulations, well within the range of B_{MSY} and certainly not in its lower range. The fact that the stock has recovered to biomass at the lower range of that at B_{MSY} even with fishing mortality higher than F_{MSY} is encouraging. And it should be noted that ICES applies significant precaution reflected in the choice of target, so controls are still contributing to stock recovery, although further reductions in fishing mortality are desirable. It is acknowledged that there has been a declining trend in recruitment since about 2010, which is the reason ICES based its 2018 stock projections on pessimistic recruitment assumptions, for example. Our concern with this is reflected in the scoring of SIb at SG80 rather than SG100. The scheduled review of the HCR in 2020 will no doubt consider these processes which may lead to changes in the HCR but the evidence to date indicates rebuilding can and is occurring consistent with the 2014 simulations.	Not accepted (no score change)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Res-ponse Code
All species	All gears	1.2.1	Yes	No (no score change expected)	SIa - "*The harvest strategy consists of annual reassessment of the status of stocks and performance of the fisheries with respect to reference points*". The harvest strategy (HS) is according to MSC a combination of the information base and stock assessment, but also of the management reaction to it, control rules and tools in place. So the statement is at least limited, and focusing on scientific advice and the process to provide one, and less on the management system that request that advice and that may or may not use it, and on the many other measures that one uses to manage a fishery (effort management, gear specifications, closed areas/seasons, discard policies, monitoring, etc). Furthermore, the statement "*Plaice and Atlantic wolffish are not currently managed through the ICES system*" or " *Under the MSY approach, (the elements of the harvest strategy) appear to be working together*" are both incorrect as ICES does not manage any stock and ICES MSY approach is not a HS. ICES provides scientific advice to managemnet bodies that manage stocks based (or not) in ICES advice. Harvest Strategies are adopted and implemented by managing bodies. The rational for this SI needs to be reformulated to focus on management and not on ICES.	The assessment team is cognisant of the respective roles of MII, MFRI and ICES in the elements of the harvest strategy. A number of edits were made to the scoring rationale of Sia to ensure that these are appropriately described with no ambiguity.	Accepted (no score change)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
Golden redfish	All gears	1.2.1	Yes	No (no score change expected)	Golder redfish SIa - "*For golden redfish, the stock assessment indicates that retrospectively the fishing mortality have not been achieved because of adjustments in the stock assessment have recently changed the perception of the exploitation rate. Hence management has been responding appropriately to management advice*." This is a somewaht simplistic explanation: first of all the management system should be able to adapt and react to changes in stock perception and advice (something that routenly happens in many other stocks), while knowing that the TACs are regularly overpassed due to likely an overflexible TAC system and that the Faroes are not accounted for in the TAC, one cannot state that fishing moratlity has not been achieved due to changes in the perception of the stock! Please reformulate.	The perception that historical fishing mortality has been significantly above the F_{MGT} target was only determined in the most recent (2018) assessment and was due to an error uncovered by the ICES NWWG in the previous analyses. The latter had indicated that fishing mortality had been reduced from high levels prior to 2010 to levels either close to or at the target since then, so the fishery was following scientific advice. It was determined that the previous assessment models had not fully converged to the optimum solution, resulting in a 12% downward adjustment in recent biomass. With correction of this error, it is expected that the harvest strategy informed by the new assessment will result in fishing mortality being lowered towards the target. Text on the retrospective analysis has been added to the Stock Status and Assessment sections and the scoring rationale has also been edited.	Not accepted (no score change)
All species	All gears	1.2.1	No (material score reduction expected to <80)	No (material score reduction expected to <80)	Sif. This SI should be scored, regardless if discards are very low presently or in the past as they may increase in the future, but particularly if there is doubt that the monitoring in place may not be able to detect discarding. This is particularly true for species that may have low quota and/or that discards may depend on the presence of juveniles and pulses of recruitment (this latest such as golden redfish). Furthermore, this SI should be scored by species/stock, as different species have different levels of risk of being discarded, particularly considering	The assessment team considered that discarding represented a negligible proportion (about 1% across all species) and thus did not score this SI. It is not correct to assume that Iceland has no at-sea monitoring which would report on discarding. MII conducts at-sea inspections while MFRI conducts at-sea biological sampling (see section 3.4.3.3). While coverage is low (approx 1%), it indicates that, consistent with regulations, discarding is low. The Icelandic management system is more focused in creating incentives not to discard (e.g. quota trading) rather than being enforcement-focused. Given that all reports are that discards are negligible, it is difficult to see what would be the basis of possible scoring of this SI. Re the misleading statement, the intent was to indicate that if the	Not accepted (no score change)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Res-ponse Code
					they are targetted by different gears, and with different discard %s that may be above 1% reported globally for all species. There are also some missleading statements: "*Any review of alternative measures to reduce unwanted catch is implicit in this system as it is conditional on finding discarding as a nonnegligible risk to the fishery management system*" and "*there is no dedicated review of unwanted mortality, but levels of discarding are considered in the stock assessment*". The first assumes an at-sea monitoring programme that is capable of detecting discards, while with the second all ICES stocks would fall into this category. On monitoring programes, note that Iceland does not have an at-sea observer or electronic monitoring programme based on the information collect through the DiscardLess Project (at-sea observations are made by inspectors, that collect also biological samples, through their normal at-sea inspection work). In addition discards, as stated in the report, are derived from comparisons between length composition samples taken at sea and from landings, but this analysis has serious shortcomings as no difference does not necessarely mean no discarding.	annual assessment process uncovered discarding, a review of alternate measures would occur, either part of or independent of the assessment process. Text has been added to the scoring rationale on this.	

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
All species	All gears	1.2.2	No (no score change expected)	No (no score change expected)	All SIs - As with the harvest strategy SIs, there is a focus on the ICES/MFRI process and science, while this SI is about management primarely and should be its focus. So information should be given, first of all, if the HCRs are agreed and in law, if they are used to set the TAC, and only after if they have been tested and reach the stated objectives. For example "*The HCRs used to set TACs are not based upon a formal MSE – style review either by MFRI or ICES but rather can be considered extensions of the assessment process*" There is a HCR to set a TAC, but nothing is said if its actually in law/agreed, althought it is perceived that is "in place". And then it is stated that the HCR can be considered an extensions of the assessment. As with previous comments, ICES/MFRI are not management bodies and the rule to provide scientific advice on fishing oportunities is only considered an "in place" HCR if the TAC set has followed scientific advice and its not in contradiction with agreed law. This said i dont disagree with scoring, but justification needs to be reformulated, mentioning specifically if the HCR is explicit in law and if the TACs set follow that HCR for all stocks.	Text emphasing that MII uses the HCRs to set TACs which are either part of a formal management plan (golden redfish, saithe, tusk and ling) or not (wolffish, plaice and blue ling) has been added to the scoring rationale and which strengthens the scoring for each of these species. Note that it is not a requirement that the HCR is "in law". The HCR needs to be implemented, so that we can see whether it is being applied in practice (in this case correct calculation of the TAC and that catches are within reasonable bounds of the TAC). The performance of the TAC in practice should be assessed through the ICES/MFRI process.	Accepted (no score change)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Res-ponse Code
Wolffish, blue ling and plaice	All gears	1.2.2	Yes	No (scoring implications unknown)	SIa - Wolffish, blue ling and plaice have no agreed management plan in law (stated in the p3 section). This needs to be stated clearly. However, since the TAC set follows the advice provided by the scientific bodies (for all three stocks?) that use an explicit rule, then the rule used to provide advice can be considered "well-defined" and "in place" so SG80 is partially reached. However, because the HCR "in place" does not reduces exploitation rate as the PRI is approached, SG80 is not reached. This is the apropriate rational to score this SI and the misisng elements should be added to the scoring table.	Text clarifiying the status of the HCRs in relation to management plans by MII has been added to the SIa scoring rationale of the three species.	Accepted (no score change)
Golden redfish	All gears	1.2.2	No (no score change expected)	No (no score change expected)	Sia - golden redffish has an agreed management plan in law that was tested by ICES to be in accordance to ICES PA and MSY approach. However, ICES also recomends adding a safety rule if SSB falls well below Blim. This should be mentioned in the rational.	Text on this ICES recommendation has been added both to the Harvest Strategy section and the SIa scoring rationale.	Accepted (no score change)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
Golden redfish	All gears	1.2.2	Yes	No (material score reduction expected to <80)	Golden redfish SIc - Fishing mortality has never been below the target. Knowing that the TACs are regularly overpassed due to likely an overflexible TAC system and that the Faroes are not accounted for in the TAC, it is clear that the TAC system is not limiting mortality for this stock. Therefore there is evidence that the tools in use are not effective in achieving the exploitation levels required under the HCRs and thus SG80 is not reached.	The effectiveness of the tools used in each stock must be considered in relation to their use across all stocks in this multi-species fishery, in which opportunities to reduce the catch of a single species relative to other species can be limited. As described in Section 3.3.3.5, TAC overages to address foreign catch and inter-species trades are recognized and addressed by the management system. Overall all stocks, TACs have been successful in managing landings and harvest rates, generally reducing these from high levels in the mid-late 2000s to the recent low levels in 2017/18. In response, stock biomass has also increased during this period, in most cases to levels consistent with B_{MSY}. In the case of golden redfish, biomass has increased to the lower range of B_{MSY}, but this would have been closer to median SSB if it were not for an assessment error which has changed the historical perspective of biomass and fishing mortality and resulted in higher than planned harvesting. The HCR is to be reviewed in 2020 and may be updated based upon recent events but one cannot fault the tools as being ineffective based on past evidence.	Not accepted (no score change)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Res-ponse Code
Ling	All gears	1.2.2	Yes	No (material score reduction expected to <80)	Ling SIc - As with golden redfish, fishing mortality has never been below the target. It is clear that the TAC system is not limiting mortality for this stock.Therefore there is evidence that the tools in use are not effective in achieving the exploitation levels required under the HCRs and thus SG80 is not reached.	As for golden redfish, the effectiveness of the tools used in each stock must be considered in relation to their use across all stocks in this multi-species fishery, in which opportunities to reduce the catch of a single species relative to other species can be limited. As described in Section 3.3.3.5, TAC overages to address foreign catch and inter-species trades are recognized and addressed by the management system. Overall all stocks, TACs have been successful in managing landings and harvest rates, generally reducing these from high levels in the mid-late 2000s to the recent low levels in 2017/18. In response, stock biomass has also increased during this period, in most cases to levels consistent with B_{MSY}. Further, the HCR was recently (2017) evaluated and determined to be effective. Thus, it is clear that the tools have been effective in controlling harvest rates.	Not accepted (no score change)
All species	All gears	1.2.3	Yes	Yes	SIc - please refrased "*Stocks with non-negligible catches outside Iceland waters are managed through the ICES system*." as no stocks are managed by ICES or trough ICES, while oficial catches are reported <u>to</u> ICES, not by ICES.	Editorial change were made to scoring rationale to address this concern.	Accepted (no score change)
All species	All gears	1.2.4	Yes	Yes			
Wolffish and plaice	All gears	2.1.1	No (non-material score reduction expected)	Yes	SIa - the scoring of Wolffish and plaice depends on what the estimates of Bmsy used to score the stock against MSY levels are, considering also that both stocks have only been exploited below MSY levels in recent years and thus SG100 may not be reached.	The scoring of PI 1.1.1 for wolffish and plaice was reconsidered (see above) and both stocks are considered to be highly likely above the PRI but not with a high degree of certainty. For wolffish the text states that " the probability of B2018 being greater than the notional estimate of PRI (15 kt) is 92.1%." which meets the high degree of certainty for 2.1.1. SIa remains at 100, but for plaice SIa = 80.	Accepted (non-material score reduction)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
All species	All gears	2.1.2	Yes	No (non-material score reduction expected)	Sia - First of all species are not managed through the ICES system. Please rephrase. The statement "*the scientific advice has been followed for these stocks, limiting exploitation to sustainable levels.*" iIs incorret, as there is at least two stocks where exploitations levels have not been reduce to MSY levels, ling and golden redfish, but also where the TAC has not been followed in the past, ex. golden redfish. Therefore, the concluding statement "Because all primary stocks have a harvest strategy with TACs set based on scientific monitoring, SG100 is met for all gears/stocks." is questionable and SG100 may not be reached for at least golden redfish.	The text has been editing to ensure that there is no ambiguity in the roles of MII, MFRI and ICES. There is a strategy in place to ensure that all main and minor primary species are above the PRI and maintained at levels consistent with MSY. In the case of ling, the HCR has been in place since 2017 and is expected to produce MSY associated stock conditions. In the case of golden redfish, up until 2017, it was thought that the strategy was achieving MSY associated conditions but an assessment error in 2018 was uncovered which indicated that this was not the case. This has been addressed and should not be an issue in future.	Not accepted (no score change)
Golden redfish and ling	All gears	2.1.2	Yes	No (non-material score reduction expected)	Sic - as above, in the case of golden redfish and ling, clearly the TAC have not been efective in reducing fishing mortality and thus SG100 is not reached for these two stcoks.	The assessment team considers that TACs have been effective across all species in managing catch according to the harvest strategy. Since the early 2000s, based upon TAC reductions, fishing mortality has been reduced from high levels to either at or close to target levels. The concerns regarding golden redfish and ling are addressed in the response to the comment on SIa.	Not accepted (no score change)
All species	All gears	2.1.2	Yes	No (scoring implications unknown)	Sif - As above, I disagree that the scoring is not relevant. Not only there has been issues in the past with discards for some species (ex. haddock and golden redfish), many of these species, as stated in the report, have no estimates of discards. Considering that at-sea monitoring of Icelandic fisheries reaches only 1% based on inspections activities, one cannot state that discards	The response to the comment on Sif of PI 1.2.1. is relevant here. Discarding is prohibited and, according to MII, compliance is high. This is not a perception. Further, if discarding is detected, a further review to address this would be conducted. The scoring rationale has been edited to include these comments.	Not accepted (no score change)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
					"would be detected in the assessment process". Moreover, although i agree that "*The perception is that discarding is prohibited and compliance is high*", one needs facts to score SIs and this statement has never been overall/truly tested.		
All species	All gears	2.1.3					
Lesser black-backed gull	All gears	2.2.1	No (scoring implications unknown)	Yes	Sia lesser black-backed gull - "population grew continuously, reaching ~50,000 pairs, until the 2004-5 sandeel decline". And after the decline the population size is? Only then one can know if 150 ind bycatch is signifcant or not. And missing "likely" in the conclusion.	This has been added, but did not change the scoring.	Accepted (no score change)
All species	All gears	2.2.2	Yes	No (scoring implications unknown)	Sie minor in-scope species - "discarding is not permitted in Icelandic fisheries and review of alternative measures to minimise mortality is addressed within the harvest strategy for all species. Therefore a review is conducted routinely by the MFRI alongside all other issues pertinent to controlling fishing mortality." This statement and rational would been aplicable to any stock that is under a discard ban and has an assessment, ex all EU stocks. Stating that by assessing mortality one assesses measures to minimise UoA-related mortality of unwanted catch is an understatement, while it does not refer to the existance of the measures and a discard ban is not per se a mesure to reduce the	The response to the comment on Sif of PI 1.2.1. is relevant here. Discarding is prohibited and, according to MII, compliance is high. Available monitoring indicates that discarding is not significant. Further, if discarding is detected, a further review to address this would be conducted. The scoring rationale has been edited to include these comments.	Not accepted (no score change)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
					mortality of unwanted catch (gear configuration, change in fishing operations, etc are).		
All species	All gears	2.2.3	Yes	Yes			
All species	All gears	2.3.1	Yes	Yes			
All species	All gears	2.3.2	No (scoring implications unknown)	No (scoring implications unknown)	Sia - There are national management targets for several species, and these can be considered as national requirements for the protection of ETP species. Because if management targets exist, in oposition to permited levels of bycacth as in 2.3.1, then if the population falls below that level then some measures whould be expected to be taken, particularly in relation to activities that have a direct impact on the population. Therefore this SIa should be scored.	As we understand MSC's intent with these limits, it applies to limits set on the UoA (or the fishery more widely) - e.g. Australia and the US can set limits on ETP species interactions for longline fisheries in terms of catch per 1000 hooks - if these are exceeded, some additional mitigation measures are required. This kind of limits are not in place in Iceland. For the seal species, it is true that there are targets in terms of population size (below which the population is considered depleted) but these are not limits in the sense of triggering specific actions in the fishery - they are just a level below which the population should be considered depleted; nor are they connected in any particular way to the management of the fishery (except that the fishery is one of the sources of impacts on these populations). So we believe that it is correct that this PI is not scored.	Not accepted (no score change)
All species	Gillnet	2.3.2	Yes	No (material score reduction expected to <60)	SIb - gillnet: I disagree with the rational that because a fishery has less bycacth than another where measures are being taken to reduce bycatch, that fishery is a "measure" by itself and SG60 is reached. To reach SG60 actual measures, such as gear modifications, change in fishing operations, etc need to be taken. If no measures are in place then SG60 is not reached.	But by this logic, you would penalise fisheries that naturally have very low rates of bycatch, because they would not have 'measures in place'; because they wouldn't require any. So the scoring has to allow for 'measures' which are inherent in the fishery as well as measures that are applied for the specific reason of reducing bycatch, otherwise you end up with unintended consequences (fisheries being required to put in place unnecessary measures to deal with impacts that they don't have). In the table of P2 definitions (Table SA8) it is clear that 'measures' do not have to have been designed to manage that impact specifically.	Not accepted (no score change)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Res-ponse Code
All species	All gears	2.3.2	Yes	No (material score reduction expected to <80)	Sic - All UoA: As with the scoring above, I disagree with the rational that because all fisheries are not considered to have an impact on the recovery and rebuilding of ETP species, then 'measures" exist and are likely to work. Again actual measures need to exist, and their effectiveness discussed in a possible future where a fishery may indeed have an impact on the recovery of an ETP species.	See argument above. And MSC scoring cannot possibly be based on considering hypothetical possible futures; it has to be based on the current operation of the fishery. Possible futures are dealt with through the process of audit and re-assessment when they become a reality.	Not accepted (no score change)
All species	All gears	2.3.3	Yes	Yes			
All species	All gears	2.4.1	Yes	Yes			
All species	All gears	2.4.2	Yes	Yes			
All species	All gears	2.4.3	Yes	Yes			
All species	All gears	2.5.1	Yes	Yes			

