Vottunarstofan Tún ehf.
Sustainable Fisheries Scheme

Marine Stewardship Council Fisheries Assessment

ISF Iceland Anglerfish Fishery

Public Comment Draft Report

Report on the 1st assessment of the fishery

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

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Glossary

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

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

1. Executive Summary

1.1 Scope of the Assessment

This report presents the results of the assessment of anglerfish (*Lophius piscatorius*) caught by bottom trawl, *Nephrops* trawl, Danish seine, gillnet, anglerfish gillnet, lumpfish gillnet and longline 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:

- Rod Cappell: Team leader and expert responsible for Principle 3 issues;
- Dr. Leyla Knittweis: Expert assessor responsible for Principle 2 issues;
- Dr. Giuseppe Scarcella: Expert assessor responsible for Principle 1 issues;
- Lovísa Ó. Guðmundsdóttir MSc: Assessment Secretary on behalf of Vottunarstofan Tún.

1.3 Outline of the Assessment

Full assessment of the ISF Iceland anglerfish fishery was initiated in March 2017 and covers seven different fishing methods: bottom trawl, *Nephrops* trawl, Danish seine, gillnet, anglerfish gillnet, lumpfish gillnet and longline. 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. Eight conditions were raised and put to the Client who then submitted a plan of action to address those over the period of potential certification.

Preliminary Draft Report was submitted for Client review in August 2017. Subsequent to minor amendments, a Peer Review Draft Report was issued by the assessment team at the end of September and a Public Comment Draft Report was issued in early November.

1.4 Main Strengths and Weaknesses of the Assessed Fishery

Strengths:

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

Weaknesses:

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

- Some species may be at risk of unsustainable fishing mortality, now or in the future. Concerns remain in particular with regards to the interaction between (cod) gillnets and harbour seals, and lumpfish gillnet fishing and black guillemot, common loon, European shag, great cormorant, harbour seals and grey seals. In the particular case of harbour seal recent information on the status of the Icelandic population indicates that the species is not likely to be above biologically based limits. It could not be ascertained that there are measures in place which are expected to ensure that the lumpfish gillnet UoA does not hinder recovery and rebuilding of this species since bycatch of harbour seal in this fishery remain high. As a result the lumpfish gillnet fishery failed to secure a passing score for the secondary species outcomes status score (PI 2.2.1, scoring issue a).
- There is no local designation of ETP species, and no risk assessment has been conducted to assess the potential impact on species known to interact with the fisheries.
- There is currently no management strategy specifically implemented to manage by-catch of seabirds and marine mammals, and further improvements are required to improve the information available on bycatch rates of such species.
- Although some vulnerable habitats such as several known deep-water *Lophelia* coral reefs are protected, there is a need to further address fishing impacts on habitats (in particular from bottom trawling on coral gardens, areas with deep-water sponge aggregations, and unprotected *Lophelia* reefs), by evaluating the need for implementing protective measures. Mapping of benthic habitats has recently been given new impetus, but will take a considerable time to complete.

1.5 Overall Conclusion

The ISF Iceland anglerfish fishery reaches the minimum aggregate score of 80 for each of the three Principles and the minimum of 60 for each Performance Indicator for all UoAs except lumpfish gillnets (UoA6) which fails in Principle 2 . Six outline conditions were set for lumpfish gillnet (UoA6).

The average weighted scores for each of the three Principles were as follows:

Principle		***Score***
Principle 1 – Target Species		82.5
Principle 2 – Ecosystem	UoA1: Bottom Trawl (TB)	90.0
	UoA2: Nephrops Trawl (TN)	90.3
	UoA3: Danish Seine (SD)	92.0
	UoA4: Gillnet (GN)	83.3
	UoA5: Anglerfish gillnet (AGN)	82.7
	UoA6: Lumpfish gillnet (LGN)	fail
	UoA7: Longline (LL)	85.0
Principle 3 – Management System		92.9

1.6 Determination, Conditions and Recommendations

The assessment team recommends that the bottom trawl, Nephrops trawl, Danish seine, gillnet, anglerfish gillnet and longline units of the ISF Iceland anglerfish fishery are granted certification against the MSC Fisheries Standard as a well-managed and sustainable fishery. The team recommends that the lumpfish gillnet unit of the ISF anglerfish fishery is not granted certification since it fails to reach the minimum score of 60 for one of the Principle 2 Performance Indicators.

This draft determination is made provided the following eight conditions set are sufficiently addressed in a plan of action submitted by the Client (see also section 6 and Appendix 1.3). The Danish seine unit has no conditions. Two conditions were set for bottom trawl unit, one for *Nephrops* trawl unit, four for gillnet unit, five for anglerfish gillnet unit and four for longline unit. Furthermore, two recommendations were set for the whole fishery.

Condition 1 (PI 1.2.2)

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

Condition 2 (PI 2.2.1)

Harbour seal (gillnet, anglerfish gillnet) and harbour porpoise (anglerfish gillnet) must be shown highly likely to be within biologically based limits, or it must be demonstrated that there is a partial strategy of demonstrably effective mitigation measures in place such that the UoAs do not hinder recovery and rebuilding.

Condition 3 (PI 2.2.2)

A demonstrably effective partial strategy should be put in place such that the gillnet, anglerfish gillnet and longline fisheries do not hinder recovery and rebuilding of vulnerable out-of-scope secondary marine mammal and seabird species. This should include a regular review of the potential effectiveness and practicality of alternative measures to minimise fishery related mortality of unwanted catch of vulnerable species such as harbour seal, harbour porpoise, European shag, greater black-backed gull and fulmar, as well as regular reviews to ensure that the relevant measures are implemented as appropriate.

Condition 4 (PI 2.2.3)

By the second surveillance audit electronic logbook reporting provides some quantitative information on seabird and marine mammal bycatch that is both available and adequate to assess the impact of the UoA on main secondary species with respect to their status. The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals.

This condition is harmonised with that for ISF Iceland golden redfish, ISF Iceland saithe & ling, ISF cod and ISF halibut fisheries.

Condition 5 (PI 2.3.2)

A strategy should be put in place that is expected to ensure that gillnets and anglerfish gillnets do not hinder the recovery of ETP marine mammal and seabird species. This should include a regular review of the potential effectiveness and practicality of alternative measures to minimise fishery related mortality of unwanted catch of vulnerable seabird and marine mammal species, as well as regular reviews to ensure that the relevant measures are implemented as appropriate.

This condition can be implemented together with condition 3.

Condition 6 (PI 2.3.3)

By the second surveillance audit electronic logbook reporting provides some quantitative information on of seabird and marine mammal bycatch that is both available and adequate to assess the impact of the gillnet and anglerfish gillnet UoAs on ETP marine mammal and seabird species with respect to their status. The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals.

This condition can be implemented together with condition 4.

Condition 7 (PI 2.4.1)

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

This condition is harmonised with that for ISF Iceland haddock, ISF Iceland golden redfish and the ISF Iceland saithe & ling fisheries.

Condition 8 (PI 2.4.2)

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

With regard to the bottom trawl UoA, this condition is harmonised with that for ISF Iceland haddock, ISF Iceland golden redfish and the ISF Iceland saithe & ling fisheries.

With regards to Nephrops UoA, this condition is harmonised with that for ISC Icelandic cod and halibut.

Recommendation 1 (PI 2.2.3 Secondary species information – Bottom trawl, *Nephrops* trawl, Danish seine)

The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and *ad hoc* observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals. This recommendation applies to all gears except gillnets, anglerfish gillnets, lumpfish gillnets and longlines (where this issue is covered in Condition 4).

Recommendation 2 (Traceability)

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

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

2 Authorship and Peer Reviewers

2.1 Team Members and Assessment Secretary

Mr Rod Cappell, MSc., team leader. Primarily responsible for Principle 3 and RBF

Rod Cappell is Director with Poseidon based in Northern Ireland and has 20 years of experience in the maritime sector. Rod holds degrees in marine biology, marine resource development and a post-graduate qualification in environmental economics. Recent work includes exploring the economic impact of the CFP reform's discard ban. Rod has also worked on a range of European fisheries projects including a review of effort management regimes, Regulatory Impact Assessments and evaluations of EC policy, including CFP reform, cessation measures and EFF funding. Rod's MSC experience has included a variety of UK and European fisheries at pre-assessment and main assessment level. He is TL and P3 expert on the Icelandic Greenland halibut fishery.

His completed main assessments include Greenland lumpfish & halibut fisheries, Dutch flatfish fisheries, hand-raked cockles, Scandinavian *Nephrops* fisheries, whitefish in the Barents Sea and various mussel fisheries. His surveillance experience continues with these fisheries extends to Greenland shrimp & North Sea Haddock. Rod is also providing support and benchmarking for Fishery Improvement Plans in the UK and in China.

Dr. Giuseppe Scarcella, team member. Primarily responsible for Principle 1

Dr. Giuseppe Scarcella holds a laurea 110/110 in Biology (2001), PhD in Marine Biology and Ecology at the Università Politecnica delle Marche (2009) with Vincenzo Caputo. He served as contracted research scientist at the National Research Council (CNR), Institute of Marine Sciences (ISMAR) of Ancona since 2008. Following his degree he was offered a job as project scientist in several research programs about artificial reef and the impact of off-shore platform. During the years of employment at CNR-ISMAR he has gained experience in benthic ecology, fish assemblages of artificial structures, fisheries ecology and impacts of fishing activities, stock assessment, otholith analysis, population dynamic. During the same period, he attended courses of uni- and multivariate statistics and participated in field activity, both scuba diving and aboard fishing and research vessels.

His work as a researcher for the National Research Council (CNR), Institute of Marine Sciences (ISMAR) of Ancona, as well as him academic experience at the Polytechnic University of Marche, have given him considerable international field knowledge. He is currently participating in expert meetings and working groups which are organized under the auspices of the EC's Directorate General for Maritime Affairs (DGMARE), STECF, ICES, GFCM, and the FAO regional projects MedSudMed, Adriamed and Eastmed. In addition, He is collaborating with numerous scientific institutions in the horizontal framework project MAREA (scientific advice for the implementation of the Common Fisheries Policy in the Mediterranean Sea), in the framework of EMODNET-MedSea checkpoint and other DGMARE tenders recently started.

As a scientist at CNR-ISMAR, Dr Scarcella is responsible for the sampling design and statistical analyses of numerous research activities. In particular, I have worked as a project scientist on several research programs about fishery activities in the Mediterranean and Black sea, artificial structures and their impact on the marine environment. In the framework of such activities I have gained experience in stock assessment, management plans, benthic ecology, fish assemblages of artificial structures, analysis of stomach contents, fisheries ecology and the impacts of fishing activities. Moreover, during his employment at ISMAR-CNR he worked as part of a team of scientists operating within different fields of marine biology, including population dynamics, taxonomy and fisheries as well as with physical oceanographers and fisheries technologists. The application of EAF principles to fisheries management have been at the core of these collaborations.

Since the beginning of 2010 Dr Scarcella has moved to Cyprus, where he is collaborating as consultant with the private sector (AP Marine Environmental Consultancy Ltd), working on DCF data collection, marine bio-invasions and the implementation of the Marine Strategy Framework Directive. This allowed him to extend his work experience on the eastern part of the Mediterranean and also to improve my skill in working in international/multicultural projects and environments. Dr. Scarcella has over five years' experience in the fisheries sector related to the tasks under his responsibility, and has passed MSC team leader training.

Dr. Leyla Knittweis, team member. Primarily responsible for Principle 2

Dr. Leyla Knittweis is a resident academic at the Department of Biology of the University of Malta with over ten years of experience working as a fisheries biologist. She holds a Bachelor of Science in Marine Biology (Swansea, UK), a Master in Science in Coastal Management (Newcastle upon Tyne, UK) and a PhD in Biology from Bremen University (Bremen, Germany). Her research interests include population dynamics, fisheries biology, environmental impacts of fishing, and resource management.

Leyla has worked as scientific consultant for numerous clients including the Food and Agriculture Organisation (FAO) of the UN, the European Fisheries Control Agency (EFCA), and the European Commission; as Fisheries Advisor for Government of Malta; and as post-doc scientific researcher at the Centre for Tropical Marine Ecology in Bremen (Germany). She has participated in numerous research projects, including more recently the projects CREAM (ecosystem approach to fisheries management), GAP II (bridging the gap between scientists and fisheries stakeholders), MESMA (marine spatial planning), MAREA-MEDISEH (Mediterranean sensitive habitats), LIFE BaĦAR for N2K (benthic habitat research for marine Natura 2000 site designation in Malta's Fisheries Management Zone), and MANTIS (marine protected areas: networks for enhancement of sustainable fisheries in EU Mediterranean waters).