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
All species	All gears	2.5.2	Yes	No (non-material score reduction expected)	Sia - Point 2 - "trophic relationships between target species are being understood and integrated into fisheries management planning by applying the precautionary approach of stocks management when setting reference points thus covering removal of target-as-prey". No reference to explicit consideration of prey-predator interactions are considered in the P1 stocks or their reference points, except for a global natural mortality. Therefore this rational is not applicable and SG100 is not met.	The consideration of predator -prey interactions is implicit when setting reference points, in particular with regards to setting annual catch quota. The issue of predator prey interactions as part of ecosystem considerations is considered by the stock working groups an presented in the advice where applicable. Where an ecosystem consideration is raised this is then highlighted in the advice. Therefore the state of the art regarding prey-predator interactions is qualitative at the moment. In order to address this in depth, this would need to be done via whole systems management, which at this stage is only possible through simulation models (e.g. Atlantis, an end-to-end integrated model, applied to the Baltic Sea [Bossier et al 2018]. This is a huge undertaking for the waters around Iceland and the wider NE Atlantic, and not proportionate to the scale of the target stocks involved in this assessment. However, it could be argued, that such a model as a management requirement could be applied to cod .	Not accepted (no score change)
All species	All gears	2.5.3	Yes	Yes			
All species	All gears	3.1.1	Yes	Yes	The information given on the management plans should be added to the P1 SIs namelly harvest strategy and HCRs.	The management plans relate more to fishery specific management than general fisheries management. These are referenced under 3.2.1. P1 text has been amended and do refer to the HS & HCRs.	Accepted (no score change)
All species	All gears	3.1.2	Yes	Yes			
All species	All gears	3.1.3	Yes	Yes			
All species	All gears	3.2.1	Yes	Yes			

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
All species	All gears	3.2.2	Yes	Yes			
All species	All gears	3.2.3	Yes	Yes	Sic - As stated above, based on the information collect through the DiscardLess Project, there are no at-sea observers programmes in Iceland. chapter 1 & 18 https://www.springer.com/us/book/9783030033071 At-sea observations are made by inspectors, that collect also biological samples, through their normal at-sea inspection work.	See response to same comment made in 'general comments. Distinction is made between DF onboard inspectors (see 3.4.4.1 and table 18) and MII observers (focusing on ETP bycatch)	Not accepted (no score change)
All species	All gears	3.2.4	Yes	Yes			

Report from Peer Reviewer 2

Question	Yes/No	Peer Reviewer Justification (as given at initial Peer Review stage). Peer Reviewers should provide brief explanations for their 'Yes' or 'No' answers in this table, summarising the detailed comments made in the PI and RBF tables.	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)
Is the scoring of the fishery consistent with the MSC standard, and clearly based on the evidence presented in the assessment report?	Yes	This is a well researched and clearly presented assessment and scoring of these fisheries based on extensive evidence presented in the background and scoring texts. Although I have raised questions about the scoring of several scoring issues, none of these would result in a change in the overall assessment of these fisheries. I have noted some concern for the conditions but for the most part what is needed is come clarification or more detail in either the milestones or client action plan.	

Are the condition(s) raised appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCP v2.1, 7.18.1 and sub-clauses]	Yes	**Conditions 1, 2, and 3** concern the development and adoption of harvest control rules for Wolffish, Plaice and Blue Ling, respectively. The conditions raised recognize it may well take 4 years to conducted the research, review the proposed rules and approve the rules for use in these fisheries. I believe the milestones are appropriate and achievable. **Condition 5** milestones should result in the fisheries being rescored at the SG 80 level. **Condition 6** concerns improvement in the information available to assess bycatch levels and trends and populations to assess the impact of gillnet and longline fisheries. Although bycatch levels and trends are explicitly identified in the milestones and considered appropriate, there is no reference to improving estimates of population size of bycaught species. I believe these will be needed. I believe the milestones outlined for **Condition 8** are appropriate and will lead to a rescoring at the 80 level. The milestones in **Condition 9** are appropriate and should result in a rescoring to the 80 level.	Condition 6: As also noted below, the CAP for years 1-3 states 'The Client will support research as necessary to evaluate bycatch, as well as population size and trends in main secondary species'. This addresses the concern with this condition.
Are the condition(s) raised appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCP v2.1, 7.18.1 and sub-clauses]	No	**Condition 4** concerns the outcome status of harbour porpoise, but the condition mistakenly refers to harbour seals. This will need to be corrected. Also, based on NAMMCO information grey seals may also be taken by gillnets. As juvenile grey seals and harbour seals can be difficult to distinguish, but are most likely to be caught, **Condition 4** also should address the extent to which juvenile grey seals are taken. Finally, much of **Condition 4** refers to the development of a partial strategy which is more pertinent to **Condition 5**. Although I believe the timeframe of milestone and action plan are appropriate, I suggest that this condition should address the data needed to determine if the harbour porpoise population is above biological limits and does not hinder recovery of secondary species if they are below a biological based limit.	Condition 4: The condition and milestones are correct but the CAP refers to harbour seals, which we should have picked up; apologies. It has been corrected by the client. Regarding grey seals, they are considered under ETP species, for reasons set out in the Principle 2 background text. The reason it refers to a strategy is that this is taken here to be a milestone on the way to achieving 'not hindering recovery' - i.e. the proposed process by the client is along the lines of i) improve the data, ii) evaluate if changes are required (a 'strategy'), iii) if so, implement them leading to iv) the fishery is not hindering / impacting harbour porpoise.

Is the client action plan clear and sufficient to close the conditions raised? [Reference FCR v2.0, 7.11.2-7.11.3 and sub-clauses]	No	See comment above on **Condition 4**. I believe the Client action plan for **Condition 5** should be amended to "Evaluate a partial strategy" rather than to "Evaluate the need for a partial Strategy". There is clearly a need for a partial strategy as indicated by the current score. Also, in the year 4 of the plan, the phase ".. if necessary" with respect to implementation of the partial strategy seem too tentative. Why the apparent hesitation to commit to implementation? As noted in the milestones for **Condition 6,** the client action plan does not reference the need for better information on population sizes of bycaught species to assess impact. This should be included in the action plan. **Condition 7** seems to focus on the development of strategy rather than on the information needed to assess outcome which is the intent of this SI. **Condition 8** would seem to be the place for the development and implementation of a partial strategy. I note that the same change on wording should apply to the client action plan for **Condition 8** as suggested for **Condition 5** above.	Re Condition 5: The current score is driven largely by uncertainty in the information available; it is presumed that as more information becomes available it will become more clear i) whether a partial strategy is required and ii) if so what it would contain. It's really just a question of covering all bases - likewise with the 'if necessary'. Re Condition 6: Not so - the CAP for years 1-3 states '*The Client will support research as necessary to evaluate bycatch, as well as population size and trends in main secondary species*'. Re Condition 7: Same comment as for Condition 4. Re Condition 8: Same comment as for Condition 5. Overall, the team regards this set of conditions as closely linked - i.e. lacking good information, the outcome scores are low and it is not clear whether or not management is sufficient. The task for the client is therefore to improve the information base, such that outcome can be re-evaluated, and if impacts are still considered inappropriate, management can be strengthened. However, it is important to note that the approach to tackling conditions is set by the client, not the assessment team.
Is the client action plan clear and sufficient to close the conditions raised? [Reference FCR v2.0, 7.11.2-7.11.3 and sub-clauses]	Yes	The client action plan for **Condition 9** is appropriate and should lead to quantitative information to determine whether the UoA may be a threat to protection and recovery of the ETP species and a rescoring to the 80 level.	
Optional: General Comments on the Peer Review Draft Report (including comments on the adequacy of the background information if necessary)		There are few spelling mistakes (e.g., Wollfish, resonsible) in this draft. A careful edit if the final draft will no doubt correct these. I point these out as they are easily missed in the draft of this size.	Thank you for appreciating the scale of task for a report such as this. Additional check though has corrected spelling & grammatical errors.

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Res-ponse Code
Saithe	All gears	1.1.1	Yes	Yes			
Plaice	All gears	1.1.1	Yes	Yes			
Ling	All gears	1.1.1	Yes	Yes			
Blue Ling	All gears	1.1.1	Yes	Yes			
Tusk	All gears	1.1.1	Yes	Yes			
Golden Redfish	All gears	1.1.1	Yes	Yes			
Atlantic Wolffish	All gears	1.1.1	Yes	Yes			
Golden Redfish	All gears	1.1.2	Yes	Yes			
Saithe	All gears	1.2.1	Yes	Yes			
Plaice	All gears	1.2.1	Yes	Yes			
Ling	All gears	1.2.1	Yes	Yes			
Blue Ling	All gears	1.2.1	Yes	Yes			
Tusk	All gears	1.2.1	Yes	Yes			
Golden Redfish	All gears	1.2.1	Yes	Yes			
Atlantic Wolffish	All gears	1.2.1	Yes	Yes			
Saithe	All gears	1.2.2	Yes	Yes			
Plaice	All gears	1.2.2	Yes	Yes	C2		
Ling	All gears	1.2.2	Yes	Yes			
Blue Ling	All gears	1.2.2	Yes	Yes	C3		
Tusk	All gears	1.2.2	Yes	Yes			
Golden Redfish	All gears	1.2.2	Yes	Yes			
Atlantic Wolffish	All gears	1.2.2	Yes	Yes	C1		
Saithe	All gears	1.2.3	Yes	Yes			
Plaice	All gears	1.2.3	Yes	Yes			
Ling	All gears	1.2.3	Yes	Yes			
Blue Ling	All gears	1.2.3	Yes	Yes			

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
Tusk	All gears	1.2.3	Yes	Yes			
Golden Redfish	All gears	1.2.3	Yes	Yes			
Atlantic Wolffish	All gears	1.2.3	Yes	Yes			
Saithe	All gears	1.2.4	Yes	Yes	SI c requires that major sources of uncertainty have been identified, however, the text concludes that all major sources of uncertainty have been identified. This appears to overstate the case relative to the current text which gives several examples. This comment applies to all stocks under assessment.	The ADCAM and GADGET models characterize the uncertainties considered by the peer review to be influential in their respecitve assessments. These vary amongst the assessments with data uncertainties relatively more important in some stocks and process uncertainties more important in others. It is clear that the assessments take account of uncertainties, meeting SG80, but these are not used to express stock and fishery indicators in probabilistic terms, not meeting SG100.	Not accepted (no score change)
Plaice	All gears	1.2.4	Yes	Yes			
Ling	All gears	1.2.4	Yes	Yes			
Blue Ling	All gears	1.2.4	Yes	Yes	SI c - the text states that uncertainty is considered through the "choice of the Icelandic fall survey which covers the depth and distributional range of the stock and is a more precise index than the spring survey." It is not clear from this text how this addresses uncertainty.	The uncertainties in the data and dynamics were examined in a 2012 GADGET model which led to decision to base the assessment on the fall survey as well as inclusion of the PA buffer and Uncertainty Cap in the DLS HCR. The text and scoring rationale has been edited to clarify this.	Accepted (no score change)
Tusk	All gears	1.2.4	Yes	Yes			
Golden Redfish	All gears	1.2.4	Yes	Yes			
Atlantic Wolffish	All gears	1.2.4	Yes	Yes			
Atlantic Wolffish	Handline	2.1.1	Yes	Yes			

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Res-ponse Code
Atlantic Wolffish	Bottom trawl	2.1.1	Yes	Yes			
Atlantic Wolffish	Danish siene	2.1.1	Yes	Yes			
Atlantic Wolffish	Gillnet	2.1.1	Yes	Yes			
Atlantic Wolffish	Longline	2.1.1	Yes	Yes			
Atlantic Wolffish	Nephrops trawl	2.1.1	Yes	Yes			
Blue Ling	Bottom trawl	2.1.1	Yes	Yes			
Blue Ling	Danish siene	2.1.1	Yes	Yes			
Blue Ling	Gillnet	2.1.1	Yes	Yes			
Blue Ling	Handline	2.1.1	Yes	Yes			
Blue Ling	Longline	2.1.1	Yes	Yes			
Blue Ling	Nephrops trawl	2.1.1	Yes	Yes			
Golden redfish	Bottom trawl	2.1.1	Yes	Yes			
Golden redfish	Danish siene	2.1.1	Yes	Yes			
Golden redfish	Gillnet	2.1.1	Yes	Yes			
Golden redfish	Handline	2.1.1	Yes	Yes			
Golden redfish	Longline	2.1.1	Yes	Yes			
Golden redfish	Nephrops trawl	2.1.1	Yes	Yes			

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
Ling	Bottom trawl	2.1.1	Yes	Yes			
Ling	Danish siene	2.1.1	Yes	Yes			
Ling	Gillnet	2.1.1	Yes	Yes			
Ling	Handline	2.1.1	Yes	Yes			
Ling	Longline	2.1.1	Yes	Yes			
Ling	Nephrops trawl	2.1.1	Yes	Yes			
Plaice	Bottom trawl	2.1.1	Yes	Yes			
Plaice	Danish siene	2.1.1	Yes	Yes			
Plaice	Gillnet	2.1.1	Yes	Yes			
Plaice	Handline	2.1.1	Yes	Yes			
Plaice	Longline	2.1.1	Yes	Yes			
Plaice	Nephrops trawl	2.1.1	Yes	Yes			
Saithe	Bottom trawl	2.1.1	Yes	Yes			
Saithe	Danish siene	2.1.1	Yes	Yes			
Saithe	Gillnet	2.1.1	Yes	Yes			
Saithe	Handline	2.1.1	Yes	Yes			
Saithe	Longline	2.1.1	Yes	Yes			

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
Saithe	Nephrops trawl	2.1.1	Yes	Yes			
Tusk	Bottom trawl	2.1.1	Yes	Yes			
Tusk	Danish siene	2.1.1	Yes	Yes			
Tusk	Gillnet	2.1.1	Yes	Yes			
Tusk	Handline	2.1.1	Yes	Yes			
Tusk	Longline	2.1.1	Yes	Yes			
Tusk	Nephrops trawl	2.1.1	Yes	Yes			
All stocks	All gears	2.1.2	Yes	Yes			
All stocks	All gears	2.1.3	Yes	Yes			
All stocks	Bottom trawl	2.2.1	Yes	Yes			
All stocks	Danish siene	2.2.1	Yes	Yes			
All stocks	Gillnet	2.2.1	Yes	Yes	C4 - although harbour porpoise are clearly the species of interest in this condition, milestones and the client action plan refer to harbour seals. See General Comments. Also according to NAMMCO grey seals may also be taken in gillnet fisheries. Species identification of juvenile grey and harbour seals (the age class most likely to be taken) can be problematic. Therefore I believe grey seals should be added to the table and text associated with 2.2.1.a.	Grey seals and harbour seals are considered under ETP species (i.e. 2.3.1-3) rather than secondary, for reasons which are explained in the Principle 2 background text. Grey and harbour seals are considered separately under 2.3 - grey seals are not included in the condition because the most recent survey does not consider that the population is depleted relative to management targets. Regarding harbour seals / porpoise, see response to comment in General Comments on conditions.	Accepted (no score change)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Res-ponse Code
All stocks	Handline	2.2.1	Yes	Yes			
All stocks	Longline	2.2.1	Yes	Yes			
All stocks	Nephrops trawl	2.2.1	Yes	Yes			
All stocks	Bottom trawl	2.2.2	Yes	Yes			
All stocks	Danish siene	2.2.2	Yes	Yes			
All stocks	Gillnet	2.2.2	Yes	Yes	C5		
All stocks	Handline	2.2.2	Yes	Yes			
All stocks	Longline	2.2.2	Yes	Yes	C5		
All stocks	Nephrops trawl	2.2.2	Yes	Yes			
All stocks	Bottom trawl	2.2.3	Yes	Yes			
All stocks	Danish siene	2.2.3	Yes	Yes			
All stocks	Gillnet	2.2.3	yes	Yes	C6		
All stocks	Handline	2.2.3	Yes	Yes			
All stocks	Longline	2.2.3	Yes	Yes	C6		
All stocks	Nephrops trawl	2.2.3	Yes	Yes			
All stocks	Danish siene	2.3.1	Yes	Yes			

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
All stocks	Gillnet	2.3.1	Yes	No (material score reduction expected to <80)	C7. In the text for SI b, reference is made to the management targets for both harbour and grey seals. The assessment team has used these targets as the basis for scoring. However, the target for grey seals seems quite low and it would be useful for the reader to understand the basis for these targets. Can the team provide rationale or sources? A score of 80 seems high given the uncertainty both in population size and level of bycatch in these gears (bottom and Nephrops trawl and gillnet). I am not convinced that a score of 80 is appropriate for the gillnet bycatch of loons. Although migratory, the Iceland population is likely to have some degree of isolation from North America. It's small size, low reproductive rate and the uncertainty with respect to trend would seem to suggest 60 as a more appropriate score.	Regarding the management targets for harbour and grey seals, this is an excellent question, which we posed to MFRI (Sandra Granqvist, Icelandic Seal Centre). Reportedly, the targets were initially published in the NAMMCO report of 2006, and are the most recent population estimates at that time. A sentence has been added to the background section explaining this. There is unfortunately no basis for evaluating these targets against any reference points intrinsic to the population dynamics (e.g. BMSY or similar), and therefore obviously no basis for judging if the target for grey seals is 'low'. The scoring is therefore difficult, but the team concluded that they should be considered suitable management targets, if MFRI and NAMMCO consider them suitable management targets, given their considerable collective expertise. We would also note, in relation to grey seals, that the wider population of which Icelandic seals are a part (the eastern Atlantic population, excluding the Baltic) is healthy (IUCN LC) and Iceland is at the northern edge of their range, so we might not expect the same population densities as occur in Scotland, for example. Relating to loons, this is likewise an excellent question, which we again posed to our key bird stakeholder (Kristinn H Skarphéðinsson). He noted in reply that although there is no	Accepted (non-material score reduction)

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Res-ponse Code
						evidence of any population differentiation, many bird protection organisations (such as Wetlands International) consider the Iceland/Greenland breeders separately from the wider North American population. On this basis, the team reviewed the scoring and agreed that 60 would be more precautionary. The scoring and rationale has therefore been changed as suggested. Note that because the conditions relate to 'birds and mammals' rather than individual species, no re-drafting of the condition and milestones has been required. This is done deliberately, to allow for the possibility that improved bycatch data may increase scores for some species but reduce them for others, throughout the audit process.	
All stocks	Bottom trawl	2.3.1	Yes	No (material score reduction expected to <80)	SI b as above for seals.	See comments above on seals.	Not accepted (no score change)
All stocks	Handline	2.3.1	Yes	Yes			
All stocks	Longline	2.3.1	Yes	Yes	C7		

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
All stocks	Nephrops trawl	2.3.1	Yes	No (material score reduction expected to <80)	SI b as above for seals. Note, the text does not distinguish between bottom trawl and Nephrops trawl. As such, my comments may or may not apply to both.	The text refers to those gear types which are identified as having some bycatch - see Table 19 in the main report. This is demersal bottom trawl (not nephrops trawl). The nephrops trawl should be included in 'other gears' but was included next to bottom (otter) trawl by mistake here.	Accepted (no score change)
All stocks	Danish siene	2.3.2	Yes	Yes			
All stocks	Gillnet	2.3.2	Yes	Yes	C8. The text for SI b indicates that the lower bycatch of harbour seals in these fisheries than in the lumpfish fishery somehow constitutes " measures in place". I do not follow the logic here. Clarification of the text is needed.	The logic is that there is a difference in how these gillnets are used (season, location etc.) which results in lower levels of bycatch. We agree that these differences are not intended to reduce seal bycatch specificially, but under MSC's definition of 'measures in place' (FCRG Table SA8) this is not a requirement for them to be considered as measures. See also response to PR A. But you are right that clarification of the text was needed - see below.	Accepted (no score change)
All stocks	Handline	2.3.2	Yes	Yes			
All stocks	Longline	2.3.2	Yes	Yes	C8. The text for SI b indicates that the lower bycatch of harbour seals in these fisheries than in the lumpfish fishery somehow constitutes " measures in place". I do not follow the logic here. Clarification of the text is needed.	Apologies - this wasn't very clear. There is no evidence of seal bycatch in the longline fishery, so the text relating to longline discusses bird bycatch and is below the section on seals. The discussion has been split by gear and species type, and the headings have been clarified.	Accepted (no score change)
All stocks	Nephrops trawl	2.3.2	Yes	Yes			
All stocks	Bottom trawl	2.3.2	Yes	Yes			
All stocks	Danish siene	2.3.3	Yes	Yes			
All stocks	Gillnet	2.3.3	Yes	Yes	C9		

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Response Code
All stocks	Handline	2.3.3	Yes	Yes			
All stocks	Longline	2.3.3	Yes	Yes	C9		
All stocks	Nephrops trawl	2.3.3	Yes	Yes			
All stocks	Bottom trawl	2.3.3	Yes	Yes			
All stocks	Danish siene	2.4.1	Yes	Yes			
All stocks	Gillnet	2.4.1	Yes	Yes			
All stocks	Handline	2.4.1	Yes	Yes			
All stocks	Longline	2.4.1	Yes	Yes			
All stocks	Nephrops trawl	2.4.1	Yes	Yes			
All stocks	Bottom trawl	2.4.1	Yes	Yes			
All stocks	Danish siene	2.4.2	Yes	Yes	Both components of recommendation 2 with respect to 2.4.2 can be expected to contribute to improvements in habitat management.		
All stocks	Gillnet	2.4.2	Yes	Yes	Both components of recommendation 2 with respect to 2.4.2 can be expected to contribute to improvements in habitat management.		
All stocks	Handline	2.4.2	Yes	Yes	Both components of recommendation 2 with respect to 2.4.2 can be expected to contribute to improvements in habitat management.		

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Res-ponse Code
All stocks	Longline	2.4.2	Yes	Yes	Both components of recommendation 2 with respect to 2.4.2 can be expected to contribute to improvements in habitat management.		
All stocks	Nephrops trawl	2.4.2	Yes	Yes	Both components of recommendation 2 with respect to 2.4.2 can be expected to contribute to improvements in habitat management.		
All stocks	Bottom trawl	2.4.2	Yes	Yes	Both components of recommendation 2 with respect to 2.4.2 can be expected to contribute to improvements in habitat management.		
All stocks	All gears	2.4.3	Yes	Yes			
All stocks	All gears	2.5.1	Yes	Yes			
All stocks	All gears	2.5.2	Yes	Yes			
All stocks	All gears	2.5.3	Yes	Yes	With respect to SI e, SG 100 does not require complete information only that sufficient information exists to support the development of strategies to manage ecosystem impacts. Therefore I suggest that the text here be clarified. Is the state of knowledge adequate to develop strategies to manage ecosystem impacts? If no, what is missing?	Noted, thank you, and clarification added.	Accepted (no score change)
All stocks	All gears	3.1.1	Yes	Yes			

UoA stock	UoA gear	PI	PI Information	PI Scoring	Peer Reviewer Justification (as given at initial Peer Review stage)	CAB Response to Peer Reviewer's comments (as included in the Public Comment Draft Report - PCDR)	CAB Res-ponse Code
All stocks	All gears	3.1.2	Yes	Yes	SI c - while I appreciate the value of these reports, the text does suggest, that overall, the management system "demonstrates consideration of the information and explains how it is used or not used." Are these few instances sufficient to expect that a score of 100 is not warranted?	GSA4.4.1 states: A UoA cannot score 100 without being transparent on how information provided is or is not used. TExt revised to "However there were instances cited to the assessment team where stakeholders received no such explanation. This lack of transparency for some stakeholders within the consultation process indicates SG100 is not met."	Not accepted (no score change)
All stocks	All gears	3.1.3	Yes	Yes			
All stocks	All gears	3.2.1	Yes	Yes			
All stocks	All gears	3.2.2	Yes	Yes			
All stocks	All gears	3.2.3	Yes	Yes			
All stocks	All gears	3.2.4	Yes	Yes			

Appendix 3: Stakeholder Submissions

Appendix 3.1: Stakeholder Submissions Regarding Conditions

Appendix 3.1.1 Joint Memorandum of the Ministry of Industries and Innovation (MII) and the Marine & Freshwater Research Institute (MFRI) (2 pages)

Icelandic Sustainable Fisheries
Grandagarður 16
101 Reykjavík

MARINE & FRESHWATER RESEARCH INSTITUTE

Reykjavík, 16.04.2019
21.09.00
SMJ/mþ

Joint memo by MII and MFRI

MII and MFRI have met to discuss with ISF the conditions for continued certification of sustainability according to the MSC standard of sustainability. The conditions raised are mostly in line with ongoing assignments and projects of Icelandic authorities, the Ministry and its agencies or institutions.