Leyla has been a regular participant at the meetings of the European Commission's Scientific Technical and Economic Committee for Fisheries (STECF) since 2009, contributing to expert working groups addressing topics including fisheries data collection, Mediterranean stock assessments, review of scientific advice, the development of an ecosystem approach to fisheries, the implementation of the landing obligation, and technical fisheries management measures. She chaired the STECF expert working group assessing balance between fishing capacity and opportunities for the EU fishing fleet in 2014-2016, and is a permanent STECF Committee member since April 2016. Leyla has authored numerous scientific articles and scientific reports. She has over ten years' experience in the fisheries sector related to the tasks under her responsibility, and has passed MSC team member training

Lovísa Ó. Guðmundsdóttir, M.Sc. Assessment Secretary

Lovísa Ó. Guðmundsdóttir is an assessment coordinator for Tún's fisheries certification program. Ms. Guðmundsdóttir has a university degree (M.Sc.) in fisheries biology, has passed the MSC online training seminar, and has participated in several of Tún´s assessment works as an observer and as an assessment secretary.

Further details of the team members and assessment secretary can be obtained from Tún and from downloading the announcement of the assessment: https://fisheries.msc.org/en/fisheries/isf-iceland-anglerfish/@@assessments

2.2 Use of Risk Based Framework

The Risk Based Framework (RBF) was used in this assessment for the scoring of Performance Indicator 2.2.1 (Secondary species outcome) for the anglerfish gillnet unit of assessment (UoA5). The use of RBF was also announced for PI's 2.3.1 (ETP species outcome) and 2.4.1 (habitats outcome) but the team later concluded that sufficient information was available for those two PI´s and that RBF would therefore not be needed. Stakeholder notice of the eventual application of RBF was issued.

The team members are experienced in the use of the RBF and several of them, including the team leader, have completed the MSC online training on the use of RBF.

2.3 Peer Reviewers

The following experts were appointed peer reviewers of this assessment report.

William Brodie
William (Bill) Brodie is an independent fisheries consultant with previously, a 36-year career with Science Branch of Fisheries and Oceans Canada (DFO, Newfoundland and Labrador Region). He has a BSc in Biology from Memorial University of Newfoundland and Labrador. For the last twelve years with DFO he worked as Senior Science Coordinator/Advisor on Northwest Atlantic Fisheries Organization (NAFO) issues, serving as chair of the Scientific Council of NAFO and chairing 3 of its standing committees. As a stock assessment biologist, he led assessments and surveys for several flatfish species and stocks, including American plaice, Greenland halibut, yellowtail and witch flounders. These include the largest stocks of flatfish in the NW Atlantic. He also participated in assessments of flatfish, gadoid, and shrimp stocks in the NE Atlantic and North Sea. Bill has participated in over 30 scientific research vessel surveys on various Canadian and international ships, and he has over 200 publications in the scientific and technical literature, primarily on flatfish stock assessment. He has been involved with fishery managers and the fishing industry on a variety of issues, including identification of ecologically sensitive areas, and developing rebuilding plans for groundfish under a Precautionary Approach. Since retirement from DFO in 2014, Bill has been contracted to serve as an assessor on several FAO-based Responsible Fisheries Management certification assessment and surveillance audits for Alaskan stocks including Pacific cod, halibut, sablefish, pollock, and flatfish. He has also provided peer review for an MSC certification assessment for a redfish stock on the Grand Banks.

Tristan D. Southall
Tristan is an experienced marine and fisheries industry analyst with a range of professional experience in questions of sustainable marine resource exploitation, working with a wide spectrum of stakeholders but with particular focus and expertise on the management and evaluation of capture fisheries, both in the UK, EU and internationally. His consultancy expertise includes project management, fisheries liaison, feasibility studies, stakeholder consultation, policy analysis and management advice and draws on an extensive understanding of fishery management and operations, as well as strong experience and understanding of a number of other marine industries – notably aquaculture. This focus on management is supported by a solid understanding and appreciation of marine ecosystems and a practical understanding of working at sea. Tristan has considerable professional experience of the EU Common Fisheries Policy and has coordinated EU fisheries training and promotion activities – covering all aspects of sustainable fisheries management and control. In addition, Tristan has excellent understanding of a range of non-EU fishery management systems in countries as diverse as Turkey, Suriname and the Gambia, meaning that his expertise and experience is applicable to a wide variety of situations, enabling valuable comparative analysis. In recent years Tristan has put his skills and extensive fisheries management experience to good use in undertaking a number of MSC sustainability assessments of fisheries around the world and is increasingly serving as team leader on assessment teams. As a result, he has a sound understanding of MSC Fisheries Assessment Methodology as well as it's practical application.

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

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

Units of Assessment (7)	
Fish stock	Anglerfish (*Lophius piscatorius)* in ICES subarea 5.a
Location of Fishery	FAO Statistical Area 27 / ICES 5.a; Icelandic Exclusive Economic Zone
Management	Ministry of Industries and Innovation
Fishing Methods	UoA1: Bottom Trawl (TB)
	UoA2: Nephrops Trawl (TN)
	UoA3: Danish Seine (SD)
	UoA4: Gillnet (GN)
	UoA5: Anglerfish gillnet (AGN)
	UoA6: Lumpfish gillnet (LGN)
	UoA7: Longline (LL)
Fishery Practices	All registered vessels 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, Danish seine, Gillnet, anglerfish gillnet, lumpfish gillnet and longline that fish anglerfish in Icelandic waters.
Proposed Units of Certification (6)	
Fish stock	Anglerfish (*Lophius piscatorius)* in ICES subarea 5.a
Location of Fishery	FAO Statistical Area 27 / ICES 5.a; Icelandic Exclusive Economic Zone
Management	Ministry of Industries and Innovation
Fishing Methods	UoA1: Bottom Trawl (TB)
	UoA2: Nephrops Trawl (TN)
	UoA3: Danish Seine (SD)
	UoA4: Gillnet (GN)
	UoA5: Anglerfish gillnet (AGN)
	UoA6: Lumpfish gillnet (LGN) ***NB: This unit is not proposed for certification***

	UoA7: Longline (LL)
Fishery Practices	All registered vessels 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 targeting the anglerfish stock and/or that are incidentally catching anglerfish in other MSC certified fisheries within Icelandic jurisdiction.

The UoAs are the same multispecies fisheries as other MSC certified fisheries, including the recently certified Icelandic cod, haddock, halibut, Atlantic wolffish, plaice, blue ling and tusk. In fact anglerfish are only directly targeted by anglerfish gillnets and the species is a minor by-catch species for the other UoAs under assessment (percentage of total catch in 2011-2016: 0.06% bottom trawlers; 3.85% Nephrops trawlers; 0.54% Danish seine; 0.22% (cod) gillnets; 0.23% lumpfish gillnets; 0.02% longlines). As such it is clear that the UoAs have the same environmental impacts and are subject to the same management system as other MSC certified fisheries which concern major target species such as cod. Although several out-of-scope species are affected by the fisheries (see section 3.4.6) there are no UoAs which have main catches that are considerable (i.e. more than 10% of total catch), and there are no national or international requirements set catch limits for the ETP species which were identified in the present assessment (see section 3.4.7).

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

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

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

Iceland Sustainable Fisheries (ISF) ehf. confirms its willingness to share certificate for MSC certification of the ISF Iceland anglerfish fishery, including any further potential extension of the scope of that certificate. Anglerfish will be eligible for marketing with reference to the certificate, provided the fish is caught, supplied and/or sold to Iceland Sustainable Fisheries ehf, and/or its authenticated certificate sharers. Any Icelandic holders of permits, issued by the Icelandic Directorate of Fisheries, for the fishing of anglerfish and/or processors and/or traders of this species of fish derived from the above fishery, are invited to apply to ISF ehf. for the sharing of the certificate and its *potential scope extension. Applicants will be eligible to enter into certificate sharing agreement with the ISF ehf. on the basis of:*

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

3.1.2 Final Units of Certification

(PCR ONLY)

The PCR shall describe:

a. The UoC(s) at the time of certification.
b. A rationale for any changes to the proposed UoC(s) in section 3.1©.
c. Description of final other eligible fishers at the time of certification.
d. (References: FCR 7.4.8-7.4.10)

3.1.3 Total Allowable Catch (TAC) and Catch Data

Table 2: TAC and Catch Data for anglerfish.

<table>
<tr><td>TAC</td><td>Year</td><td>2016/2017</td><td>Amount</td><td>711 t</td></tr>
<tr><td>UoA share of TAC</td><td>Year</td><td>2016/2017</td><td>Amount</td><td>711 t</td></tr>
<tr><td>UoC share of total TAC</td><td>Year</td><td>2016/2017</td><td>Amount</td><td>711 t</td></tr>
<tr><td rowspan="2">Total green weight catch by UoC</td><td>Year (most recent)</td><td>2015/2016</td><td>Amount
Bottom trawl:
Nephrops trawl:
Danish seine:
Gillnet:
Anglerfish gillnet
Lumpfish gillnet
Longline:</td><td>909t
140t
208t
39t
23t
488t
1t
10t</td></tr>
<tr><td>Year (second most recent)</td><td>2014/2015</td><td>Amount
Bottom trawl:
Nephrops trawl:
Danish seine:
Gillnet:
Anglerfish gillnet
Lumpfish gillnet
Longline:</td><td>1073t
123t
253t
58t
53t
576t
0t
10t</td></tr>
</table>

3.2 Overview of the fishery

Anglerfish is taken as part of a multispecies demersal fishery and a recently developed gillnetting fishery targeting anglerfish. Demersal fisheries have a long history in Iceland, but mechanisation began with the first trawler in Iceland arriving in 1905, replacing the decked sailboats. During much of the 20th century, British and German vessels dominated the foreign demersal fisheries and Norwegian vessels the pelagic fisheries. However, most foreign fleets were excluded from Icelandic waters as the exclusive economic zone was extended from 4 miles in 1952 to 200 miles in 1975. Foreign vessels continue to operate under licence,(i.e. Faroese vessels) but take a very small proportion of the anglerfish catch.

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. Anglerfish catches are shown in table 2 and figure 3-1.

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

Historically the anglerfish catch by bottom trawlers contributed the largest portion of the total catches, in some years prior to 1990 reaching 60% of the total landings. In the 1990s the landings from bottom trawlers declined significantly within a period of 5 years, and have been just above 40% of the total landings in the last decade. The proportion of catch from (cod) gillnets has declined over the same time period and is now only half of what it was in the 1980s. From 2011-2016 the targeted anglerfish gillnet fishery has grown and accounted for 69% of the catch in 2015/16.

The most important fleets in Iceland are:

- Large and small trawlers using demersal trawl. This fleet is the most important one fishing cod, haddock, saithe, and *Nephrops*, and operates year around mostly outside 12 nautical miles.
- Boats (< 300 GT) using gillnet. These boats are mostly targeting cod but haddock and a number of other species are also targeted. Around 10 gillnet vessels are targeting anglerfish. This fleet is mostly operating within a couple of miles from shore.
- Boats using longlines. These boats are both small boats (< 10 GT) operating in shallow waters as well as much larger vessels operating in deeper waters. Cod and haddock are the main target species of this fleet.
- Boats using jiggers. These are small boats (<10 GT). Cod is the most important target species of this fleet with saithe of secondary importance.
- Boats using Danish seine. (20—300 GT) Cod, haddock and variety of flatfishes, e.g. plaice, dab, lemon sole and witch are the target species of this fleet.