MII and MFRI can confirm that the issues outlined are among critical issues being addressed and carried forward with the Icelandic government. Therefore, it is safe to say that these conditions and recommendations are within scope of current or planned actions and projects within MII and/or MFRI.

The conditions presented by ISF and discussed are as follows:

1. Discussion about harvest control rules
    a. Atlantic wolffish (Condition 1)
    b. Plaice (Condition 2)
    c. Blue ling (Condition 3)
2. Discussion about secondary species outcome
    a. Gillnet (Condition 4)
3. Discussion about secondary species management strategy
    a. Gillnet & longline (Condition 5)
4. Discussion about secondary species information
    a. Gillnet & longline (Condition 6)
5. Discussion about ETP species outcome
    a. Gillnet & longline (Condition 7)
6. Discussion about ETP species management strategy
    a. Gillnet & longline (Condition 8)

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

7. Discussion about ETP species information
    a. Gillnet & longline (Condition 9)

On behalf of Marine and Freshwater Research Institute,

Sólmundur Már Jónsson

Appendix 3.1.2 Letter from the Ministry of Industries and Innovation (2 pages)

Icelandic Sustainable Fisheries ehf.
Mr. Kristinn Hjálmarsson

ATVINNUVEGA- OG
NÝSKÖPUNARRÁÐUNEYTIÐ

Ministry of Industries and Innovation

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

Reykjavík April 17, 2019
Reference: ANR19040210/11.02.11

Ministry of Industries and Innovation and MFRI have met to discuss with ISF the conditions for continued certification of sustainability according to the MSC standard of sustainability. The conditions raised are mostly in line with ongoing assignments and projects of Icelandic authorities, the Ministry and its agencies or institutions.

The Ministrycan confirm that the issues outlined are among critical issues being addressed and carried forward with the Icelandic government. Therefore, it is safe to say that these conditions and recommendations are within scope of current or planned actions and projects within MII and/or MFRI.

The conditions presented by ISF and discussed are as follows:

1. Discussion about harvest control rules
    a. Atlantic wolffish (Condition 1)
    b. Plaice (Condition 2)
    c. Blue ling (Condition 3)
2. Discussion about secondary species outcome
    a. Gillnet (Condition 4)
3. Discussion about secondary species management strategy
    a. Gillnet & longline (Condition 5)
4. Discussion about secondary species information
    a. Gillnet & longline (Condition 6)
5. Discussion about ETP species outcome
    a. Gillnet & longline (Condition 7)
6. Discussion about ETP species management strategy
    a. Gillnet & longline (Condition 8)
7. Discussion about ETP species information

a. Gillnet & longline (Condition 9)

On behalf of the Minister of Fisheries and Agriculture

Jóhann Guðmundsson

Appendix 3.2: Other Stakeholder Submissions

No written submissions were made by stakeholders as part of the assessment process. A summary of subjects discussed with stakeholders during the site visit is provided in table 23. An informal record of all site visit meetings is held by Tun. Where verbal submissions contributed towards material outcomes of the scoring process these are specifically referred to as *pers. comm*. in the scoring tables in Appendix 1.1. The Marine Stewardship Council provided a Technical Oversight as part of the review process, which is appended below, along with the assessors' responses.

Sub-ID	Page Ref.	Grade	Requirement Version	Oversight Description	PI	CAB Comment
1 29349	26, 155	Guidance	FCR-7.10.6.1 v2.0	PI 1.1.1: Blue ling UoA. Within the body of the report, the assessment team state that "2*BPA = 1443.6 t" though the value given in Table 1.1.1b is given as 1072.0 t.	1.1.1,	The value in Table 1.1.1b (1072.0 t) is the BMSY proxy used by the team to score SIb and is the median of the 2001-2010 biomass proxy (one generation time) during which the fishing mortality proxy was varying around the FMSY proxy and indicative of the BMSY proxy. The 2*BPA stated in the body of the report is for reference and was not used in the scoring. The text has been edited to clarify this.
2 29350	157	Major	FCR-7.10.6.1 v2.0	PI 1.1.1. SI b. Atlantic wolfish UoA. The team have scored this UoA as meeting SG80 but state that "In the case of Atlantic Wolffish, fishing mortality has been less than its FMSY proxy for only 0.4 generations." SA2.2.4 allows fishing mortality to be used as a means of scoring stock status, provided it has been low enough for long enough (SA2.2.4.1). In this context its unclear how information presented in the rationale and Figure 13 justifies this score.	1.1.1,	The argument for the 80 score depends upon interpretation of all the time series information, not just fishing mortality. A clear reference is made to the biomass in scoring SG80. Below, we outline a summary of the information used to come to our conclusions. The assessment time series starts in 1980. Since 2000, CPUE has been relatively stable. It has been estimated that harvestable biomass has generally increased since at least 1980 (2.3 generations) and has continually increased since 1994 (1.5 generations) even during a period when fishing mortality was apparently above the FMSY proxy (0.30). This has been attributed to strong recruitment during the 1990s, while fishing mortality was declining. However, as fishing mortality continued to decline, to be at or below FMSY since 2013 (0.4 generations), recruitment also declined. Recruitment has been largely driven by environmental factors. Current biomass (B2018 = 31.2 kt) is above the lowest (B1980 ~17 kt) observed in the time series with 93.5% probability (assuming 30% CV on

Sub-ID	Page Ref.	Grade	Requirement Version	Oversight Description	PI	CAB Comment
						biomass which is high compared to other Icelandic stocks). The lowest biomass in the time series is often used by ICES as a proxy for BLIM if there is no evidence of recruitment impairment at this biomass, which is clearly the case here (see Stock Status section). 1.4*BLIM is often used as a proxy for BPA, which implies a PRI and BPA of 17 kt and 23.8 kt respectively. The Yield Per Recruit (YPR) analysis provided in the 2018 assessment (see Reference Point section) indicates that at the FMSY proxy (0.3), 0.75 g/recruit (age 1) can be expected. Over the last generation (TGEN=16.5) of year-classes entering the stock, age one recruitment has averaged 11.5 million individuals, implying an MSY proxy catch of 11.5 * 0.75 = 8.6 kt with an associated BMSY of 8.63 /0.3 = 28.8 kt. Since 2006, fishing mortality has been declining, reaching the FMSY proxy in 2013. The 2014-2017 median fishing mortality is 0.26, below the proxy with 70% probability (assuming a relatively high CV of 30%). In 2013, biomass was ~28 kt, above the assumed BPA of 23.8 kt and is projected to increase to 31.2 kt by 2018. The MSC Interpretation on scoring status against BMSY for ICES stocks states that to achieve an assumed status of BMSY, fishing mortality should have been at or below FMSY for at least one generation from a starting point of BPA and two generations from a starting point of BLIM. Shorter rebuilding times are expected starting at higher biomass. It is clear that in the case of Wolffish, biomass was relatively high in 2013 (28 kt), compared to BPA (23.8 kt) and close to the BMSY proxy (28.8 kt). Recent relatively low (compared to the FMSY proxy) fishing mortalities will have allowed biomass to increase further to 31.2 kt by 2018. Therefore, the team considered that there has been sufficient time of exploitation at or below FMSY to achieve BMSY conditions by 2018 given the initial high stock status. PI 1.1.1 SIb scoring rationale has been edited to reflect this interpretation more clearly.

Sub-ID	Page Ref.	Grade	Requirement Version	Oversight Description	PI	CAB Comment
3 29351	162	Major	FCR-7.10.6.1 v2.0	PI 1.2.1. SI a. Wolffish and Plaice UoAs. The assessment team has scored all UoAs as meeting SG80. As part of the rationale the team states "The objective of the harvest strategies for all stocks is to maintain them at levels consistent with MSY and, the case of all stocks except wolffish and plaice, through a precautionary approach, avoid low biomass levels which would impair stock rebuilding." This statement implies that wolfish and plaice are being managed by a harvest strategy in the absence of a precautionary approach to avoid low biomass levels which would impair stock rebuilding. In this context its unclear what approach has been taken for Wolffish and Plaice in respect of the harvest strategy.	1.2.1,	The harvest strategy is to harvest the stock at FMSY which implies a BMSY target as well as avoidance of a limit biomass. It is over-stated that there is an absence of a precautionary approach as it is clear Icelandic fisheries are guided by this. Rather, precautionary approach reference points are explicitly stated in all fisheries except those for wolffish and plaice where they are implied. In the case of the latter, a condition was raised in the initial assessment which is continued into the current assessment requiring the development and implementation of explicit limit reference points for the Wolffish and Plaice fisheries. These are currently being developed with implementation imminent. The scoring rationale has been edited to clarify this situation.
4 29353	167-168	Major	FCR-7.10.6.1 v2.0	PI 1.2.2. SI a. Blue ling, tusk and golden redfish UoAs. Within the rationale for for PI 1.2.1, the assessment team state that these three UoAs "are shared with neighbouring countries and occur outside the Iceland EEZ (ICES Division 5a)." However, there does not appear to be discussion about the HCRs in PI 1.2.2 as they apply to waters outside the control of MII. As P1 applies to the entire stock (SA2.1.1), it is unclear at present if the HCR are being applied in a way for all removals.	1.2.2,	In the case of Blue Ling, catch outside of Iceland has been an insignificant part of the total with the latter well below the stock-level TAC. In the case of Tusk, the assessment of this stock has not included catch information from the Greenland part of Subarea 14. Historically the catches from this area have on average been around 1% of the total catch but this increased to ~15% of the total catches in 2016 and 2017. However, in the 2017 benchmark, it was not considered appropriate to include catches from the Greenland part of Subarea 14 in the assessment before conducting additional exploration as there are doubts about the catch information and whether the tusk in the area constitute a single population. In the management strategy evaluation (MSE) a sensitivity analysis, where the catches from this area were included in the stock

Sub-ID	Page Ref.	Grade	Requirement Version	Oversight Description	PI	CAB Comment
						assessment, showed a minor upward revision in the estimated stock biomass (1%–4% throughout the years) and a downwards revision of the estimated harvest rate (0%–3% in most years, although with an increase in 2015 and 2016). It is hence expected that conclusions from HCR evaluations are robust to not accounting for these catch data. It is recognized that If the recent higher levels of catch in the Greenland area of Subarea 14 continue, the treatment of catch data may need to be reconsidered in future assessments and management. In the case of Golden Redfish, there are explicitly defined TACs for the Iceland and Greenland components of the fishery which has been the case since 2007. In all three cases, as with the other Icelandic fisheries, there is explicit consideration of non-Icelandic catch and its regulation with consideration of adjustments to the HCR during its review cycle as and when deemed necessary. The scoring rationale has been edited to clarify this.
5 29354	246	Minor	FCR-7.10.6.2 v2.0	PI 3.1.2 SI c. It is not clear from the supporting rationale, how or if the consultation process 'facilitates' effective engagement, as required for a score of SG100.	3.1.2,	Scoring rationale revised to address the TO: The timing and locations of meetings are set by authorities in conjunction with fishing representatives in order to facilitate their effective engagement. SG 100 is met.
6 29355	253	Major	FCR-7.10.6.2 v2.0	PI 3.2.3 SI b. SG80 requires that sanctions are consistently applied. As the rationale states that there is no evidence to demonstrate that sanctions are consistently applied in relation to the self-reporting of non-commecial bycatch and ETP species, it is not clear that SG80 is met.	3.2.3,	Scoring rationale revised to address the TO. Please note that the consistent application of sanctions being scored under this PI SI differs to any issues relating to the robustness of information derived from self-reporting (which is mentioned in Sia in rationale for SG100 not being met and this should not be scored twice).
7 29356	129	Minor	FCR_7.12.1.5.b v2.0	The report states that auctions and other sub-contract cooler, freezer storages (prior to landing) and on-land facilities		Benefit from further clarification of the status of auctions and cooler/freezer storages is acknowledged. Text of a recommendation´s 3rd bullet point in par. 8 of section 5.2 has

Sub-ID	Page Ref.	Grade	Requirement Version	Oversight Description	PI	CAB Comment
				(e.g. storage) are used but it is unclear if they are all part of the fishery certificate. Further, the description of the traceability systems in place at these facilities is not documented in Section 5.2. This is despite section 5.2 documenting the risks present and the recommendation made to ensure full segregation of catch by gear and region and appropriate packing and labelling processes are followed.		been strengthened; outline of the risk has been further detailed regarding cooler/storage in mainline 4, par 2 of Table 26; and the status of cooler/storage facilities with regard to chain of custody is clarified in par 4 of section 5.3.
8 29357	131	Minor	FCR_7.12.2.1 v2.0	This fishery has high levels of complexity in terms of the UoC and the certificate sharing agreement. Section 5.3 is difficult to understand in order to determine the eligibility of product to be sold into certified supply chains. For example, its unclear whether all landing points, and all fish auctions (provided they don't take ownership or process) covered by the fishery certificate? Similarly, it is unclear if there are operators who are part of the client group and take ownership of fish that are intended to be covered by the fishery certificate (and thus not require their own CoC certificate). Given that CoC may begin at different points depending on how it's landed and where it goes, it is recommended to revise Section 5.3 to make this information clearer. It would benefit for the statement to clarify that only fish from the UoC that is handled by licensed fish auctions (provided they meet the criteria set out in 5.3) is eligible		In an effort to clarify eligibility for entering CoC, section 5.3 has been extended, with a new paragraph added to summarize eligibilty, and further note on CoC requirements for client members added to the following paragraph. Re your last point here, please note that only part of fish landed in Iceland is sold via auctions (none of which can operate without an official licence).

Sub-ID	Page Ref.	Grade	Requirement Version	Oversight Description	PI	CAB Comment
				to be sold as certified.		
9 29358	128	Guidance	FCR-7.6.1 v2.0	The table in section 5.1 is not clear. For example, the date per line is not listed according to the existing certificates i.e. (1) ISF Iceland saithe, ling, atlantic wolffish and plaice fishery; (2) ISF Iceland golden redfish, blue ling and tusk fishery. Please could this be clarified.		The table has been amended to outline the eligibility date for each originally certified fish stock and each fish stock added to the original certificates via expedited audits.
10 29359	129	Minor	FCR_7.12.1.5.c v2.0	Section 5.2: Please list all four auction operations that are CoC certified, and clarify if there are other auction house that are not CoC certified but are used to process fish prior to sale. Further in section 5.3 CoC is required at first sale, but on Table 26 row 5 it says CoC is required post-landing. This needs to be clarified.		Par 5 of section 5.2 has been amended to clarify the current position of auctions with regard to processing, including providing list of the four currently CoC certified auction companies. The CoC requirement for post-landing activities in row 5 of Table 26 has been further clarified. Please note that par 3 of section 5.3. clearly states that "chain of custody will commence as of the first point of sale, change of ownership and/or processing after landing", thus including requirements for auctions conducting gutting or other primary processing to be CoC certified.
11 29360	129	Guidance	FCR_7.12.1.1 v2.0	Section 5.2: The first bullet point for client members to note should include the consideration of ".. More than one gear, or use of non-certified gear during the same fishing trip". Further it'll be useful to confirm any catch from non-certified gear/ location must be declared as non-certified.		The first bullet point has been amended as follows: "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; furthermore, such segregation should also be ensured in the event certified and non-certified gear is applied during the same fishing trip; any fish caught by a non-certified gear and /or caught in a location outside the scope of the certification must be declared as non-certified".
12 29361	131	Guidance	FCR-7.19.4.2 v2.0	Section 5.3: Please provide the full list of landing points inside and outside Iceland. The map in p. 132 is unclear.		To section 5.3. have been added lists of officially licenced harbours/landing points for fish in Iceland, Greenland, Norway and Faroe Islands (see notes re. smaller landing sites in Greenland and Norway).
13 29362	132	Guidance		Section 5.4 on Eligibility of IPI stocks to enter further CoC is missing according to		Section 5.4 has been added to clarify that there are no IPI stocks involved in this re-assessment.

Sub-ID	Page Ref.	Grade	Requirement Version	Oversight Description	PI	CAB Comment
				MSC Full Assessment Template		
14 29363	89	Guidance	*N/A vn/a	The CAB notes a Joint Committee report for improved handling of Marine Resources to be submitted to the minister in late-2018. Its unclear whether this is now published and included within the assessment.		At the time of cut-off for completion of review of information and scoring, the report was not available.
15 29364	202	Minor	FCR-7.10.6.1 v2.0	PI 2.3.1 SI b: Trawl. The team notes that "stakeholders report that catching a seal in a demersal trawl is in practice a rather rare event". In this context its unclear which stakeholders provided this input and any other supporting information.	2.3.1,	According to notes from the site visit, this comment came from the MFRI scientists; this has been clarified.
16 29365	204	Minor	FCR-7.10.6.1 v2.0	PI 2.3.1 SI b: Gillnet. For common loon, the team notes that the Icelandic population of loons "seems to have been increasing gradually". References should be provided to support the rationale.	2.3.1,	This comes from the Icelandic redlist entry on common loon: https://www.ni.is/biota/animalia/chordata/aves/ciconiiformes/himbrimi-gavia-immer *Himbrimi er sjaldgæfur varpfugl hér á landi og hefur stofninn verið gróflega metinn 200−300 pör (Náttúrufræðistofnun Íslands 2000). Væntanlega er stofninn nú nokkuð stærri, enda eru þekktir varpstaðir og/eða óðul um 500 talsins og er varpið þéttast á Mýrum, heiðunum upp af Dölum, í Húnavatnssýslu og Borgarfirði, á Skaga, Norður-Sléttu, í grennd við Mývatn og í Veiðivötnum (sjá kort 1). Himbrimi er sennilega farfugl að einhverju leyti en hann sést allt í kringum land á vetrum (sjá kort 2)*. The reference is provided in the appropriate place at the end of the PI, but has now also been specified in the sentence itself.
17 29366	208	Minor	FCR-7.10.6.1 v2.0	PI 2.3.2 SI b: Gillnet and Longline. The team notes that "there are some seabird bycatch mitigation measures which are in use in the Icelandic fishery". Its unclear what these measures are.	2.3.2,	This was not appropriately explained or referenced. The rationale has been expanded to explain what these are and provide a reference.

Sub-ID	Page Ref.	Grade	Requirement Version	Oversight Description	PI	CAB Comment
18 29367	187	Major	FCR-7.10.6.1 v2.0	PI 2.1.3.SI a. Bait (all relevant UoAs). The rationale is unclear on how/whether bait species are considered in respect of this SI.		Bait species were not singled out in this PI, primarily because recording source and the quantity of bait (i.e. bait purchases) might be the only relevant information. All bait species are minor species, so text has been added under PI 2.1.3 b pointing out that bait source and quantities are recorded, which should be sufficient to meet SG100. For PI 2.1.3 c, these fisheries are not expected to provide any direct information to support a harvest strategy for bait species since bait is purchased from other fisheries. The responsibility would be to source from reputable sources, but this is not relevant to this PI.
19 29368	180-200	Major	FCR-7.10.6.1 v2.0	PI 2.1.3/2.2.3/2.3.3. SI a. All UoAs Its unclear from the rationale how/whether data has been used to establish prevalence of unobserved fishing mortality (e.g. ghost fishing etc.) (see SA 3.1.8 and linked guidance)		Mortality from discards: Discarding is not permitted in Iceland. Gear loss and ghost fishing: Gear loss is reported (by fishermen and MFRI) to be rare since gear is expensive. Ghost fishing is only likely to be a significant issue in trap fisheries (not relevant here) since nets and lines do not continue to fish for long when lost. Given the nature of the gears and the low level of gear loss, unobserved mortality from ghost fishing is therefore not considered likely. PI2.1.3: These species are subject to a stock assessment and therefore total mortality is estimated - this will include all unobserved mortality (predation, stress ....) by definition PI2.2.3 and PI2.3.3: The potential for and evaluation of unobserved mortality is now discussed in the rationales. The scores have not changed.
20 29369	227	Major	FCR-7.10.6.1 v2.0	PI 2.4.2. SI a. Bottom Trawl, Danish Seine, Nephrops Trawl. Its unclear whether there are commonly accepted Move-on Rules in place to avoid encounters with VMEs or potential VMEs as per SA3.14.2.3 (SG60 requirement). Please see requirement, related guidance and this interpretation for more info: http://msc-		At SG60 the move-on rule is required when there is nothing else that could protect potential VME habitats (ie, that is where 'if necessary' applies). The move on rule was designed for the Southern Ocean, by CCAMLR, where there are no protected areas for benthic habitats. There, if a vessel brings up coral/ sponge etc of a certain amount, it is asked to move on, to avoid potential damage. There is also a 200% observer coverage to ensure the move on rule is complied with. However, where there are alrady closed areas to protect habitat, and there are ongoing

Sub-ID	Page Ref.	Grade	Requirement Version	Oversight Description	PI	CAB Comment
				info.accreditation-services.com/questions/move-on-rules-at-sg60-for-pi2-4-2a/		habitat mapping programmes, a move on rule is non-sensical, in particular as it is clear that it is unenforceable in practice. It is much more effective to have buffer zones around the protected areas which cause an alarm to go off when crossed into, as is the practice in Iceland

Appendix 4: Surveillance Frequency

Table 4.1 : Surveillance level rationale

Year	Surveillance activity	Number of auditors	Rationale
1-4	*On-site audit*	*1 auditor on-site with support from a minimum of 1 auditor.*	*Given the complexity of the assessment and P1 and P2 conditions, it is proposed to hold annual onsite surveillance audits with lead assessor supported by a minimum of one auditor to ensure P1 and P2 expertise in the team.*

Table 4.2: Timing of surveillance audit

Year	Anniversary date of certificate	Proposed date of surveillance audit	Rationale
1-4	*September*	*September*	*Most annual scientific advice released in June, timing of audit should enable findings of scientific advice to be included.*

Table 4.3: Fishery Surveillance Program

Surveillance Level	Year 1	Year 2	Year 3	Year 4
Level 6	*On-site surveillance audit*	*On-site surveillance audit*	*On-site surveillance audit*	*On-site surveillance audit & re-certification site visit*

Appendix 5: Objections Process

There were no objections raised against the Final Report and Determination for this fishery.

Appendix 6: Secondary, out of scope and ETP species

Table 31: Secondary species, out of scope and ETP species list, including English, scientific and Icelandic names. Resilience has been included for all in-scope species. Species which are not in scope are considered main.

English Name	Species	Icelandic Name	Type	Resilience
FISH				
Atlantic barracudina	Magnisudis atlantica	Digra geirsíli	Fish	Low
Atlantic halibut	Hippoglossus hippoglossus	Lúða	Fish	Low
Atlantic pomfret	Brama brama	Stóri bramafiskur	Fish	Low
Baird's slickhead	Alepocephalus bairdii	Gjölnir	Fish	Low
Black scabbardfish	Aphanopus carbo	Stinglax	Fish	Low
Blackbelly rosefish	Helicolenus dactylopterus	Svartgóma	Fish	Low
Broadnose chimaera / straightnose rabbitfish	Rhinochimaera atlantica	Trjónufiskur	Fish	Low
Cornish blackfish	Schedophilus medusophagus	Bretahveðnir	Fish	Low
Dealfish	Trachipterus arcticus	Vogmær	Fish	Low
European eel	Anguilla anguilla	Áll	Fish	High
European Hake	Merluccius merluccius	Lýsingur	Fish	High
Flounder	Platichthys flesus	Flundra	Fish	High
Greater eelpout	Lycodes esmarkii	Dílamjóri	Fish	Low
Greater forkbeard	Phycis blennoides	Litla brosma	Fish	Low
Grey gurnard	Eutrigla gurnardus	Urrari	Fish	High
Horse mackerel	Trachurus trachurus	Brynstirtla	Fish	High
Megrim	Lepidorhombus whiffiagonis	Stórkjafta / Öfugkjafta	Fish	High
Northern wolffish	Anarhichas denticulatus	Blágóma	Fish	Low
Norway pout	Trisopterus esmarkii	Spærlingur	Fish	High
Ocean sunfish	Mola mola	Tunglfiskur	Fish	Low
Orange roughy	Hoplostethus atlanticus	Búrfiskur	Fish	High
Pollack	Pollachius pollachius	Lýr	Fish	High
Pearlside	Maurolicus muelleri	Gulldepla	Fish	High
Rabbit fish	Chimaera monstrosa	Geirnyt/Havmus	Fish	Low
Raitt's/Lesser sandeel	Ammodytes marinus	Sandsíli	Fish	High
Roughhead grenadier	Macrourus berglax	Snarphali	Fish	Low
Roundnose grenadier	Coryphaenoides rupestris	Slétti langhali	Fish	Low
Salmon	Salmo salar	Lax	Fish	Low
Scalebelly eelpout	Lycodes squamiventer	Mjóri	Fish	Low
Snake blenny	Ophidion barbatum	Stóri mjóni	Fish	Low
Spiny eel	Notacanthus chemnitzii	(Nef)broddabakur	Fish	Low
Turbot	Psetta maxima	Sandhverfa	Fish	High
White hake	Urophycis tenuis	Stóra brosma	Fish	High

English Name	Species	Icelandic Name	Type	Resilience
RAY & CEPHALOPOD				
Blue Skate	*Dipturus flossada*	Skata	Ray	Low
Sailray	Rajella lintea	Hvítaskata	Ray	Low
Shagreen ray	Leucoraja fullonica	Náskata	Ray	Low
Starry ray	Amblyraja radiata	Tindaskata	Ray	Low
European Flying Squid	Todarodes sagittatus	Smokkfiskur	Cephalopod	High
BIVALVES, CRUSTACEAN, ECHINOIDS, GASTROPODS				
Atlantic rock crab	Cancer irroratus	grjótkrabbi	Crustacean	Low
Blue mussel	Mytilus edulis	Kræklingur / Bláskel	Bivalve	High
Green crab	Carcinus maenas	Strandkrabbi / Bogkrabbi	Crustacean	High
Ocean quahog	Arctica islandica	Kúfiskur / Kúskel	Bivalve	Low
Portly spider crab	Libinia emarginata	Trjónukrabbi	Crustacean	Low
Red deepsea crab	Chaceon affinis	Tröllakrabbi	Crustacean	Low
MARINE MAMMALS				
Harbour porpoise	Phocoena phocoena	Hnísa	Cetacean	Low
Harbour seal	Phoca vitulina	Landselur	Cetacean	Low
Humpback whale	Megaptera novaeaamgliae	Hnúfubakur	Cetacean	Low
White-Beaked Dolphin	Lagenorhynchus albirostris	Hnýðingur	Cetacean	Low
Ring seal	Phoca hispida	Hringanóri	Pinneped	Low
Harbour seal	Phoca vitulina	Landselur	Pinneped	Low
Harp seal	Pagophilus groenlandicus	Vöðuselur	Pinneped	Low
Bearded seal	Eringnathus barbatus	Kampselur	Pinneped	Low
Grey seal	Halichoerus grypus	Útselur	Pinneped	Low
ELASMOBRANCHS				
Black dogfish	Centroscyllium fabricii	Svartháfur	Shark	Low
Greenland shark	Somniosus microcephalus	Hákarl	Shark	Low
Leafscale gulper shark	Centrophorus squamosus	Rauðháfur	Shark	Low
Porbeagle	Lamna nasus	Hámeri	Shark	Low
Portuguese dogfish	Centroscymnus coelolepis	Gljáháfur	Shark	Low
Spiny / Picked dogfish	Squalus acanthias	Háfur	Shark	Low
BIRDS				
Common guillemot	Uria aalge	Langvía	Bird	
Cormorant	Phalacrocorax carbo	Díláskarfur	Bird	
Fulmar	Fulmarus glacialis	Fýll	Bird	
Great black-backed gull	Larus marinus	Svartbakur	Bird	
Northern gannet	Morus bassanus	Súla	Bird	
Shag	Phalacrocorax aristotelis	Toppskarfur	Bird	

Appendix 7: Full Scoring Table for PI 2.1.1 All UoAs

Evaluation Table for PI 2.1.1 – Primary species outcome: All Gears

In many cases, the species status is uncertain. In these cases, if the species makes up less than 10% of the UoA landings and the UoA lands less than 30% of the total landings of a species, the UoA is not considered influential in hindering a recovery in a marginal sense (MSC CR 2.0 GSA3.4.6).