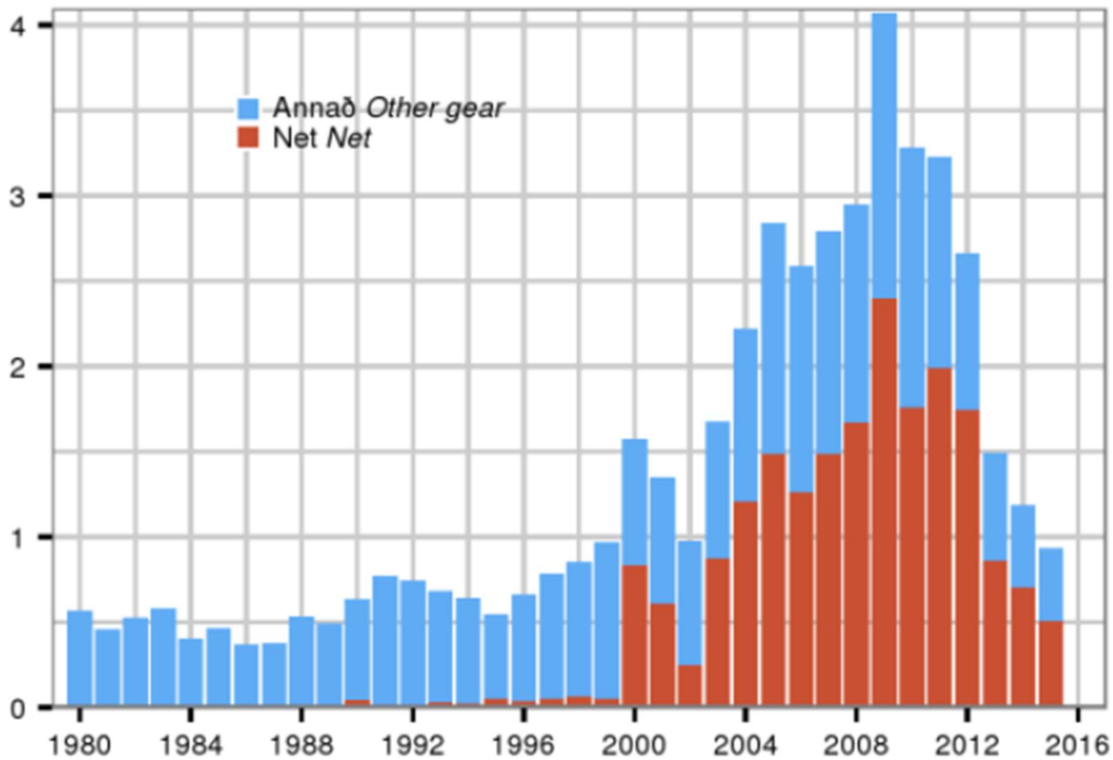


Figure 3-1. Landings of Iceland anglerfish in kilotonnes. Source: MFRI, 2016.

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

Gear category	*Number of vessels*
Bottom trawl	71
Nephrops trawl	12
Danish seine	44
Gillnet	110
Anglerfish gillnet	15
Lumpfish gillnet	244
Longline	256

Gear types

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

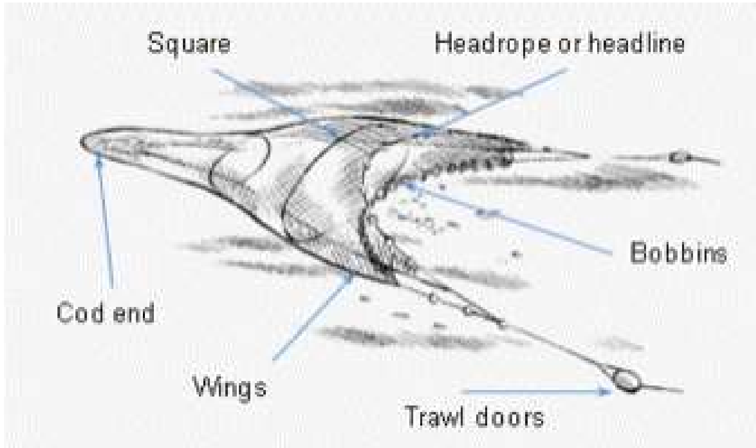


Figure 3-2. Sketch of a trawl.

Longlines 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 gear that the fish are usually alive when the line is hauled in the boat.

Gillnets are mainly used by small to intermediate sized boats. The nets are rectangular and kept vertical by floaters on top and lead-weights at the bottom. Each net is about 50 m long, but a few (often around 10) nets are tied together and a number of such units placed by each ship. The nets soaking time is usually one night. Besides cod gillnets, many specialized versions of bottom gillnets are used, differing in mesh size based on their target species. These are described further in

Table 4)

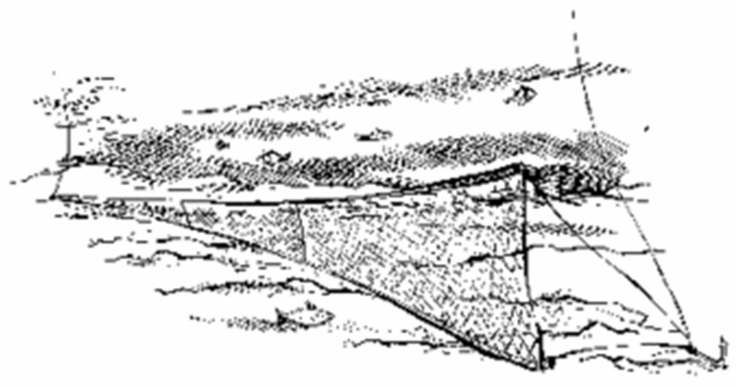


Figure 3-3. Sketch of a gillnet.

Some items regarding gillnets for Anglerfish are regulated in Rgl nr 923/2010, but others are general practice[1].

Regulated:

- Mesh sizes may not be lesser than 305mm, and almost none are using larger meshes.
- The length of nets may not be longer than 100 fathoms (183m) of a unassembled net.
- When the net have been constructed on lines it is usually ~ 55m long, making the hanging ratio near 0,3.
- The floating line is regulated to be not with more buoyancy than 13 g/m, making it almost impossible for the net to stand up from the bottom.
- A number of nets allowed to use are regulated to be not more than 100 nets in sea per person on board on that fishing boat but never more than 600. Fewer nets must be used if a fishing boat is setting another type of gillnets in the sea (cod-nets).

Practiced:

- The height of nets are almost in all cases 14 meshes some few cases 18 meshes.
- Location of fishing grounds where gillnets are deployed, including differences in depth of deployment and soaking time;

Location and season

The main areas fished have changed in recent years. From 2000 to 2007 most of the monkfish gillnet fishery occurred in the south of Iceland, but since 2008 to date most of the fishing grounds are west of Iceland and are moving further to the north (*Figure 3-4*).

The depth intervals for setting monkfish nets is from ~20 to 200 meters when the average depth are in most years between near 80 meters down to ~60 meters in the last couple of years. The soaking time last years has been near 3,5 nights (counted in numbers of the night in the sea).

In most of the last years very little anglerfish gillnetting occurs in January to May. The main fishery is usually late summer and into the winter.

[1] Haraldur Arnar Einarsson, MFRI, pers comm. November 2016

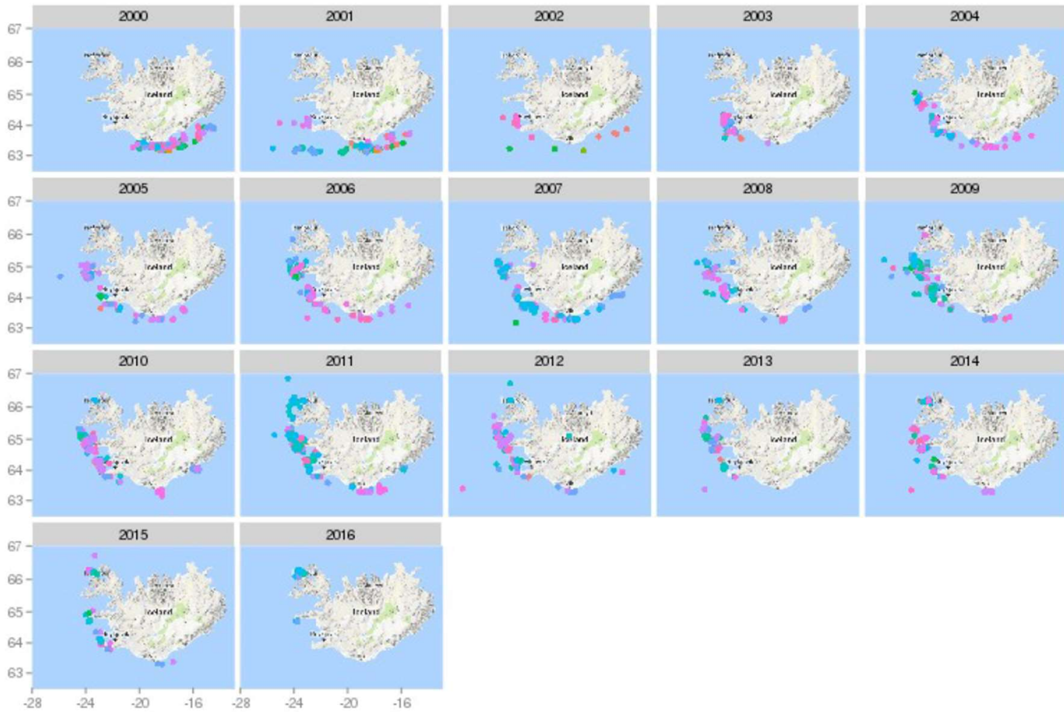


Figure 3-4 Location of Anglerfish gillnet catches 2000-2016 (source: MFRI)

Table 4: Differences in gillnet gear characteristics

Issues	***Anglerfish gillnet****	***Cod gillnet***
Mesh size**	The mesh size is minimum 12 inches (= 30 cm).	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).
Position in water column	Floating line regulated to be no more buoyant than 13 g/m, so net does not stand up from the bottom. It sits on the bottom and goes up ~1 meters, bulging in middle.	The nets are rectangular and kept vertical by floaters on top and lead-weights at the bottom (www.fisheries.is).
Setting depth	Set close to shore in ~20 to 200 m depth Main catch 60-80 m) but they can go down to 70 fathoms (130 m)	Cod is caught all around Iceland and mostly at depths of 100-250 m (www.fisheries.is).
Soaking time	3-5 nights (MFRI pers. communication).	Market/quality require nets usually are only soaking for no more than 24 hours, resulting in a fresher product.
Season	Usually late summer and into the winter. limited fishery in January to May (MFRI pers. communication).	Mainly during the late winter season when the cod is migrating to the spawning grounds. Begin in January, reach a peak in March and end in May (www.fisheries.is).

*Viktor Jónsson MFRI pers. communication
**Lumpfish nets for female are required to be no smaller than 267 mm mesh and 178 mm to 203 mm for males.

3.3 Principle One: Target Species Background

Most of the information utilized in the present chapter as well as in the Principles 1 scoring tables in Appendix 1.1 is sourced from Rajudeen (2013) and Thangstad, et al. (2002).

3.3.1 The biology of anglerfish (*Lophius piscatorius*)

The genus *Lophius* is descended from a common ancestor of *Lophius*, a monotypic genus distributed to the western Pacific and Indian Ocean, by the closure of the Tethys Sea (Farina et al, 2008). Palaeo-oceanographic events in the Mediterranean Sea permitted the emergence of European species, *Lophius piscatorius* and *L. budegassa* (Farina et al, 2008).

L. piscatorius shows faster growth rates than *L. budegassa* (Farina et al., 2008), which is completely absent from the Icelandic EEZ. For *L. piscatorius*, the accuracy in age determination is poor and needs to develop. Furthermore, basic datasets are incomplete and need to address more intensively length composition, abundance index, and size distribution of large populations. Taking into account such uncertainties the approach used to assess the status of the stock (survey based assessment) in Icelandic EEZ is appropriate.

Males typically mature at a smaller size. Laurenson et al (2001) demonstrates a strong linear relationship between average length and age of anglerfish and depth around Shetland which supports existing data on this relationship by Duarte et al (1997). For *L. piscatorius*, length-at-age increased in a mainly linear pattern until ages 11-15 (Farina et al, 2008; Duarte et al, 2007; Landa et al, 2007). In addition, female anglerfish mature at a larger size and older age than males (Farina et al, 2008; Laurenson et al, 2001). This phenomenon helps drive the sex ratio with an increased ratio of large female anglerfish as the fish become larger. Females attain greater lengths and age than their male counterparts (Farina et al, 2008). The L_{inf} (asymptotic maximum) for females ranged from 110-160 cm and for males from 68-129 cm, while age estimates were 25 and 21 years, respectively (Farina et al, 2008). Laurenson et al (2001) attributed the small proportion of large, old, mature females in the anglerfish population to exploitation from intense, targeted fishing pressure that has reduced the proportion of large and mature individuals in Scotland's Anglerfish population.