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**			
	Guide post	Main primary species are likely to be above the PRI OR If the species is below the PRI, the UoA has measures in place that are expected to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are highly likely to be above the PRI OR If the species is below the PRI, there is either evidence of recovery or a demonstrably effective strategy in place between all MSC UoAs which categorise this species as main, to ensure that they collectively do not hinder recovery and rebuilding.	There is a high degree of certainty that main primary species are above the PRI and are fluctuating around a level consistent with MSY.
	Atlantic Wolffish (Iceland), Handline			
		Y	Y	Y
		There is one main stock. Atlantic cod (Iceland) is currently fluctuating at or above its MSY level and above its PRI with a high degree of certainty, meeting SG100.		

	Atlantic Wolffish (Iceland), Longline			
		Y	Y	Y
		There are 3 main stocks. Atlantic cod (Iceland), Haddock (Iceland) and Ling (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Atlantic Wolffish (Iceland), Gillnet			
		Y	Y	Y
		There are 2 main stocks. Atlantic cod (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Atlantic Wolffish (Iceland), Danish seine			
		Y	Y	Y: 2 N: 1
		There are 3 main stocks. Atlantic cod (Iceland) and Haddock (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Plaice (Iceland) is highly likely at or above its PRI, meeting SG80.		

	Atlantic Wolffish (Iceland), Bottom trawl			
		Y	Y	Y: 3 N: 1
		There are 4 main stocks. Atlantic cod (Iceland), Saithe (Iceland) and Haddock (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) is highly likely at or above its PRI, meeting SG80.		

	Atlantic Wolffish (Iceland), Nephrops trawl			
		Y	Y	Y: 3 N: 3
		There are 6 main stocks. Atlantic cod (Iceland), Ling (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Nephrops (Iceland) and Witch (Iceland) are highly likely at or above their PRI, meeting SG80.		

	Blue ling (Iceland/Greenland/Faroes), Handline			
		Y	Y	Y: 1 N: 2
		There are 3 main stocks. Atlantic cod (Iceland) is currently fluctuating at or above its MSY level and above its PRI with a high degree of certainty, meeting SG100. Mackerel (North East Atlantic) and Greenland halibut (Iceland / Greenland) are highly likely at or above their PRI, meeting SG80.		

	Blue ling (Iceland/Greenland/Faroes), Longline			
		Y	Y	Y: 4 N: 1
		There are 5 main stocks. Atlantic cod (Iceland), Ling (Iceland), Tusk (Iceland) and Haddock (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) is highly likely at or above its PRI, meeting SG80.		

	Blue ling (Iceland/Greenland/Faroes), Gillnet			
		Y	Y	Y: 2 N: 1
		There are 3 main stocks. Atlantic cod (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) is highly likely at or above its PRI, meeting SG80.		

	Blue ling (Iceland/Greenland/Faroes), Danish seine			
		Y	Y	Y: 3 N: 3
		There are 6 main stocks. Atlantic cod (Iceland), Haddock (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Witch (Iceland) and Plaice (Iceland) are highly likely at or above their PRI, meeting SG80.		

	Blue ling (Iceland/Greenland/Faroes), Bottom trawl			
		Y	Y	Y: 4 N: 3
		There are 7 main stocks. Atlantic cod (Iceland), Saithe (Iceland), Deepwater redfish (NE Arctic) and Haddock (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Deepwater redfish (Icelandic slope stock) and Greenland halibut (Iceland / Greenland) are highly likely at or above their PRI, meeting SG80.		

	Blue ling (Iceland/Greenland/Faroes), Nephrops trawl			
		Y	Y	Y: 3 N: 3
		There are 6 main stocks. Atlantic cod (Iceland), Ling (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Nephrops (Iceland) and Witch (Iceland) are highly likely at or above their PRI, meeting SG80.		

	Golden Redfish (Iceland / Greenland), Handline			
		Y	Y	Y
		There are 2 main stocks. Atlantic cod (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Golden Redfish (Iceland / Greenland), Longline			
		Y	Y	Y
		There are 3 main stocks. Atlantic cod (Iceland), Haddock (Iceland) and Ling (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Golden Redfish (Iceland / Greenland), Gillnet			
		Y	Y	Y
		There are 2 main stocks. Atlantic cod (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Golden Redfish (Iceland / Greenland), Danish seine			
		Y	Y	Y: 4 N: 2
		There are 6 main stocks. Atlantic cod (Iceland), Haddock (Iceland), Saithe (Iceland) and Atlantic wolffish (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Plaice (Iceland) and Lemon sole (Iceland) are highly likely at or above their PRI, meeting SG80.		

	Golden Redfish (Iceland / Greenland), Bottom trawl			
		Y	Y	Y
		There are 3 main stocks. Atlantic cod (Iceland), Saithe (Iceland) and Haddock (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Golden Redfish (Iceland / Greenland), Nephrops trawl			
		Y	Y	Y: 3 N: 2
		There are 5 main stocks. Atlantic cod (Iceland), Ling (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Nephrops (Iceland) and Witch (Iceland) are highly likely at or above their PRI, meeting SG80.		

	Ling (Iceland), Handline			
		Y	Y	Y: 2 N: 1
		There are 3 main stocks. Atlantic cod (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) is highly likely at or above its PRI, meeting SG80.		

	Ling (Iceland), Longline			
		Y	Y	Y
		There are 3 main stocks. Atlantic cod (Iceland), Haddock (Iceland) and Atlantic wolffish (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Ling (Iceland), Gillnet			
		Y	Y	Y
		There are 2 main stocks. Atlantic cod (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Ling (Iceland), Danish seine			
		Y	Y	Y: 4 N: 3
		There are 7 main stocks. Atlantic cod (Iceland), Haddock (Iceland), Saithe (Iceland) and Atlantic wolffish (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Plaice (Iceland), Lemon sole (Iceland), Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland and N. Azores) are highly likely at or above their PRI, meeting SG80.		

	Ling (Iceland), Bottom trawl			
		Y	Y	Y: 3 N: 1
		There are 4 main stocks. Atlantic cod (Iceland), Saithe (Iceland) and Haddock (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) is highly likely at or above its PRI, meeting SG80.		

	Ling (Iceland), Nephrops trawl			
		Y	Y	Y: 2 N: 3
		There are 5 main stocks. Atlantic cod (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Nephrops (Iceland) and Witch (Iceland) are highly likely at or above their PRI, meeting SG80.		

	Plaice (Iceland), Handline			
		Y	Y	Y: 4 N: 2
		There are 6 main stocks. Atlantic cod (Iceland), Haddock (Iceland), Ling (Iceland) and Atlantic wolffish (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Witch (Iceland) and Lumpfish are highly likely at or above their PRI, meeting SG80.		

	Plaice (Iceland), Longline			
		Y	Y	Y
		There are 3 main stocks. Atlantic cod (Iceland), Haddock (Iceland) and Atlantic wolffish (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Plaice (Iceland), Gillnet			
		Y	Y	Y
		There is one main stock. Atlantic cod (Iceland) is currently fluctuating at or above its MSY level and above its PRI with a high degree of certainty, meeting SG100.		

	Plaice (Iceland), Danish seine			
		Y	Y	Y
		There are 3 main stocks. Atlantic cod (Iceland), Haddock (Iceland) and Atlantic wolffish (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Plaice (Iceland), Bottom trawl			
		Y	Y	Y: 3 N: 1
		There are 4 main stocks. Atlantic cod (Iceland), Saithe (Iceland) and Haddock (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) is highly likely at or above its PRI, meeting SG80.		

	Plaice (Iceland), Nephrops trawl			
		Y	Y	Y: 3 N: 3
		There are 6 main stocks. Atlantic cod (Iceland), Ling (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Nephrops (Iceland) and Witch (Iceland) are highly likely at or above their PRI, meeting SG80.		

	Saithe (Iceland), Handline			
		Y	Y	Y
		There is one main stock. Atlantic cod (Iceland) is currently fluctuating at or above its MSY level and above its PRI with a high degree of certainty, meeting SG100.		

	Saithe (Iceland), Longline			
		Y	Y	Y
		There are 3 main stocks. Atlantic cod (Iceland), Haddock (Iceland) and Ling (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Saithe (Iceland), Gillnet			
		Y	Y	Y
		There is one main stock. Atlantic cod (Iceland) is currently fluctuating at or above its MSY level and above its PRI with a high degree of certainty, meeting SG100.		

	Saithe (Iceland), Danish seine			
		Y	Y	Y: 3 N: 2
		There are 5 main stocks. Atlantic cod (Iceland), Haddock (Iceland) and Atlantic wolffish (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Plaice (Iceland), Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland and N. Azores) are highly likely at or above their PRI, meeting SG80.		

	Saithe (Iceland), Bottom trawl			
		Y	Y	Y: 2 N: 1
		There are 3 main stocks. Atlantic cod (Iceland) and Haddock (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) is highly likely at or above its PRI, meeting SG80.		

	Saithe (Iceland), Nephrops trawl			
		Y	Y	Y: 2 N: 3
		There are 5 main stocks. Atlantic cod (Iceland) and Ling (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Nephrops (Iceland) and Witch (Iceland) are highly likely at or above their PRI, meeting SG80.		

	Tusk (Iceland / Greenland), Handline			
		Y	Y	Y: 2 N: 1
		There are 3 main stocks. Atlantic cod (Iceland) and Saithe (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) is highly likely at or above its PRI, meeting SG80.		

	Tusk (Iceland / Greenland), Longline			
		Y	Y	Y
		There are 3 main stocks. Atlantic cod (Iceland), Haddock (Iceland) and Ling (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Tusk (Iceland / Greenland), Gillnet			
		Y	Y	Y
		There are 3 main stocks. Atlantic cod (Iceland), Saithe (Iceland) and Ling (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100.		

	Tusk (Iceland / Greenland), Danish seine			
		Y	Y	Y: 4 N: 4
		There are 8 main stocks. Atlantic cod (Iceland), Haddock (Iceland), Saithe (Iceland) and Atlantic wolffish (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Witch (Iceland), Lemon sole (Iceland), Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) and Plaice (Iceland) are highly likely at or above their PRI, meeting SG80.		

	Tusk (Iceland / Greenland), Bottom trawl			
		Y	Y	Y: 4 N: 2
		There are 6 main stocks. Atlantic cod (Iceland), Saithe (Iceland), Deepwater redfish (NE Arctic) and Haddock (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) and Deepwater redfish (Icelandic slope stock) are highly likely at or above their PRI, meeting SG80.		

	Tusk (Iceland / Greenland), Nephrops trawl			
		Y	Y	Y: 3 N: 2
		There are 5 main stocks. Atlantic cod (Iceland), Saithe (Iceland) and Ling (Iceland) are currently fluctuating at or above their MSY level and above their PRI with a high degree of certainty, meeting SG100. Nephrops (Iceland), Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland and N. Azores) are highly likely at or above their PRI, meeting SG80.		

b	Minor primary species stock status			
	Guide post			Minor primary species are highly likely to be above the PRI OR If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species

	Blue ling (Iceland/Greenland/Faroes), Handline			
				Y: 7 N: 2
		There are 9 minor stocks. Saithe (Iceland), Haddock (Iceland), Ling (Iceland), Tusk (Iceland) and Atlantic wolffish (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) is highly likely above its PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Blue ling (Iceland/Greenland/Faroes), Longline			
				Y: 14 N: 3
		There are 17 minor stocks. Saithe (Iceland), Atlantic wolffish (Iceland), Deepwater redfish (NE Arctic) and Blue shark (North Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Greenland halibut (Iceland / Greenland), Whiting (Iceland), Plaice (Iceland), Deepwater redfish (Icelandic slope stock), Long rough dab (Iceland), Monkfish, Small redfish (Iceland), Witch (Iceland) and Lemon sole (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Spotted wolffish (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Blue ling (Iceland/Greenland/Faroes), Gillnet			
				Y: 14 N: 0
		There are 14 minor stocks. Ling (Iceland), Haddock (Iceland), Tusk (Iceland) and Atlantic wolffish (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Monkfish, Plaice (Iceland), Lemon sole (Iceland), Lumpfish, Whiting (Iceland), Witch (Iceland), Long rough dab (Iceland) and Greenland halibut (Iceland / Greenland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) and Spotted wolffish (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Blue ling (Iceland/Greenland/Faroes), Danish seine			
				Y: 11 N: 1
		There are 12 minor stocks. Ling (Iceland), Atlantic wolffish (Iceland) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Lemon sole (Iceland), Whiting (Iceland), Monkfish, Long rough dab (Iceland), Lumpfish, Mackerel (North East Atlantic) and Greenland halibut (Iceland / Greenland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Common dab (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Blue ling (Iceland/Greenland/Faroes), Bottom trawl			
				Y: 20 N: 1
		There are 21 minor stocks. Atlantic wolffish (Iceland), Ling (Iceland), Tusk (Iceland) and Blue whiting (North East Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Greater silver smelt (Iceland), Plaice (Iceland), Small redfish (Iceland), Whiting (Iceland), Lemon sole (Iceland), Monkfish, Mackerel (North East Atlantic), Witch (Iceland), Herring (Iceland and Norwegian Spring Spawning), Northern shrimp (Inshore), Northern shrimp (Offshore), Long rough dab (Iceland), Lumpfish, Nephrops (Iceland) and Atlantic bluefin tuna (Eastern Atlantic / Mediterranean) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Spotted wolffish (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Blue ling (Iceland/Greenland/Faroes), Nephrops trawl			
				Y: 15 N: 0
		There are 15 minor stocks. Haddock (Iceland), Atlantic wolffish (Iceland) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Monkfish, Whiting (Iceland), Lemon sole (Iceland), Plaice (Iceland), Small redfish (Iceland), Greater silver smelt (Iceland), Mackerel (North East Atlantic), Greenland halibut (Iceland / Greenland), Long rough dab (Iceland) and Lumpfish are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Atlantic Wolffish (Iceland), Handline			
				Y: 19 N: 2
		There are 21 minor stocks. Saithe (Iceland), Haddock (Iceland), Ling (Iceland), Tusk (Iceland), Deepwater redfish (NE Arctic) and Blue ling (North East Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Witch (Iceland), Lumpfish, Lemon sole (Iceland), Whiting (Iceland), Plaice (Iceland), Mackerel (North East Atlantic), Greenland halibut (Iceland / Greenland), Monkfish, Deepwater redfish (Icelandic slope stock) and Small redfish (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Atlantic Wolffish (Iceland), Longline			
				Y: 20 N: 3
		There are 23 minor stocks. Tusk (Iceland), Saithe (Iceland), Blue ling (North East Atlantic), Deepwater redfish (NE Arctic) and Blue shark (North Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Plaice (Iceland), Whiting (Iceland), Greenland halibut (Iceland / Greenland), Monkfish, Deepwater redfish (Icelandic slope stock), Long rough dab (Iceland), Small redfish (Iceland), Lumpfish, Lemon sole (Iceland), Sea cucumber (Iceland), Witch (Iceland), Mackerel (North East Atlantic) and Greater silver smelt (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Spotted wolffish (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Atlantic Wolffish (Iceland), Gillnet			
				Y: 16 N: 0
		There are 16 minor stocks. Ling (Iceland), Haddock (Iceland), Blue ling (North East Atlantic) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Plaice (Iceland), Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Monkfish, Lumpfish, Lemon sole (Iceland), Whiting (Iceland), Witch (Iceland), Long rough dab (Iceland), Mackerel (North East Atlantic) and Greenland halibut (Iceland / Greenland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) and Spotted wolffish (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Atlantic Wolffish (Iceland), Danish seine			
				Y: 15 N: 1
		There are 16 minor stocks. Saithe (Iceland), Ling (Iceland), Blue ling (North East Atlantic) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Lemon sole (Iceland), Witch (Iceland), Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Whiting (Iceland), Monkfish, Long rough dab (Iceland), Lumpfish, Mackerel (North East Atlantic), Sea cucumber (Iceland) and Greenland halibut (Iceland / Greenland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Common dab (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Atlantic Wolffish (Iceland), Bottom trawl			
				Y: 23 N: 1
		There are 24 minor stocks. Deepwater redfish (NE Arctic), Ling (Iceland), Blue ling (North East Atlantic), Tusk (Iceland) and Blue whiting (North East Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Deepwater redfish (Icelandic slope stock), Greenland halibut (Iceland / Greenland), Greater silver smelt (Iceland), Plaice (Iceland), Lemon sole (Iceland), Whiting (Iceland), Small redfish (Iceland), Monkfish, Mackerel (North East Atlantic), Witch (Iceland), Herring (Iceland and Norwegian Spring Spawning), Lumpfish, Long rough dab (Iceland), Nephrops (Iceland), Northern shrimp (Inshore), Northern shrimp (Offshore) and Atlantic bluefin tuna (Eastern Atlantic / Mediterranean) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Spotted wolffish (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Atlantic Wolffish (Iceland), Nephrops trawl			
				Y: 15 N: 0
		There are 15 minor stocks. Haddock (Iceland), Blue ling (North East Atlantic) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Monkfish, Whiting (Iceland), Lemon sole (Iceland), Plaice (Iceland), Long rough dab (Iceland), Small redfish (Iceland), Greater silver smelt (Iceland), Mackerel (North East Atlantic), Greenland halibut (Iceland / Greenland) and Lumpfish are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Ling (Iceland), Handline			
				Y: 16 N: 2
		There are 18 minor stocks. Tusk (Iceland), Haddock (Iceland), Atlantic wolffish (Iceland), Deepwater redfish (NE Arctic) and Blue ling (North East Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Witch (Iceland), Lemon sole (Iceland), Whiting (Iceland), Mackerel (North East Atlantic), Plaice (Iceland), Greenland halibut (Iceland / Greenland), Monkfish, Deepwater redfish (Icelandic slope stock) and Greater silver smelt (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Ling (Iceland), Longline			
				Y: 20 N: 3
		There are 23 minor stocks. Tusk (Iceland), Saithe (Iceland), Blue ling (North East Atlantic), Deepwater redfish (NE Arctic) and Blue shark (North Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Whiting (Iceland), Plaice (Iceland), Greenland halibut (Iceland / Greenland), Monkfish, Long rough dab (Iceland), Deepwater redfish (Icelandic slope stock), Small redfish (Iceland), Lemon sole (Iceland), Mackerel (North East Atlantic), Lumpfish, Witch (Iceland), Greater silver smelt (Iceland) and Sea cucumber (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Spotted wolffish (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Ling (Iceland), Gillnet			
				Y: 17 N: 0
		There are 17 minor stocks. Haddock (Iceland), Tusk (Iceland), Blue ling (North East Atlantic) and Atlantic wolffish (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Plaice (Iceland), Monkfish, Lumpfish, Lemon sole (Iceland), Whiting (Iceland), Greenland halibut (Iceland / Greenland), Witch (Iceland), Mackerel (North East Atlantic), Long rough dab (Iceland) and Greater silver smelt (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) and Spotted wolffish (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Ling (Iceland), Danish seine			
				Y: 10 N: 1
		There are 11 minor stocks. Blue ling (North East Atlantic) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Witch (Iceland), Whiting (Iceland), Monkfish, Long rough dab (Iceland), Lumpfish, Mackerel (North East Atlantic) and Greenland halibut (Iceland / Greenland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Common dab (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Ling (Iceland), Bottom trawl			
				Y: 23 N: 1
		There are 24 minor stocks. Deepwater redfish (NE Arctic), Atlantic wolffish (Iceland), Blue ling (North East Atlantic), Tusk (Iceland) and Blue whiting (North East Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Deepwater redfish (Icelandic slope stock), Greater silver smelt (Iceland), Greenland halibut (Iceland / Greenland), Plaice (Iceland), Whiting (Iceland), Lemon sole (Iceland), Small redfish (Iceland), Monkfish, Mackerel (North East Atlantic), Witch (Iceland), Herring (Iceland and Norwegian Spring Spawning), Lumpfish, Long rough dab (Iceland), Northern shrimp (Inshore), Northern shrimp (Offshore), Nephrops (Iceland) and Atlantic bluefin tuna (Eastern Atlantic / Mediterranean) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Spotted wolffish (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Ling (Iceland), Nephrops trawl			
				Y: 16 N: 0
		There are 16 minor stocks. Haddock (Iceland), Blue ling (North East Atlantic), Atlantic wolffish (Iceland) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Monkfish, Whiting (Iceland), Lemon sole (Iceland), Plaice (Iceland), Long rough dab (Iceland), Small redfish (Iceland), Greater silver smelt (Iceland), Mackerel (North East Atlantic), Greenland halibut (Iceland / Greenland) and Lumpfish are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Plaice (Iceland), Handline			
				Y: 7 N: 2
		There are 9 minor stocks. Saithe (Iceland) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Lemon sole (Iceland), Monkfish, Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores) and Whiting (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Plaice (Iceland), Longline			
				Y: 20 N: 2
		There are 22 minor stocks. Ling (Iceland), Tusk (Iceland), Saithe (Iceland), Blue ling (North East Atlantic), Deepwater redfish (NE Arctic) and Blue shark (North Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Whiting (Iceland), Monkfish, Greenland halibut (Iceland / Greenland), Lumpfish, Deepwater redfish (Icelandic slope stock), Long rough dab (Iceland), Lemon sole (Iceland), Sea cucumber (Iceland), Witch (Iceland), Small redfish (Iceland) and Mackerel (North East Atlantic) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Plaice (Iceland), Gillnet			
				Y: 17 N: 0
		There are 17 minor stocks. Saithe (Iceland), Haddock (Iceland), Ling (Iceland), Atlantic wolffish (Iceland), Blue ling (North East Atlantic) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Monkfish, Lumpfish, Lemon sole (Iceland), Whiting (Iceland), Long rough dab (Iceland), Witch (Iceland), Mackerel (North East Atlantic) and Greenland halibut (Iceland / Greenland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) and Spotted wolffish (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Plaice (Iceland), Danish seine			
				Y: 15 N: 1
		There are 16 minor stocks. Saithe (Iceland), Ling (Iceland), Blue ling (North East Atlantic) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Lemon sole (Iceland), Witch (Iceland), Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Monkfish, Whiting (Iceland), Long rough dab (Iceland), Lumpfish, Mackerel (North East Atlantic), Sea cucumber (Iceland) and Greenland halibut (Iceland / Greenland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Common dab (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Plaice (Iceland), Bottom trawl			
				Y: 23 N: 1
		There are 24 minor stocks. Deepwater redfish (NE Arctic), Atlantic wolffish (Iceland), Ling (Iceland), Blue ling (North East Atlantic), Tusk (Iceland) and Blue whiting (North East Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Deepwater redfish (Icelandic slope stock), Greenland halibut (Iceland / Greenland), Greater silver smelt (Iceland), Lemon sole (Iceland), Whiting (Iceland), Mackerel (North East Atlantic), Monkfish, Witch (Iceland), Small redfish (Iceland), Herring (Iceland and Norwegian Spring Spawning), Lumpfish, Long rough dab (Iceland), Nephrops (Iceland), Northern shrimp (Inshore), Northern shrimp (Offshore) and Atlantic bluefin tuna (Eastern Atlantic / Mediterranean) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Spotted wolffish (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Plaice (Iceland), Nephrops trawl			
				Y: 15 N: 0
		There are 15 minor stocks. Haddock (Iceland), Atlantic wolffish (Iceland), Blue ling (North East Atlantic) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Monkfish, Whiting (Iceland), Lemon sole (Iceland), Long rough dab (Iceland), Greater silver smelt (Iceland), Small redfish (Iceland), Mackerel (North East Atlantic), Lumpfish and Greenland halibut (Iceland / Greenland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Saithe (Iceland), Handline			
				Y: 20 N: 2
		There are 22 minor stocks. Haddock (Iceland), Ling (Iceland), Tusk (Iceland), Atlantic wolffish (Iceland), Blue ling (North East Atlantic) and Deepwater redfish (NE Arctic) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Mackerel (North East Atlantic), Witch (Iceland), Whiting (Iceland), Greenland halibut (Iceland / Greenland), Lemon sole (Iceland), Lumpfish, Plaice (Iceland), Monkfish, Small redfish (Iceland), Deepwater redfish (Icelandic slope stock) and Greater silver smelt (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Saithe (Iceland), Longline			
				Y: 20 N: 3
		There are 23 minor stocks. Tusk (Iceland), Atlantic wolffish (Iceland), Blue ling (North East Atlantic), Deepwater redfish (NE Arctic) and Blue shark (North Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Whiting (Iceland), Greenland halibut (Iceland / Greenland), Plaice (Iceland), Monkfish, Deepwater redfish (Icelandic slope stock), Long rough dab (Iceland), Lumpfish, Small redfish (Iceland), Lemon sole (Iceland), Mackerel (North East Atlantic), Witch (Iceland), Greater silver smelt (Iceland) and Sea cucumber (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Spotted wolffish (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Saithe (Iceland), Gillnet			
				Y: 18 N: 0
		There are 18 minor stocks. Ling (Iceland), Haddock (Iceland), Tusk (Iceland), Blue ling (North East Atlantic) and Atlantic wolffish (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Plaice (Iceland), Monkfish, Lumpfish, Lemon sole (Iceland), Greenland halibut (Iceland / Greenland), Whiting (Iceland), Witch (Iceland), Mackerel (North East Atlantic), Long rough dab (Iceland) and Greater silver smelt (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Saithe (Iceland), Danish seine			
				Y: 12 N: 1
		There are 13 minor stocks. Ling (Iceland), Blue ling (North East Atlantic) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Lemon sole (Iceland), Witch (Iceland), Whiting (Iceland), Monkfish, Long rough dab (Iceland), Lumpfish, Mackerel (North East Atlantic) and Greenland halibut (Iceland / Greenland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Common dab (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Saithe (Iceland), Bottom trawl			
				Y: 24 N: 1
		There are 25 minor stocks. Deepwater redfish (NE Arctic), Atlantic wolffish (Iceland), Ling (Iceland), Blue ling (North East Atlantic), Tusk (Iceland) and Blue whiting (North East Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Deepwater redfish (Icelandic slope stock), Greenland halibut (Iceland / Greenland), Greater silver smelt (Iceland), Plaice (Iceland), Whiting (Iceland), Lemon sole (Iceland), Small redfish (Iceland), Monkfish, Mackerel (North East Atlantic), Witch (Iceland), Herring (Iceland and Norwegian Spring Spawning), Long rough dab (Iceland), Lumpfish, Northern shrimp (Inshore), Northern shrimp (Offshore), Nephrops (Iceland) and Atlantic bluefin tuna (Eastern Atlantic / Mediterranean) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Spotted wolffish (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Saithe (Iceland), Nephrops trawl			
				Y: 16 N: 0
		There are 16 minor stocks. Haddock (Iceland), Blue ling (North East Atlantic), Atlantic wolffish (Iceland) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Monkfish, Whiting (Iceland), Lemon sole (Iceland), Plaice (Iceland), Long rough dab (Iceland), Small redfish (Iceland), Greater silver smelt (Iceland), Mackerel (North East Atlantic), Greenland halibut (Iceland / Greenland) and Lumpfish are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Golden Redfish (Iceland / Greenland), Handline			
				Y: 19 N: 2
		There are 21 minor stocks. Haddock (Iceland), Ling (Iceland), Tusk (Iceland), Atlantic wolffish (Iceland), Blue ling (North East Atlantic) and Deepwater redfish (NE Arctic) are above their PRI with a high degree of certainty, meeting SG100. Witch (Iceland), Greenland halibut (Iceland / Greenland), Whiting (Iceland), Lemon sole (Iceland), Mackerel (North East Atlantic), Plaice (Iceland), Small redfish (Iceland), Monkfish, Deepwater redfish (Icelandic slope stock), Lumpfish and Greater silver smelt (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Golden Redfish (Iceland / Greenland), Longline		
			Y: 18 N: 3
		There are 21 minor stocks. Tusk (Iceland), Atlantic wolffish (Iceland), Saithe (Iceland), Blue ling (North East Atlantic), Deepwater redfish (NE Arctic) and Blue shark (North Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Greenland halibut (Iceland / Greenland), Whiting (Iceland), Plaice (Iceland), Monkfish, Long rough dab (Iceland), Deepwater redfish (Icelandic slope stock), Lemon sole (Iceland), Small redfish (Iceland), Witch (Iceland), Mackerel (North East Atlantic) and Lumpfish are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Spotted wolffish (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).	

	Golden Redfish (Iceland / Greenland), Gillnet		
			Y: 16 N: 0
		There are 16 minor stocks. Ling (Iceland), Haddock (Iceland), Tusk (Iceland), Blue ling (North East Atlantic) and Atlantic wolffish (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Greenland halibut (Iceland / Greenland), Plaice (Iceland), Monkfish, Lumpfish, Lemon sole (Iceland), Whiting (Iceland), Witch (Iceland), Mackerel (North East Atlantic) and Long rough dab (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.	