Species of the *Lophius* genus often populate in bathydemersal continental shelves and upper slopes down to depths greater than 1000 m, mainly on sand and gravel substrata (Farina et al, 2008). Within their life histories, eggs and larvae normally reside in the water column and progress to benthic habitats as juveniles and adults (Farina et al, 2008; Hislop et al, 2001). Despite the relatively well-documented life histories of *L. piscatorius*, little is known about the maturation, reproduction, spawning time or location, or the larval phase (Farina et al, 2008).

The genetic sequence of populations is little known causing difficulty in distinguishing independent species of the *Lophius* genus (Farina et al, 2008). The *L. piscatorius* shows limited genetic structure and low genetic variation (Farina et al, 2008). However, *L. piscatorius* was observed having high levels of microsatellite polymorphism from populations in the Cantabrian Sea (Blanco et al, 2006). In contrast, O'Sullivan et al (2006) reported an absence of spatial and temporal genetic differentiation in *L. piscatorius*. The lack of genetic variability between *Lophius* species may indicate unrestricted gene flow over large areas (Farina et al, 2008). Hislop et al (2001) suggest that the unrestricted gene flow is mediated by a broad dispersal capacity via an extensive larval pelagic phase, namely passive transport across substantial distances. In addition, large migrations are not wholly-restricted to mature anglerfish. Laurenson et al (2005) documented displacements as far as 876 km, from the Shetland Isles to southeast Iceland, by an immature female. Hislop et al (2000) reported vertical displacements of immature and mature L. piscatorius in the Northeast Atlantic, from as deep as the seabed to the near surface. The displacement has been related to spawning or feeding patterns, however the cause is unknown.

Anglerfish are classified as opportunistic, non-selective feeders that are typically sit-and-wait predators (Farina et al, 2008). The main predation method is luring prey by raising and moving the *illicium* (Farina et al, 2008). The *L. piscatorius* exhibit a diet that is mainly size- dependent. The prey size selection has largely been attributed to the size and morphology of the mouth as much as visual or sensory factors (Gordoa & Macpherson, 1990). Small juvenile anglerfish comprise a considerable proportion of their diet with the consumption of invertebrates; however, this disproportionate consumption of invertebrates decreases with age (Farina et al, 2008). A wide variety of pelagic and benthic fish prey constitutes the diet of larger juveniles and adults, with larger Anglerfish typically consuming larger prey (Farina et al, 2008). Moreover, diets are not dependent solely on developmental processes, but also predator size and geographic area (Laurenson & Priede, 2005; Crozier, 1985). Anglerfish are ambush feeders and naturally there is a seasonal variation in diet in accordance with the spatio-temporal patterns in prey availability and abundance (Laurenson & Priede, 2005; Crozier, 1985). Norway pout (*Trisopterus esm*arkii) is the main prey species for *L. piscatorius* in northern European waters, while blue whiting (*Micromesistius poutassou*) remains a predominant prey species in southern European waters (Farina et al, 2008). The *L. piscatorius* has demonstrated a greater incidence of feeding activity in the autumn and winter (Farina et al, 2008).

According to Laurenson & Priede, 2005, cannibalism is quite common in anglerfish while the main predators are European conger and cod.

A significant amount of energy is allotted for reproduction evidenced by the gonad mass of a mature female in spawning state which forms up to 35-50% of total body mass (Armstrong et al, 1992; Yoneda et al, 2001; Walmsley et al, 2005). Long ribbons of gelatinous matrix, inside of which houses mature eggs in separate chambers, comprises the ovarian structure (Armstrong et al, 1992; Alfonso-Dias & Hislop, 1996). The long ribbons, which can be greater than 10 m long, may contain greater than a million eggs in a ripe female before spawning buoyant gelatinous egg masses (Armstrong et al, 1992; Yoneda et al, 2001). Despite fertilization being an external process, observations of the phenomenon in the Atlantic are poorly understood. It has been reported that *L. piscatorius* produces a single batch during the spawning season, which lasts from November to May (Farina et al, 2008).

However, even the timing of spawning period has been contested displaying an array of possible ranges: November-May (Alfonso-Dias & Hislop, 1996); January-June (Duarte et al, 2001); and May-June (Laurenson et al, 2001; Quincoces et al, 1998). It was demonstrated that while eggs and larvae are pelagic, the pelagic phase for *L. piscatorius* lasts for only four months after hatching (Hislop et al, 2001). The early development stage requires further research to address questions about the pelagic larval phase, mortality, and the survival of recently settled juveniles.

Further research is required on maturation processes including: the function of the gelatinous veil, spawning behaviour, spawning areas, and fecundity. Much information pertaining to the physiological, genetic, ecological, and abundance of anglerfish is incomplete or not understood and requires further research. The abundance of historical datasets with respect to populations or size and composition data is not readily available.

Status of the stock

Three stocks have been defined for *L. piscatorius* because sufficient differences between populations from western and southern European waters have been identified; however, there is no significant genetic disparity to encourage stock separation for *Lophius* species in the North Atlantic (ICES, 2006; Duarte et al, 2004).

The stock size of anglerfish has been increasing since 1998 until 2011 while extending its distributional range to northwestern and northern Iceland (Solmundsson et al., 2007). The stock biomass is decreasing since 2012 and in 2015 is at the same level observed in 2003.

Icelandic waters above 400 m with temperatures exceeding 5°C has doubled since 1989, facilitating thriving conditions for anglerfish which are typically not found in bottom waters with temperatures below 5°C (Solmundsson et al., 2007). The co-occurrence of expanding anglerfish populations with rising sea temperature may have been beneficial to juvenile Anglerfish which are exhibiting greater recruitment and larger year classes since 1998 (Solmundsson et al., 2007). It remains unclear if portions of the Icelandic Anglerfish stock originate from far distances via passive larval drift or active migration by larger mature anglerfish. However, it is understood that since 1998 local recruitment has contributed far greater to the growth of the population than the potential influence of migration (Solmundsson et al., 2007). Small changes in hydrographical conditions can greatly influence distribution and fish community composition as exemplified by the effect of warming waters on anglerfish species richness and distribution in Iceland (Solmundsson et al., 2007).

The effect of environmental or climate change on Icelandic fish stocks is not unprecedented. The warm period of the mid 1920s and 1960s saw an increased incidence of cod, capelin, and herring spawning in the north of Iceland (Solmundsson et al., 2007). In addition to affecting spawning locations, environmental change affected the migration patterns and feeding areas of herring by extending it north of Iceland (Solmundsson et al., 2007).

From 1985-1997, anglerfish was mainly caught off Iceland's southern coast in low amounts (Solmundsson et al., 2007). Since 2004, there has been an increased amount of Anglerfish catch in the northwest coast of Iceland and erratic catch amounts on Iceland's northern coast. This supports the trend of increased abundance of mid-latitude species corresponding with the decline of cold-water species in Icelandic waters (Bjornsson & Jonsson, 2004).

The stock biomass index for anglerfish has been stable over recent years at approximately 2500 t, with a record high biomass index of 4000 t from 2002-2005 (Solmundsson et al., 2007). From 1985-1997, recruitment of anglerfish was very low; however, 1998-2006 saw a higher abundance index as well as a greater proportion of 1 year and 2 year fish (Solmundsson et al., 2007). The progress in recruitment facilitated an increase in stock biomass index.

According to the Icelandic Groundfish Survey (IS-SMB), the majority of anglerfish catch occurs in waters between 6-9°C, while a minority of the catch occurs in waters below 5°C (Solmundsson et al., 2007). The implication of a net west- and northward drift of eggs and larvae along predominant ocean currents is supported by IS-IMB reporting that 1 year anglerfish typically have a more westerly and northerly distribution, than older fish (Solmundsson et al., 2007). However taking into account the northward movement of the stock observed in the last years, it is not clear if also the larval dispersal has changed. This is important because it may catalyze the expansion of the Anglerfish nursery area with the normal westerly distribution of 1 year Anglerfish (Solmundsson et al., 2007). In addition to the expansion of the Anglerfish nursery, higher ocean temperatures and greater salinity have provided greater habitat availability in the north. Solmundsson et al (2007) estimates that 100% more habitats have been provided for anglerfish in Iceland in comparison with that of 1985-1989.

Research has aimed to gain knowledge of life history, population structure, and effects of anglerfish on ecosystems in recently colonized habitats along the west and northern coasts of Iceland (Nebel et al, 2011). Studies have been conducted on anglerfish caught as by-catch in lumpfish vessels; effects of new predation pressures by anglerfish in northwestern Iceland; and disproportionate sex ratio in anglerfish landings (Nebel et al, 2011). The research revealed that lumpfish, gadidae, and cod experience significant predation from anglerfish, despite their dynamic feeding strategies (Nebel et al, 2011). In addition, it revealed a higher proportion of female anglerfish in landings (Nebel et al, 2011).

Although the recent rapid growth in anglerfish abundance and distribution in Iceland has largely been attributed for the most part to the effects of climate-induced warming and more saline waters, it remains unclear if the anglerfish population growth is the result of secondary effects such as habitat and prey availability (Solmundsson et al., 2007). Similarly, is not clear if the decline observed is also due to the environmental conditions.The change in spatial distribution of anglerfish can be generally inferred from the spatial distribution of catches observed in 2011 and in 2015 (Figure -5).

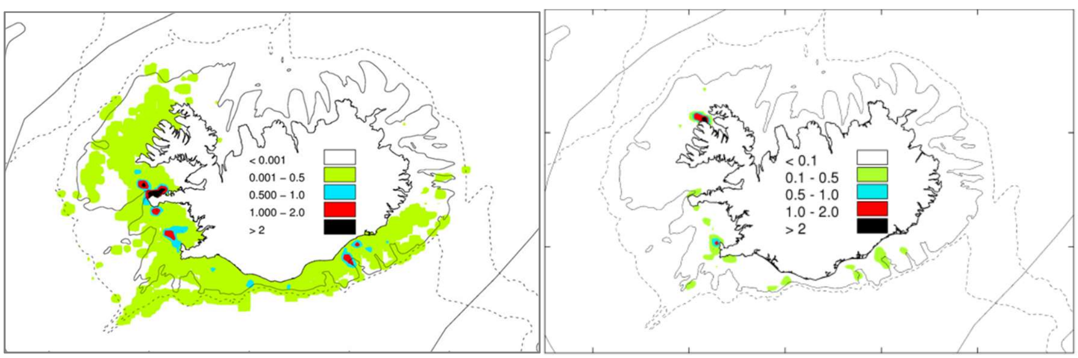


Figure 3-5: Anglerfish fishing grounds in 2011 (left) and 2015 (right; t/nm^2), all gear combined, dark areas indicate highest catches. Source: http://www.hafro.is/Bokasafn/Timarit/fjolrit-185.pdf

Anglerfish spawns in deep waters south of Iceland. The eggs and larvae then drift to shallower waters, settling on the bottom when 5 to 9 cm long. It grows to 15 to 20 cm in length the first year. The largest anglerfish caught in Icelandic waters was 155 cm long and 35 kg gutted. The anglerfish grows rapidly during its first years of life and reaches sexual maturity at the age of 4 to 6 and 40 to 80 cm in length, males younger and smaller. Therefore, is reasonable to define the age at maturity around age 4 and using the Rikhter and Efanov (1977) empirical equation a corresponding natural mortality of 0.4.

Anglerfish catches were rather stable at around 500 tonnes per year from 1965 until 1997. These were mostly bycatch in other fisheries, especially lobster fisheries. Since that time, catches have increased to the current level of 2,500 tonnes. This is because the stock is growing and therefore bycatch is higher and direct fisheries have also evolved using special gillnets. Most of the direct fisheries are in the autumn until mid winter, when the bulk of the stock migrates to deeper waters to spawn. A few are left and caught as bycatch in other fisheries. In the last years cathes decline toward less than 1,000 tonnes.

Taking into account the last evaluation of the status of anglerfish in Iceland from MFRI (Figure 5), it is possible to observe that the biomass index was high in 2005–2011 compared to previous years, but has since then decreased remaining above the levels observed in the period 1984-2000. 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 reduced in the last few years.