	Golden Redfish (Iceland / Greenland), Danish seine		
			Y: 11 N: 1
		There are 12 minor stocks. Ling (Iceland), Blue ling (North East Atlantic) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Witch (Iceland), Whiting (Iceland), Monkfish, Long rough dab (Iceland), Lumpfish, Mackerel (North East Atlantic) and Greenland halibut (Iceland / Greenland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Common dab (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.	

	Golden Redfish (Iceland / Greenland), Bottom trawl			
				Y: 24 N: 1
		There are 25 minor stocks. Deepwater redfish (NE Arctic), Atlantic wolffish (Iceland), Ling (Iceland), Blue ling (North East Atlantic), Tusk (Iceland) and Blue whiting (North East Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Deepwater redfish (Icelandic slope stock), Greenland halibut (Iceland / Greenland), Greater silver smelt (Iceland), Plaice (Iceland), Whiting (Iceland), Lemon sole (Iceland), Small redfish (Iceland), Monkfish, Mackerel (North East Atlantic), Witch (Iceland), Northern shrimp (Inshore), Northern shrimp (Offshore), Herring (Iceland and Norwegian Spring Spawning), Long rough dab (Iceland), Lumpfish, Nephrops (Iceland) and Atlantic bluefin tuna (Eastern Atlantic / Mediterranean) are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Spotted wolffish (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Golden Redfish (Iceland / Greenland), Nephrops trawl			
				Y: 16 N: 0
		There are 16 minor stocks. Haddock (Iceland), Blue ling (North East Atlantic), Atlantic wolffish (Iceland) and Tusk (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Monkfish, Whiting (Iceland), Lemon sole (Iceland), Plaice (Iceland), Long rough dab (Iceland), Small redfish (Iceland), Greater silver smelt (Iceland), Mackerel (North East Atlantic), Greenland halibut (Iceland / Greenland) and Lumpfish are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Tusk (Iceland / Greenland), Handline			
				Y: 13 N: 2
		There are 15 minor stocks. Ling (Iceland), Haddock (Iceland), Atlantic wolffish (Iceland), Blue ling (North East Atlantic) and Deepwater redfish (NE Arctic) are above their PRI with a high degree of certainty, meeting SG100. Greenland halibut (Iceland / Greenland), Mackerel (North East Atlantic), Whiting (Iceland), Deepwater redfish (Icelandic slope stock), Monkfish, Plaice (Iceland) and Lemon sole (Iceland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Tusk (Iceland / Greenland), Longline			
				Y: 18 N: 4
		There are 22 minor stocks. Atlantic wolffish (Iceland), Saithe (Iceland), Blue ling (North East Atlantic), Deepwater redfish (NE Arctic) and Blue shark (North Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Greenland halibut (Iceland / Greenland), Whiting (Iceland), Plaice (Iceland), Monkfish, Deepwater redfish (Icelandic slope stock), Long rough dab (Iceland), Small redfish (Iceland), Lemon sole (Iceland), Lumpfish, Witch (Iceland), Mackerel (North East Atlantic) and Greater silver smelt (Iceland) are highly likely above their PRI, meeting SG100. Spotted wolffish (Iceland) and Common dab (Iceland) may be below their PRI, and the fishery may be hindering any recovery, so SG100 is not met. For longline and handline, bait is considered as primary species. The catch to bait use ratio (<5% landings) indicates bait is a minor component of the landings, particularly taking into account several species might be used for bait. Bait is purchased from a variety of sources dependent on price and availability, and it is not possible to predict at the current time the status of these sources. Mackerel is used as bait and the stock status is currently above its PRI, but declining. Otherwise the main bait is saury mostly from the Pacific. Because it is not possible to determine the status of potential bait purchases, the SG100 is not met for these elements (assumed to be typically 2 species in addition to the other bycatch species).		

	Tusk (Iceland / Greenland), Gillnet			
				Y: 15 N: 0
		There are 15 minor stocks. Haddock (Iceland), Blue ling (North East Atlantic) and Atlantic wolffish (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores), Monkfish, Plaice (Iceland), Lumpfish, Whiting (Iceland), Lemon sole (Iceland), Greenland halibut (Iceland / Greenland), Witch (Iceland), Long rough dab (Iceland) and Mackerel (North East Atlantic) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) and Common dab (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Tusk (Iceland / Greenland), Danish seine			
				Y: 8 N: 0
		There are 8 minor stocks. Ling (Iceland) and Blue ling (North East Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Whiting (Iceland), Monkfish, Long rough dab (Iceland) and Lumpfish are highly likely above their PRI, meeting SG100. While it is uncertain whether Common dab (Iceland) and Spotted wolffish (Iceland) are above their PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of their total landings, meeting SG100.		

	Tusk (Iceland / Greenland), Bottom trawl			
				Y: 20 N: 1
		There are 21 minor stocks. Atlantic wolffish (Iceland), Ling (Iceland), Blue ling (North East Atlantic) and Blue whiting (North East Atlantic) are above their PRI with a high degree of certainty, meeting SG100. Greater silver smelt (Iceland), Greenland halibut (Iceland / Greenland), Plaice (Iceland), Small redfish (Iceland), Whiting (Iceland), Lemon sole (Iceland), Monkfish, Witch (Iceland), Mackerel (North East Atlantic), Long rough dab (Iceland), Lumpfish, Nephrops (Iceland), Northern shrimp (Inshore), Northern shrimp (Offshore) and Atlantic bluefin tuna (Eastern Atlantic / Mediterranean) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100. Common dab (Iceland) may be below its PRI, and the fishery may be hindering any recovery, so SG100 is not met.		

	Tusk (Iceland / Greenland), Nephrops trawl			
				Y: 14 N: 0
		There are 14 minor stocks. Haddock (Iceland), Blue ling (North East Atlantic) and Atlantic wolffish (Iceland) are above their PRI with a high degree of certainty, meeting SG100. Monkfish, Witch (Iceland), Whiting (Iceland), Lemon sole (Iceland), Plaice (Iceland), Greater silver smelt (Iceland), Small redfish (Iceland), Long rough dab (Iceland), Mackerel (North East Atlantic) and Greenland halibut (Iceland / Greenland) are highly likely above their PRI, meeting SG100. While it is uncertain whether Spotted wolffish (Iceland) is above its PRI, there is evidence that the fishery is not hindering any recovery, because the UoA landings are below 30% of its total landings, meeting SG100.		

References	http://www.iucnredlist.org; ICCAT 2015; ICCAT 2017; ICES Advice ARU 2018; ICES Advice BLI 2018; ICES Advice CAP 2018; ICES Advice COD 2018; ICES Advice GHL 2018; ICES Advice HAD 2018; ICES Advice HER_Spr 2018; ICES Advice HER_Sum 2018; ICES Advice LIN 2018; ICES Advice MAC 2018; ICES Advice POK 2018; ICES Advice REB_Ice 2018; ICES Advice REG 2016; ICES Advice USK 2018; ICES Advice WHB 2018; ICES REB_NEArctic 2018; MFRI Advice CAA 2018; MFRI Advice CAS 2018; MFRI Advice DAB 2018; MFRI Advice KHG 2018; MFRI Advice LEM 2018; MFRI Advice LUM 2018; MFRI Advice MON 2018; MFRI Advice NEP 2018; MFRI Advice PLA 2018; MFRI Advice PLE 2018; MFRI Advice PRA_Inshore 2018; MFRI Advice PRA_Offshore 2018; MFRI Advice SFV 2018; MFRI Advice WHG 2018; MFRI Advice WIT 2018; MFRI, Unpublished Data

OVERALL PERFORMANCE INDICATOR SCORE:		
Blue ling (Iceland/Greenland/Faroes), Handline	**Main stocks: 1 reaches 100, 2 reach 80** **Minor stocks: 7 reach 100, 2 do not reach 100**	**90**
Blue ling (Iceland/Greenland/Faroes), Longline	**Main stocks: 4 reach 100, 1 reaches 80** **Minor stocks: 14 reach 100, 3 do not reach 100**	**95**
Blue ling (Iceland/Greenland/Faroes), Gillnet	**Main stocks: 2 reach 100, 1 reaches 80** **Minor stocks: 14 reach 100**	**95**
Blue ling (Iceland/Greenland/Faroes), Danish seine	**Main stocks: 3 reach 100, 3 reach 80** **Minor stocks: 11 reach 100, 1 does not reach 100**	**95**
Blue ling (Iceland/Greenland/Faroes), Bottom trawl	**Main stocks: 4 reach 100, 3 reach 80** **Minor stocks: 20 reach 100, 1 does not reach 100**	**95**
Blue ling (Iceland/Greenland/Faroes), Nephrops trawl	**Main stocks: 3 reach 100, 3 reach 80** **Minor stocks: 15 reach 100**	**95**
Atlantic Wolffish (Iceland), Handline	**Main stocks: 1 reaches 100** **Minor stocks: 19 reach 100, 2 do not reach 100**	**95**
Atlantic Wolffish (Iceland), Longline	**Main stocks: 3 reach 100**	**95**

	Minor stocks: 20 reach 100, 3 do not reach 100	
Atlantic Wolffish (Iceland), Gillnet	**Main stocks: 2 reach 100** **Minor stocks: 16 reach 100**	**100**
Atlantic Wolffish (Iceland), Danish seine	**Main stocks: 2 reach 100, 1 reaches 80** **Minor stocks: 15 reach 100, 1 does not reach 100**	**95**
Atlantic Wolffish (Iceland), Bottom trawl	**Main stocks: 3 reach 100, 1 reaches 80** **Minor stocks: 23 reach 100, 1 does not reach 100**	**95**
Atlantic Wolffish (Iceland), Nephrops trawl	**Main stocks: 3 reach 100, 3 reach 80** **Minor stocks: 15 reach 100**	**95**
Ling (Iceland), Handline	**Main stocks: 2 reach 100, 1 reaches 80** **Minor stocks: 16 reach 100, 2 do not reach 100**	**95**
Ling (Iceland), Longline	**Main stocks: 3 reach 100** **Minor stocks: 20 reach 100, 3 do not reach 100**	**95**
Ling (Iceland), Gillnet	**Main stocks: 2 reach 100** **Minor stocks: 17 reach 100**	**100**
Ling (Iceland), Danish seine	**Main stocks: 4 reach 100, 3 reach 80** **Minor stocks: 10 reach 100, 1 does not reach 100**	**95**
Ling (Iceland), Bottom trawl	**Main stocks: 3 reach 100, 1 reaches 80** **Minor stocks: 23 reach 100, 1 does not reach 100**	**95**
Ling (Iceland), Nephrops trawl	**Main stocks: 2 reach 100, 3 reach 80** **Minor stocks: 16 reach 100**	**95**
Plaice (Iceland), Handline	**Main stocks: 4 reach 100, 2 reach 80** **Minor stocks: 7 reach 100, 2 do not reach 100**	**90**
Plaice (Iceland), Longline	**Main stocks: 3 reach 100** **Minor stocks: 20 reach 100, 2 do not reach 100**	**95**
Plaice (Iceland), Gillnet	**Main stocks: 1 reaches 100** **Minor stocks: 17 reach 100**	**100**
Plaice (Iceland), Danish seine	**Main stocks: 3 reach 100** **Minor stocks: 15 reach 100, 1 does not reach 100**	**95**
Plaice (Iceland), Bottom trawl	**Main stocks: 3 reach 100, 1 reaches 80** **Minor stocks: 23 reach 100, 1 does not reach 100**	**95**
Plaice (Iceland), Nephrops trawl	**Main stocks: 3 reach 100, 3 reach 80** **Minor stocks: 15 reach 100**	**95**
Saithe (Iceland), Handline	**Main stocks: 1 reaches 100** **Minor stocks: 20 reach 100, 2 do not reach 100**	**95**
Saithe (Iceland), Longline	**Main stocks: 3 reach 100** **Minor stocks: 20 reach 100, 3 do not reach 100**	**95**
Saithe (Iceland), Gillnet	**Main stocks: 1 reaches 100**	**100**

	Minor stocks: 18 reach 100	
Saithe (Iceland), Danish seine	Main stocks: 3 reach 100, 2 reach 80 Minor stocks: 12 reach 100, 1 does not reach 100	95
Saithe (Iceland), Bottom trawl	Main stocks: 2 reach 100, 1 reaches 80 Minor stocks: 24 reach 100, 1 does not reach 100	95
Saithe (Iceland), Nephrops trawl	Main stocks: 2 reach 100, 3 reach 80 Minor stocks: 16 reach 100	95
Golden Redfish (Iceland / Greenland), Handline	Main stocks: 2 reach 100 Minor stocks: 19 reach 100, 2 do not reach 100	95
Golden Redfish (Iceland / Greenland), Longline	Main stocks: 3 reach 100 Minor stocks: 18 reach 100, 3 do not reach 100	95
Golden Redfish (Iceland / Greenland), Gillnet	Main stocks: 2 reach 100 Minor stocks: 16 reach 100	100
Golden Redfish (Iceland / Greenland), Danish seine	Main stocks: 4 reach 100, 2 reach 80 Minor stocks: 11 reach 100, 1 does not reach 100	95
Golden Redfish (Iceland / Greenland), Bottom trawl	Main stocks: 3 reach 100 Minor stocks: 24 reach 100, 1 does not reach 100	95
Golden Redfish (Iceland / Greenland), Nephrops trawl	Main stocks: 3 reach 100, 2 reach 80 Minor stocks: 16 reach 100	95
Tusk (Iceland / Greenland), Handline	Main stocks: 2 reach 100, 1 reaches 80 Minor stocks: 13 reach 100, 2 do not reach 100	95
Tusk (Iceland / Greenland), Longline	Main stocks: 3 reach 100 Minor stocks: 18 reach 100, 4 do not reach 100	95
Tusk (Iceland / Greenland), Gillnet	Main stocks: 3 reach 100 Minor stocks: 15 reach 100	100
Tusk (Iceland / Greenland), Danish seine	Main stocks: 4 reach 100, 4 reach 80 Minor stocks: 8 reach 100	95
Tusk (Iceland / Greenland), Bottom trawl	Main stocks: 4 reach 100, 2 reach 80 Minor stocks: 20 reach 100, 1 does not reach 100	95
Tusk (Iceland / Greenland), Nephrops trawl	Main stocks: 3 reach 100, 2 reach 80 Minor stocks: 14 reach 100	95

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