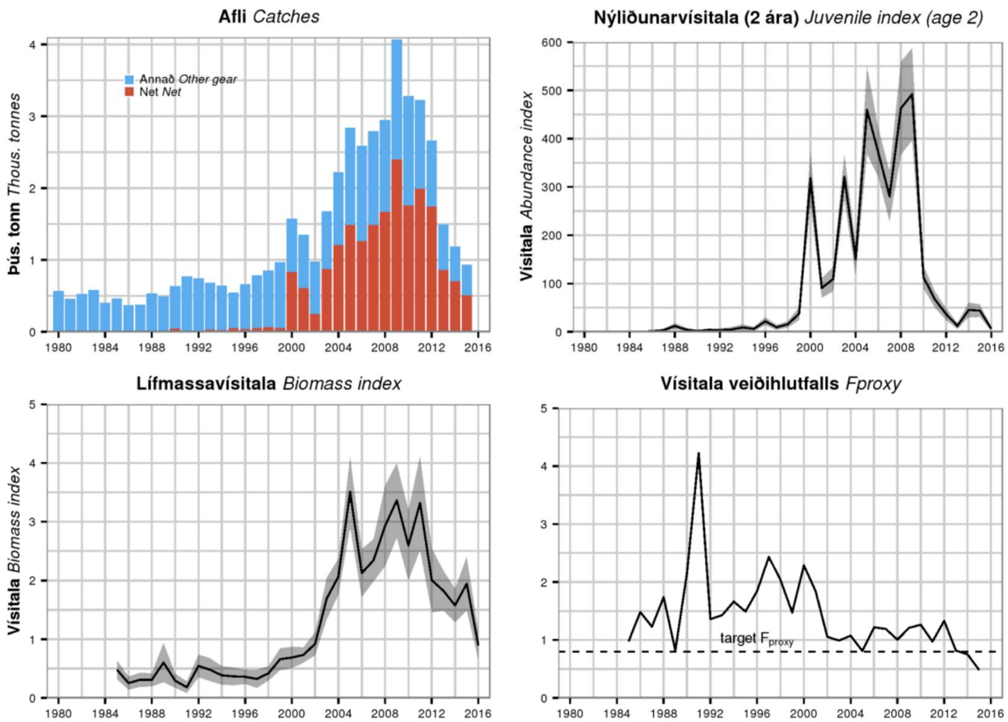


Figure 5-6: Anglerfish. Catch by gear type, juvenile (2-yr old) and biomass indices, and Fproxy (catch/survey biomass index). Source: http://www.hafro.is/Bokasafn/Timarit/fjolrit-185.pdf

The advice follows the ICES framework for stocks where reliable stock biomass indices are available, but analytical age-length based assessment is not possible (Category 3 stocks; ICES, 2012). IS-SMB biomass index of anglerfish 40 cm and larger, along with catch, is used to calculate F_{proxy} (catch/survey biomass). IS-SMB survey covers the geographical distribution of the fisheries, and according to MFRI provides an accurate estimation of the anglerfish abundance in the Icelandic EEZ. Moreover, according to ICES WGBEAM, a pilot inshore beam trawl survey started in 2016 and is going to be improved in terms of number of stations in the future (ICES, 2016a). MFRI reported that the beam trawl survey could provide accurate estimates of anglerfish especially in the in-shore areas.

Table 5: Anglerfish. Recommended TAC, national TAC, and catches (tonnes).
Source: http://www.hafro.is/Bokasafn/Timarit/fjolrit-185.pdf

Fiskveiðiár *Fishing year*	Tillaga *Rec. TAC*	Aflamark *National TAC*	Afli *Catches*
2010/11	2500	3000	3376
2011/12	2500	2850	3006
2012/13	1500	1800	1930
2013/14	1500	1500	1398
2014/15	1000	1000	1080
2015/16	1000	1000	909
2016/17	711	711	

The target F_{proxy} was defined as 80% of the mean F_{proxy} from the reference period of 2001–2015. The advice is based on multiplying the target F_{proxy} value to the most recent index value (Source: http://www.hafro.is/Bokasafn/Timarit/fjolrit-185.pdf). Recruitment has been low in recent years and juvenile indices indicate that the 2008–2014 year classes are small. The index of fishable biomass has decreased since 2011. The recommended catch levels are expected to decline in coming years.

Annual landings of anglerfish in Icelandic waters have steadily decreased since peaking in 2009. About half of landings are caught by gillnets and the other half mostly in demersal seine and trawls as bycatch. In recent years, most of the landings come from off Iceland's west coast.

In the last four fishing season the recommended TAC by MFRI has been set as the national TAC, that has been respected by the fisheries, with the only exception of 2014/15 (Table 5). In the previous period the catches were higher than the national TAC, mainly because of the migration pattern that made the stock more abundant in areas (northwestern) where the fisherman did not have enough quota in that period (see next section).

3.3.2 Anglerfish management in Iceland

Similar to other fishery resources, the Icelandic Ministry of Industry and Innovation (MII) is responsible for the management of anglerfish exploitation. The Marine and Freshwater Marine Research Institute of Iceland (MFRI) carries out MII directives, namely: to conduct research on Iceland's living resources and marine environment; provide guidance to the government on catch levels and conservation measures; and to raise awareness and inform the government, fishery sector, and public about Iceland's seas and living resources (MFRI, 2012a).

The MFRI provides recommendations for the Total Allowable Catch (TAC) of anglerfish based on estimated stock status. Based on the stock survey the anglerfish stock had been deemed large, but decreasing (MFRI, 2012b). Since 2008, the size of anglerfish cohorts has been small, thereby reducing the fishable biomass (MFRI, 2012b). The MFRI advised a decrease in fishing pressure in the quota year 2016/2017 for total landings to be 711 tonnes (MFRI, 2016). In addition to reducing anglerfish TAC, the MFRI is investigating methods to reduce juvenile by-catch in trawls.

Historically, the south and southeast coast of Iceland were primary fishing grounds for anglerfish; however in 2011, 72% of landings came from west of Reykjanes Peninsula, while the south coast showed 28% of annual anglerfish landings (MFRI, 2012b). The 2010 and 2011 fishing campaigns showed interesting trends in the Westfjords. Following the re-issuing of quota rights in 2010, the majority of which was allocated to Westfjord ports, there was a surge in anglerfish landings for several ports during the 2010 and 2011 fishing campaigns.

The reduction in by-catch of anglerfish has been aided by the introduction of sorting grids which became mandatory in 1996 (Icelandic Fisheries, 2013). The mandatory use of the sorting grid in the lobster industry is enforced to reduce by-catch of anglerfish. The use of sorting grids limits the detrimental effects of the by-catch of anglerfish which affects recruitment and spawning population.

Gillnets in Iceland experience wide-range use coinciding with the migration of cod to spawning grounds in the late winter (Icelandic Fisheries, 2013b). Given the extensive use of gillnets beginning in January, plateauing in March, and concluding in May; large quantities of anglerfish by-catch can be attributed as casualties of the cod fishing season (Icelandic Fisheries, 2013b). The gillnets used for cod range from 140 to 203mm in mesh size (Icelandic Fisheries, 2013b). In addition to the abundance of cod gillnets during the late-winter season, a variety of customized gillnets targeting other species are employed. This includes gillnets specialized for haddock (140-152 mm mesh size), flatfish (165-200 mm mesh size), and Atlantic halibut (457mm mesh size) (Icelandic Fisheries, 2013b). Importantly, lumpfish gillnets (178-267 mm mesh size) are in large-scale use during the period of March to July, prior to the exclusive anglerfish fishing season. According to Salerno et al. (2010), the highest levels of by-catch of anglerfish were found in the 254 mm gillnet mesh size. Notably, Salerno (2010) described the trend of increased length of anglerfish proportionate to increasing mesh size.

3.4 Principle Two: Ecosystem Background

3.4.1 Description of the Ecosystem

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

Three major current systems influence Icelandic waters, including the warm and saline Irminger current, which is an offshoot from the Gulf Stream flowing from the south, the intermediate East Icelandic current from the north-east, and the very cold and less saline East Greenland current flowing from the north-west (Figure).

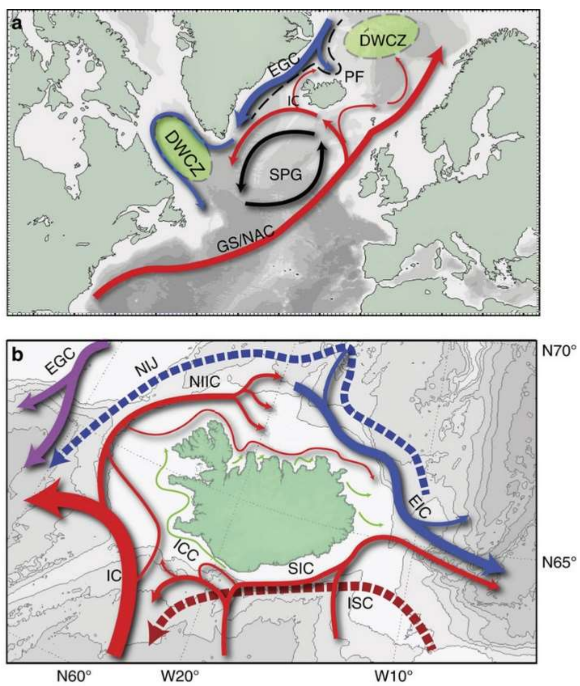


Figure 3-7: (a) North Atlantic circulation and (b) North Icelandic shelf circulation pattern. Arrows shown in blue correspond to cool and relatively fresh Arctic-sourced waters; arrows shown in red are warm and saline Atlantic-sourced waters; dashed lines correspond to deep currents whilst the solid arrows denote surface currents. The dashed black line in a) refers to the approximate position of the North Atlantic Polar Front. DWCZ, deep water convection zones; EGC, East Greenland Current; EIC, East Icelandic Current; GS/NAC, Gulf Stream/North Atlantic Current; IC, Irminger Current; iNIIC, inner NIIC; ISC, Icelandic slope current; NIIC, North Icelandic Irminger Current; NIJ, North Icelandic Jet; oNIIC, outer NIIC; PF, polar front; SIC, South Icelandic Current; SPG, Sub-Polar Gyre. Source: Reynolds et al. (2016).

The East Icelandic current consists of merged cold Arctic waters and warmer Atlantic waters, whilst the East Greenland current consists of Arctic waters. The Irminger current flows around the western, north-western and northern parts of Iceland (Steingrímur Jónsson, n.d.). The precise locations of the cold and warm water fronts shift from year to year resulting in highly variable local conditions, in particular on the northern Icelandic Shelf. Nevertheless, as a result of the hydrographic and bathymetric conditions the Icelandic ecoregion is considered to be made up of four key areas which differ in terms of species composition (Gislason and Asthorsson, 2004):

i. Northern deep: Beyond the shelf break to the north and east of Iceland, where depths exceed 500 m and Artic water is dominant.
ii. Northern shelf: Continental shelf to the north and east of Iceland, where depths are generally less than 500 m, and a mixture of coastal, Atlantic and Arctic water is found.
iii. Southern deep: Beyond the shelf break to the south and west of Iceland, where depths exceed 500 m and Atlantic water is dominant.
iv. Southern shelf: Continental shelf to the south and west of Iceland, where depths are generally less than 500 m, and a mixture of coastal and Atlantic water is found.

Primary production over the Icelandic Shelf is high, and productivity is highest over the southwestern shelf (ICES, 2016). The onset of the annual phytoplankton spring blooms generally takes place between mid-April and mid-May, however a trend towards a later onset of blooms has been observed (MFRI, 2016). Variations in phytoplankton biomass and the timing of phytoplankton blooms have led to a decreasing trend in euphausiid abundance in the south-west, south and south-east of Iceland during the last fifty years, and from 2010 copepod biomass in spring has been lower than the long-term mean observed between 1960 and 2014. These changes are in contrast to previous decades, when mesozooplankton biomass fluctuated without trends on the Icelandic shelf (Silva et al., 2014). Such changes have important impacts on the marine environment since euphausiids in particular are a vital source of food for pelagic fish, such as herring and capelin, and support the larval and fry stages of all fish stocks. The abundance of krill is said to strongly affect the survivability of larval fish that have just begun to hunt for food (MFRI, 2016). For instance, MFRI studies have shown the correlation between the abundance of krill to the south-west in the spring and the number of cod fry in August and the recruitment of cod joining the stock.

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

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

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

Several species included on the OSPAR list of threatened and / or declining species are known bycatch species in Icelandic fisheries. Only limited information is available on the impacts of fisheries on such species, however landings are generally small. A species which has been significantly impacted by fishing in Icelandic waters is Atlantic halibut (*Hippoglossus hippoglossus*), for which biomass decreased between 1985 and 1995, and has remained at a very low level since. A number of additional management measures have recently been introduced (including a total ban on all fishing of halibut and a mandatory release of viable halibut), and a small biomass increase was observed between 2015 and 2016 (MFRI, 2016). Bycatch of marine mammals (mainly small cetaceans and seals) and seabirds is known to occur in bottom set nets, in particular on the shelf off western and northern Iceland. Harbour porpoise (*Phocoena phocoena*) is the most commonly by-caught marine mammal, and seabirds such as northern fulmar (*Fulmarus glacialis*), common eider (*Somateria mollissima*) and black guillemot (*Cepphus grille*) are also caught frequently. However, bycatch in gillnets targeting cod has decreased as a result of a large decrease in gillnet fishing effort (MFRI, 2016). The reason for the decrease in gillnet fishing effort and the increase in long-line effort is that the long-line is believed to give catches of higher quality.

3.4.2 Species Allocation

A review was conducted through the assessment process of all species that the fishery might have a an impact on. This generated a list of ETP species which overlap with the fishery operations, and species reported in landings or in relevant scientific literature. Of species/stocks identified as potentially having an interaction with the UoAs under assessment, 27 have been identified as primary species (Table 13). 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. Twenty species have been identified as ETP species present in Icelandic waters mainly based on their presence on international lists of vulnerable and endangered species (CITES Appendix 1, IUCN Redlist Status for out-of-scope species, AEWA Table 1 - Column A); of these ETP species 4 species that overlap with fishing operations of the UoAs under assessment were identified (Table 22). All species not allocated to primary or ETP are considered secondary species, of which there were 44 in total.

3.4.3 Landings Profiles

The Icelandic Fisheries Management Act requires that all catches (including both commercial and non-commercial species) are landed; therefore, no discarding of any bycatch species should take place. Management measures that reduce discarding have been in place since 1991, and although there is no systematic monitoring of discarding, scientific evidence indicates that discards are, overall, a minor portion of total landings (Pálsson et al. 2005, 2012, 2013). Research by MFRI and measurements by the Directorate of Fisheries (DF) indicate that the most important discards in the Icelandic fisheries are of cod and haddock. Discards of these two species have been estimated on a regular basis by the MFRI since 2001 by comparing length composition samples taken at sea and from landings (making the assumption that discarding only occurs as high grading). Estimated discards of cod and haddock have declined in recent years and were at a minimum in 2011 in all gears. In 2011, the discards of cod amounted to 0.04% of total cod landings, and were only 0.14% for gillnets (Pálsson et al. 2013). Moreover, based on the available Icelandic landings data it is evident that catches of low commercial value are indeed landed (e.g. dogfish, black scabbard-fish, ribbonfish, and mackerel shark). The discarding ban, measures which reduce the incentive to discard, and the landing of catches of low commercial value suggest that the total catch is retained and landing data represents the approximate total catch of the fisheries.

The landings profiles (Table 6-Table 12) consist of the sum of the landings for trips in the years 2011-2016 inclusive for the UoAs under assessment. The criteria for allocation of species between minor and main follows the methodology in CR2.0 GSA3.4.2.2. Information on 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'.

*Table 6: **Bottom trawl** landings profile. PSE indicates whether the species is addressed as primary (PRIM), 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. Landings are rounded to the nearest tonne.*

Species	**PSE**	**Category**	**Landings (t)**	**%**
Atlantic cod	PRIM	Main	546764	42.4618
Golden redfish	PRIM	Main	225012	17.4745
Saithe	PRIM	Main	214420	16.6519
Haddock	PRIM	Main	98272	7.6318
Greenland halibut	PRIM	Main	53523	4.1566
Deepwater redfish	PRIM	Main	56829	4.4134
Greater silver smelt	PRIM	Minor	38214	2.9677
Atlantic wolffish	PRIM	Minor	11616	0.9021
Ling	PRIM	Minor	8495	0.6597
Plaice	PRIM	Minor	8411	0.6532
Blue ling	PRIM	Minor	5015	0.3895
Spotted wolffish	PRIM	Minor	3942	0.3061
Norway redfish	PRIM	Minor	3144	0.2442
Whiting	SEC	Minor	2737	0.2126
Mackerel	PRIM	Minor	2178	0.1691
Lemon sole	PRIM	Minor	2066	0.1604
Black scabbardfish	SEC	Minor	1560	0.1211
Anglerfish	P1	N/A	775	0.0602
Starry ray	SEC	Minor	621	0.0482
Megrim	SEC	Minor	548	0.0426
Blue whiting	PRIM	Minor	514	0.0399
Northern shrimp	PRIM	Minor	474	0.0368
Tusk	PRIM	Minor	365	0.0283
Witch	PRIM	Minor	361	0.0280
Herring	PRIM	Minor	320	0.0249
Roundnose grenadier	SEC	Minor	296	0.0230
Atlantic halibut	SEC	Minor	264	0.0205
Long rough dab	PRIM	Minor	192	0.0149
Common skate	SEC	Minor	144	0.0112
Orange roughy	SEC	Minor	100	0.0078
Roughhead grenadier	SEC	Minor	100	0.0078
Baird's slickhead	SEC	Minor	97	0.0075
Northern wolffish	SEC	Minor	94	0.0073
Greenland shark	SEC	Minor	55	0.0043

Common dab	PRIM	Minor	54	0.0042
Lumpfish	PRIM	Minor	38	0.0030
Spiny dogfish	SEC	Minor	22	0.0017
Portuguese dogfish	SEC	Minor	6	0.0005
Rabbit fish	SEC	Minor	5	0.0004
Fuller's ray	SEC	Minor	4	0.0003
Norway pout	SEC	Minor	3	0.0002
Bluefin tuna	PRIM	Minor	2	0.0002
Greater eelpout	SEC	Minor	2	0.0002
Norway lobster	PRIM	Minor	1	0.0001
Porbeagle shark	SEC	Minor	1	0.0001
Sharp-nosed skate	SEC	Minor	1	0.0001

*Table 7: **Nephrops trawl** landings profile, indicating main and minor species. PSE indicates whether the species is addressed as primary (PRIM), 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. Landings are rounded to the nearest tonne.*

Species	PSE	Category	Landings (t)	%
Atlantic cod	PRIM	Main	9530	22.4605
Norway lobster	PRIM	Main	9034	21.2915
Golden redfish	PRIM	Main	7545	17.7822
Ling	PRIM	Main	4971	11.7158
Saithe	PRIM	Main	2894	6.8206
Witch	PRIM	Main	2494	5.8779
Anglerfish	P1	N/A	1635	3.8534
Megrim	SEC	Minor	1135	2.6750
Whiting	SEC	Minor	843	1.9868
Haddock	PRIM	Minor	818	1.9279
Blue ling	PRIM	Minor	698	1.6451
Lemon sole	PRIM	Minor	355	0.8367
Atlantic wolffish	PRIM	Minor	319	0.7518
Common skate	SEC	Minor	85	0.2003
Plaice	PRIM	Minor	18	0.0424
Starry ray	SEC	Minor	18	0.0424
Atlantic halibut	SEC	Minor	17	0.0401
Tusk	PRIM	Minor	9	0.0212
Spotted wolffish	PRIM	Minor	5	0.0118
Long rough dab	PRIM	Minor	3	0.0071
Greater silver smelt	PRIM	Minor	1	0.0024
Common dab	PRIM	Minor	1	0.0024
Mackerel	PRIM	Minor	1	0.0024
Norway redfish	PRIM	Minor	1	0.0024

*Table 8: **Danish seine** landings profile, indicating main and minor species. PSE indicates whether the species is addressed as primary (PRIM), 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. Landings are rounded to the nearest tonne.*

Species	PSE	Category	Landings (t)	%
Atlantic cod	PRIM	Main	54799	42.4545
Haddock	PRIM	Main	23253	18.0148
Plaice	PRIM	Main	21326	16.5219
Saithe	PRIM	Minor	6007	4.6538
Lemon sole	PRIM	Minor	5737	4.4446
Atlantic wolffish	PRIM	Main	5022	3.8907
Witch	PRIM	Minor	3264	2.5287
Common dab	PRIM	Minor	3147	2.4381
Golden redfish	PRIM	Minor	2271	1.7594

Ling	PRIM	Minor	1434	1.1110
Anglerfish	P1	N/A	699	0.5415
Starry ray	SEC	Minor	631	0.4889
Whiting	SEC	Minor	473	0.3664
Megrim	SEC	Minor	421	0.3262
Long rough dab	PRIM	Minor	215	0.1666
Blue ling	PRIM	Minor	179	0.1387
Common skate	SEC	Minor	128	0.0992
Atlantic halibut	SEC	Minor	29	0.0225
Lumpfish	PRIM	Minor	13	0.0101
Spiny dogfish	SEC	Minor	11	0.0085
Spotted wolffish	PRIM	Minor	10	0.0077
Grey gurnard	SEC	Minor	4	0.0031
Tusk	PRIM	Minor	1	0.0008
Mackerel	PRIM	Minor	1	0.0008
Sea cucumber	PRIM	Minor	1	0.0008
Rabbit fish	SEC	Minor	1	0.0008

*Table 9: **Gillnet** landings profile, indicating main and minor species. PSE indicates whether the species is addressed as primary (PRIM), 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 considered main. Landings are rounded to the nearest tonne.*

Species	**PSE**	**Category**	**Landings (t)**	**%**
Atlantic cod	PRIM	Main	96587	77.3476
Saithe	PRIM	Main	15386	12.3212
Greenland halibut	PRIM	Main	4360	3.4915
Ling	PRIM	Minor	2623	2.1005
Herring	PRIM	Minor	1846	1.4783
Haddock	PRIM	Minor	1635	1.3093
Plaice	PRIM	Minor	717	0.5742
Golden redfish	PRIM	Minor	702	0.5622
Blue ling	PRIM	Minor	318	0.2547
Anglerfish	P1	N/A	269	0.2154
Lumpfish	PRIM	Minor	105	0.0841
Tusk	PRIM	Minor	72	0.0577
Atlantic wolffish	PRIM	Minor	52	0.0416
Spiny dogfish	SEC	Minor	42	0.0336
Starry ray	SEC	Minor	41	0.0328
Whiting	SEC	Minor	27	0.0216
Spotted wolffish	PRIM	Minor	19	0.0152
Common dab	PRIM	Minor	16	0.0128
Common skate	SEC	Minor	11	0.0088
Lemon sole	PRIM	Minor	9	0.0072
Mackerel	PRIM	Minor	8	0.0064
Long rough dab	PRIM	Minor	7	0.0056
Deepwater redfish	PRIM	Minor	6	0.0048
Witch	PRIM	Minor	4	0.0032
Atlantic halibut	SEC	Minor	4	0.0032
Porbeagle shark	SEC	Minor	2	0.0016
Black dogfish	SEC	Minor	2	0.0016
Sea cucumber	PRIM	Minor	1	0.0008
Greenland shark	SEC	Minor	1	0.0008
Fuller's ray	SEC	Minor	1	0.0008
Atlantic pollock	SEC	Minor	1	0.0008

*Table 10: **Anglerfish gillnet** landings profile, indicating main and minor species. PSE indicates whether the species is addressed as primary (PRIM), 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 considered main. Landings are rounded to the nearest tonne.*

Species	PSE	Category	Landings (t)	%
Anglerfish	P1	N/A	4708	85.9909
Atlantic cod	PRIM	Main	490	8.9498
Saithe	PRIM	Minor	67	1.2237
Ling	PRIM	Minor	62	1.1324
Plaice	PRIM	Minor	59	1.0776
Lumpfish	PRIM	Minor	42	0.7671
Atlantic wolffish	PRIM	Minor	12	0.2192
Common skate	SEC	Minor	12	0.2192
Atlantic halibut	SEC	Minor	6	0.1096
Haddock	PRIM	Minor	5	0.0913
Starry ray	SEC	Minor	3	0.0548
Golden redfish	PRIM	Minor	2	0.0365
Herring	PRIM	Minor	2	0.0365
Whiting	SEC	Minor	1	0.0183
Blue ling	PRIM	Minor	1	0.0183
Tusk	PRIM	Minor	1	0.0183
Lemon sole	PRIM	Minor	1	0.0183
Porbeagle shark	SEC	Minor	1	0.0183

*Table 11: **Lumpfish gillnet** landings profile, indicating main and minor species. PSE indicates whether the species is addressed as primary (PRIM), 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 considered main. Landings are rounded to the nearest tonne.*

Species	PSE	Category	Landings (t)	%
Lumpfish*	PRIM	Main	26955	92.4414
Atlantic cod	PRIM	Main	1773	6.0805
Plaice	PRIM	Minor	225	0.7716
Anglerfish	P1	N/A	68	0.2332
Saithe	PRIM	Minor	52	0.1783
Atlantic wolffish	PRIM	Minor	33	0.1132
Haddock	PRIM	Minor	30	0.1029
Starry ray	SEC	Minor	13	0.0446
Spotted wolffish	PRIM	Minor	5	0.0171
Lemon sole	PRIM	Minor	2	0.0069
Greenland shark	SEC	Minor	2	0.0069
Tusk	PRIM	Minor	1	0.0034

* Landings data includes both weight of landed whole lumpfish and lumpfish roe. Data on landed roe weight was multiplied by 4 (since it is estimated that roe comprises 23-28% of total lumpfish weight), and added to weight of landed whole lumpfish.

*Table 12: **Longline** landings profile, indicating main and minor species. PSE indicates whether the species is addressed as primary (PRIM), 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. Landings are rounded to the nearest tonne.*

Species	PSE	Category	Landings (t)	%
Atlantic cod	PRIM	Main	374680	64.0648
Haddock	PRIM	Main	89727	15.3420
Ling	PRIM	Main	36782	6.2892
Atlantic wolffish	PRIM	Main	26655	4.5576
Tusk	PRIM	Minor	23246	3.9747

Golden redfish	PRIM	Minor	7022	1.2007
Starry ray	SEC	Minor	6637	1.1348
Spotted wolffish	PRIM	Minor	5831	0.9970
Blue ling	PRIM	Minor	5630	0.9626
Saithe	PRIM	Minor	4346	0.7431
Whiting	SEC	Minor	1130	0.1932
Greenland halibut	PRIM	Minor	1010	0.1727
Plaice	PRIM	Minor	871	0.1489
Common skate	SEC	Minor	424	0.0725
Atlantic halibut	SEC	Minor	132	0.0226
Anglerfish	P1	N/A	129	0.0221
White hake	SEC	Minor	109	0.0186
Fuller's ray	SEC	Minor	95	0.0162
Greenland shark	SEC	Minor	69	0.0118
Bluefin tuna	PRIM	Minor	54	0.0092
Hake	SEC	Minor	52	0.0089
Deepwater redfish	PRIM	Minor	42	0.0072
Sharp-nosed skate	SEC	Minor	34	0.0058
Spiny dogfish	SEC	Minor	28	0.0048
Common dab	PRIM	Minor	26	0.0044
Long rough dab	PRIM	Minor	25	0.0043
Mackerel	PRIM	Minor	23	0.0039
Greater forkbeard	SEC	Minor	14	0.0024
Herring	PRIM	Minor	3	0.0005
Norway redfish	PRIM	Minor	3	0.0005
Rabbit fish	SEC	Minor	3	0.0005
Black dogfish	SEC	Minor	3	0.0005
Lumpfish	PRIM	Minor	2	0.0003
Northern wolffish	SEC	Minor	2	0.0003
Roundnose grenadier	SEC	Minor	1	0.0002
Common whelk	SEC	Minor	1	0.0002
Roughhead grenadier	SEC	Minor	1	0.0002
European eel	SEC	Minor	1	0.0002
Atlantic pollock	SEC	Minor	1	0.0002

3.4.4 Primary Species

The primary species consist of managed stocks (Table 13) that are not covered under P1 since they are not included in the UoA but which (i) are within scope of the MSC programme and (ii) for which management tools and measures are in place such asan 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. This consists of the landings of all species by each UoA, rounded to the nearest tonne, during the period 2011-2016 inclusive. Note that several gears only catch small amounts of anglerfish as a bycatch (e.g. longlines and lumpfish gillnets).

Table 13: Primary species list, including English, scientific and Icelandic names, and level of resilience.

English Name	**Species**	**Icelandic Name**	**Type**	**Resilience**
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 whiting	Micromesistius poutassou	Kolmunni	Fish	High
Common dab	*Limanda limanda*	Sandkoli	Fish	High
Deepwater redfish (Icelandic slope stock)	*Sebastes mentella*	Djúpkarfi	Fish	Low

English Name	Species	Icelandic Name	Type	Resilience
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
Tusk	*Brosme brosme*	Keila	Fish	High
Witch	*Glyptocephalus cynoglossus*	Langlúra	Fish	High

3.4.4.1 Outcome Status

The status of each primary species is summarised in Table 14.

There are several deepwater (beaked) redfish stocks around Iceland, and at least two of these may be below their limit reference points. It should however be noted that stock units are disputed, so there is considerable uncertainty over stock definitions outside Iceland. Allocation of the landings to appropriate stocks is important particularly for bottom trawl where deepwater redfish is a main by-catch species (Table 6).

Althought precise stock boundaries are still disputed, ICES recommends three potential management units that are geographic proxies for biological stocks of deepwater redfish in the Irminger Sea and adjacent waters: (i) Management Unit in the northeast Irminger Sea: ICES Areas 5a, 12, and 14; (ii) Management Unit in the southwest Irminger Sea: NAFO Areas 1 and 2, ICES areas 5b, 12 and 14; (iii) Management Unit on the Icelandic slope: ICES Areas 5a and 14, and to the north and east of the boundary proposed in the unit in the northeast Irminger Sea (ICES 2016b; Figure 3-8). The landings of deepwater redfish associated with anglerfish appear to be highly likely to be the Icelandic slope stock as the fishery does not operate in deeper water (>500m) and is demersal so catches would not include the pelagic or deep stocks of this species. Therefore, all landings are assumed to come from the Icelandic redfish slope stock. The proportion of the landings reported from within the Icelandic arearelevant to this certificate represented an average of 2.6% of the total landings in 2015/2016, and similar low proportion in previous years (see ICES 2016 beaked redfish advice). This suggests any catches within the Iceland EEZ are not preventing any recovery and would be a small proportion of landings, if any, making it at most a minor species even for bottom trawl.

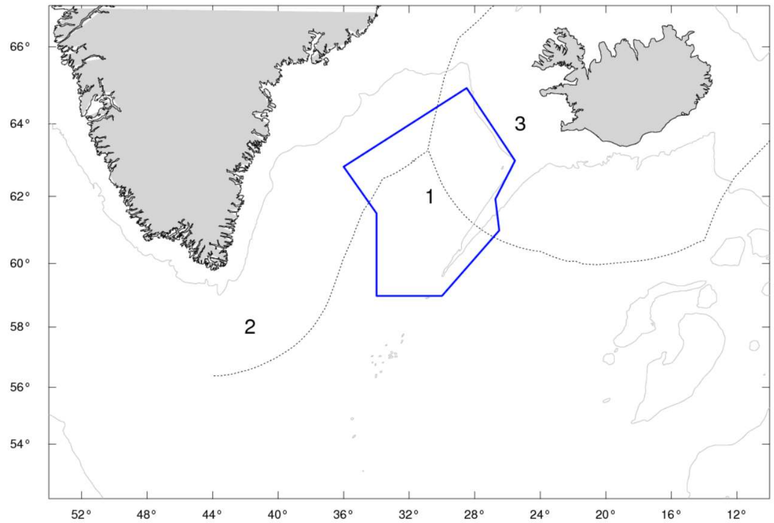


Figure 3-8: Management unit boundaries proposed for deepwater redfish by ICES (2016b). The polygon bounded by blue lines, i.e. 1, indicates the region for the 'deep pelagic' management unit in the northwest Irminger Sea, 2 is the 'shallow pelagic' management unit in the southwest Irminger Sea, and 3 is the Icelandic slope management unit.

Table 14: Stock status for primary species. The status score is indicative of the scoring guidepost for PI 2.1.1 a. If a species is designated minor for a particular gear, the species is considered under scoring issue PI 2.1.1 b, which has only one scoring guidepost: SG100. The Status interpretation is as follows: Stock is likely above its PRI – 60; Stock is highly likely above its PRI (or recovering) – 80; Stock is fluctuating around its MSY – 100. (See PI 2.1.1 a scoring guideposts for details). Information is taken from the latest ICCAT / ICES / MRI advice as listed in the References.

Stock	**Justification**	**Status**
Atlantic bluefin tuna	The perception of the stock status derived from the 2014 updated assessment suggested that fishing mortality for both younger and older fish have declined during the recent years, while SSB has increased. F_{2013} appears to clearly be below the reference target $F_{0.1}$ (F_{MSY} proxy), while current SSB is most likely to be above the level expected at $F_{0.1}$.	80
Atlantic cod	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, but with the mean around the lower values observed in the period 1955 to 1985. With SSB well above the PRI and at or above a level consistent with MSY, Icelandic cod meets SG100.	100

Stock	Justification	Status
Atlantic Wolffish (Iceland)	Atlantic wolffish abundance is tracked in the spring groundfish survey. The survey also provides a recruitment index as it catches wolffish before they recruit to the fishery. The survey suggests that the fishable stock biomass decreased by more than half in 1985–1995 but has generally increased since then, and in 2015 the index is above average. Recruitment was high from 1991–1998, but has decreased since to the lowest level in 2015. Increases in fishable stock indices from 1995–2008 correspond to the high recruitment indices in earlier years. 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}. Therefore the stock is highly likely to be above its PRI, but because F_{MSY} has only recently been applied, it is not clear whether it is at the MSY level yet.	80
Blue ling (North East Atlantic)	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 three years, but recruitment is expected to be low over the next few years due to a low juvenile abundance index recorded since 2010. The fishing mortality proxy measure is estimated to have been below the reference F_{proxy} in the last two years.	100
Blue whiting (North East Atlantic)	Fishing mortality (F) has increased from a historical low in 2011 to above F_{MSY} in 2014 (but below F_{lim}). Spawning-stock biomass (SSB) increased from 2010 to 2014. It has been above the MSY $B_{trigger}$ since the late 1990s. Recent recruitments are estimated above average, but with significant uncertainty. This meets SG100.	100
Common dab (Iceland)	Dab CPUE has decreased during 1997-2000, increased again 2001-2002, but has now been very low since 2006. The biomass index was low 2006-2009, and low again in 2015, but higher and stable 2010-2014. Based on age data, fishing mortality has been very high in last years, mostly on 4-6 year old fish. Most reports suggest maturity is reach at 2-3 years old, so many dab may be able to spawn before being subject to the high fishing mortality. The scientific advice has suggested a precautionary TAC of 500t, which is around the dab bycatch, so would effectively exclude a directed fishery. This further suggests that the stock should be considered in recovery. Given the low indices and high fishing mortality, it is not clear that the stock is highly likely to be above the PRI.	60
Deepwater redfish (Icelandic slope stock)	The stock size indicator (survey biomass index) declined from 2001 to 2003, but has been stable in the following years. The CPUE has slightly increased annually since a record low in 1994, especially in recent 3–4 years, and is now 40% higher than in 1994 (ICES 2016b).The ICES framework for category 3 stocks was applied. Altought the absence of any indications of incoming cohorts raises concerns about the future productivity of the stock, the level of biomass seems stable. Therefore, SG 80 is met.	~~80~~80
Golden Redfish (Iceland, Faroes, E. Greenland, W. Scotland, N. Azores)	Spawning-stock biomass has steadily increased for the past 20 years and is well above MSY $B_{trigger}$. Fishing mortality since 2010 is estimated to be around F_{MSY}.	100

Stock	Justification	Status
Greater silver smelt (Iceland)	Survey indices show an increase in stock biomass in 2014 follow by a decrease in 2015. The index in 2014 was very high due to few large hauls in the Icelandic autumn survey, and it is thought the change in the index from 2013 to 2014 is unlikely to be driven by changes in biomass, but there is no evidence of a decline in stock size. The F_{proxy} has decreased since 2010, so the exploitation rate in 2014 was at a similar level as in 2002–2007. The general results suggest that the stock is at least stable and highly likely above the PRI meeting SG80.	80
Greenland halibut (Iceland / Greenland)	The assessment is indicative of stock trends and provides relative measures of stock status. The stock assessment estimates that the stock has been below the biomass that is associated with B_{MSY} since the early 1990s and is presently at 68% of B_{MSY}, but highly likely above the PRI (B_{lim}=30%B_{MSY}). Since the 2004–2005 the stock has been slowly increasing and present fishing mortality is estimated to be around F_{MSY}. The stock has been increasing since 2004 and 2005 and is currently well above the MSY $B_{trigger}$ (50%B_{MSY}).	80
Haddock (Iceland)	The spawning-stock biomass (SSB) increased to a peak level 2004 to 2008, but since 2008 the SSB has decreased. The harvest rate is currently estimated near target of 0.4. Recruitment is highly variable, was high in the period 1998–2003, and has been low 2008–2013, but the 2014 year class has been estimated to be strong. The biomass is well above the trigger, and appears to be around the long term stock size since 1980, and the harvest rate has been reduced in line with reduction in stock size. This suggests the stock is being maintained around MSY, its most productive level.	100
Herring (Iceland and Norwegian Spring Spawning)	There are several stocks of herring caught around Iceland. Summer spawning herring is consider well above its B_{lim} and MSY $B_{trigger}$ point, so can be considered as around the MSY level. The Norwegian spring spawning herring stock has been declining and estimated to be below MSY $B_{trigger}$ in 2014. Fishing mortality in 2014 was below F_{pa} and F_{MSY} and the management plan target F, although F had been above this in recent years. The stock is still well-above its B_{lim}.	80
Lemon sole (Iceland)	According to biomass indices from the spring survey, the lemon sole fishable stock decreased by about half from 1987 until 2000, but increased through 2003–2010, but again has been decreasing in recent years. There are no reference points, but the biomass and recruitment indices remain higher than early series 1985-2002. Analyses suggest catches in the recent past have been too high, so the TAC has been reduced to 1200t. Nevertheless, the stock is currently highly likely above its PRI.	80
Ling (Iceland)	The spawning-stock biomass is currently at its highest level in the time series 1982-2015, and fishing mortality has decreased since 2008 and is now the lowest in the time-series. Catches have increased substantially in the last decade.	100
Long rough dab (Iceland)	CPUE biomass index indicates that the fishable biomass index has decreased substantially since 2003 and has been at a historical low in last years, but the juvenile index has been increasing and is now above the average for 1985-2014. Long rough dab is mostly caught as bycatch. MRI recommends no TAC, no direct fishing of long rough dab and that main spawning areas will be closed during spawning to promote rebuilding. As the juvenile index has been high in recent years, the stock is at least likely above the PRI, meeting SG60.	60

Stock	Justification	Status
Lumpfish	The MRI advice is based on a maximum harvest rate not exceeding the 1985–2011 average. The objective to prevent the female lumpfish biomass not falling below the historical minimum. These imply reference points for the survey indices and an appropriate HCR. The female biomass is well above its historical low point, indicating that the stock is above its PRI. Note that male biomass shows a long term decline and is near its historical minimum in 2014 since 1985.	80
Mackerel (North East Atlantic)	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.	100
Nephrops (Iceland)/Norway lobster	The *Nephrops* May biomass survey index has been decreasing since 2008 and was at an historical minimum in 2014. Based on a commercial CPUE index, MRI has indicated that this may at least in part be due to changes in survey catchability rather than just abundance. Effort has been reduced in the past, and management has achieved the target fishing mortality ($F_{0.1}$) or below it since 1995. The main concern appears to be overexploitation in some areas in some years, and overall biomass is declining rapidly due to low recruitment. Large *Nephrops* (proxy for SSB) has been declining but is above the long term mean. MRI has not yet recommended a reduction in harvest rate, suggesting they believe SSB is still well above the PRI.	80
Northern shrimp (Inshore)	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 whether they should be treated as separate stocks or a metapopulation. For the pre-assessment we assume they form a metapopulation, but the lack of increase in some populations despite very low catches may suggest their connectivity is limited. Note that many changes in population are attributed to cod and haddock predation. The TAC is set based on the biomass surveys. Overall, the fishery is responsive to the perceived stock status, so should not be hindering any recovery.	80
Northern shrimp (Offshore)	There is one recognised management unit. As for inshore shrimp, the abundance of offshore shrimp is inversely related to the abundance of cod in the same areas. The total stock biomass index of offshore shrimp appears to show a long term downward trend since the 1990s. The female index (spawning stock biomass proxy) may also be showing a long term low downward trend. Reference points for the offshore shrimp spawning stock biomass index have not been determined, but the Northwest Atlantic Fisheries Organization (NAFO) has recommended that the limit reference point should be set at 15% of the highest measurement. The female index in 2014 is well above that level, suggesting the stock is well above its PRI.	80
Norway redfish (Iceland)	Catches have been sporadic, with catches remaining very low in most years, but peaking in 2010 at 2600t, whereas catches have been around 500t since. Norway redfish are caught in a wide area of the spring survey, mostly along the southern coast. The biomass index of Norway redfish has been increasing since 2000 and the index in 2015 was the highest since surveys began in 1985. It appears that current catches are having limited impact on stock at the current time and the status of the stock appears good.	80

Stock	Justification	Status
Plaice (Iceland)	Biomass indices from the spring survey indicate that the plaice fishable stock decreased considerably in 1985–2001. Indices have increased somewhat, and then remained steady since. Based on age-catch analysis, the stock has been estimated to have decreased by more than half in 1993–2000, reaching a minimum in 2000. Since 2000, fishing mortality has been reduced and the fishable biomass has been increasing despite low recruitment. The quota is set at F_{MSY}, assuming the low recruitment is ongoing, and a seasonal closed area is used to help protect the spawning stock. Given the stock assessment results, it is unlikely that the stock is below PRI and with the current increase in stock size, the fishery is not hindering any recovery to the MSY level.	80
Saithe (Iceland)	The spawning-stock biomass of Icelandic saithe has been well above the B_{lim} and the fishing mortality has declined from 0.30 in 2009 to 0.19 in 2014, just below the target rate 0.2 (F_{MSY}).	100
Sea cucumbers (Iceland)	The distribution and abundance of sea cucumbers is very patchy. Biomass swept-area surveys have been conducted on three fishing grounds within two of the three areas sea cucumbers occur. Landings have been recommended to not exceed 10% of the estimated stock biomass in each area. The fishery is expanding, and it appears likely that a significant proportion of the biomass is unexploited (i.e. outside currently fished areas). Therefore, it is highly likely above PRI at the current time.	80
Spotted wolffish (Iceland)	The recruitment index, total biomass index and fishable biomass index has been decreasing in recent years and all three of these indices were at an historical minimum in 2015 since measurement started in 1985. The indices are likely to continue to fall unless there is a substantial reduction in catch. Based on the index, the fishable biomass is around 30-40% of the peak in the time series and therefore the stock is currently likely to be above its PRI. However, perception of the stock could change if fishing mortality is not reduced in future.	80
Tusk (Iceland)	Fishing mortality has declined in recent years, but is above the current FMSY estimate. SSB has been increasing in recent years and is likely above any candidate MSY $B_{trigger}$.	80
Witch (Iceland)	The *Nephrops* survey suggests that the fishable witch stock declined in 2005–2008, but has been steady since. Recruitment has been very poor in recent years, which will probably mean further decrease in the fishable stock in the coming years. Current biomass appears to be above any B_{lim} because biomass has been broadly stable through the recruitment decline.	80

3.4.4.2 Management

The exploitation rates of most stocks are controlled by setting appropriate TACs. However, exploitation rates are also limited by controlling fleet capacity, setting up closed areas to protect critical habitats, and regulations on fishing gears (e.g. setting minimum mesh sizes). Management of all primary species with a TAC is carried out under the same system as described in the Principle 3 (see section 3.5.3).

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

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

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

3.4.4.3 Information

There are strict requirements for vessels to be equipped with VMS and the keeping of log books on-board all fishing vessels, containing information on fishing practices such as location, dates, gear and catch quantity. Vessels above 6 GT in size are required to carry 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 monitored by certified weighers 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. Discrepancies in catch composition 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, primarily to monitor length and maturity of catches and to record by-catch. Observers aim to go on 1% of all fishing trips and coverage is good for the largest fisheries (e.g. bottom trawlers, longlines). A lower number of trips is monitored for the smaller fisheries (e.g. gillnets, demersal seines), but the overall coverage from onboard observations has improved over the past 5 years (MFRI, pers. communication). Allocation of observers to fishing vessels is generally random, and vessels cannot refuse the presence of obsevers on board. However there have in the past been instances where observers were sent to monitor fishing vessels where fishing effort and/or catch data showed anomalities (DF, pers. communication). 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 (MFRI, pers. communication). Moreover, the Icelandic coast guard monitors fishing activities in Icelandic waters, e.g. via VMS, including surveillance of areas closed for fishing. Breach of regulations leads to a warning or a fine. Repeated offences lead to heavy fines, revocation of the vessel's license to fish and possibly a prison sentence.

3.4.5 Bait Species

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. Longline and handline vessels use a variety of bait, subject to availability, price and preference. Important source of bait are herring (Norwegian spring spawners), mackerel, Pacific saury (*Cololabis saira*), South Atlantic squid (*Loligo* spp.), and artificial bait. There is no commitment to purchase bait from any particular source, such as sustainable sources.

All bait stocks are managed stocks. There is a commercial directed fishery at these stocks and an intention (or there should be) to manage them to sustainable levels. Therefore, these stocks are considered primary species.

All main bait stocks are described are in good condition, although the status of some is highly uncertain or has not been formally determined. Local bait sources (herring, mackerel) are assessed by ICES and they are also caught as bycatch in these fisheries (Table 14). Status of stocks from sources from further afield (Pacific saury, *Loligo* squid) is more uncertain. No recent stock assessment has been completed for Pacific saury, although one is expected in 2017 (NPFC, 2015). Squid could originate from a number of stocks for which the status is unknown.

The most common bait size is 30 g/hook compared to current reported catch rates of around 700 g/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).

3.4.6 Secondary Species

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 section 3.4.7). Although some of these species, such as Atlantic halibut and whiting are monitored and managed to a degree, the stock status has not yet been evaluated against reference points and they are not managed using TAC. These species, for this current assessment , have been allocated to the secondary species group.

None of the secondary species are 'main' (i.e. >5% of the catch, of >2% of the catch for less resilient species). However, we are considering several 'out of scope' species as 'main': five mammal species and eleven seabird species, that are potentially vulnerable to these fisheries. Please note that for these 'out of scope' species, the focus of the assessment has been on (cod) gillnets, anglerfish gillnets, lumpfish gillnets and longlines, since available evidence indicates that these gears have much higher interaction levels than the other gears being assessed.

Table 15: Secondary species list, including English, scientific and Icelandic names. Resilience has been included for all in-scope species.

FISH				
English Name	Species	Icelandic Name	Type	Resilience
Atlantic halibut	Hippoglossus hippoglossus	Lúða	Fish	Low
Baird's slickhead	Alepocephalus bairdii	Gjölnir	Fish	Low
Black scabbardfish	Aphanopus carbo	Stinglax	Fish	Low
European eel	Anguilla anguilla	Áll	Fish	High
European Hake	Merluccius merluccius	Lýsingur	Fish	High
Greater eelpout	Lycodes esmarkii	Dílamjóri	Fish	Low
Greater forkbeard	Phycis blennoides	Litla brosma	Fish	Low
Grey gurnard	Eutrigla gurnardus	Urrari	Fish	High
Megrim	Lepidorhombus whiffiagonis	Stórkjafta / Öfugkjafta	Fish	High
Northern wolffish	Anarhichas denticulatus	Blágóma	Fish	Low
Norway pout	Trisopterus esmarkii	Spærlingur	Fish	High
Orange roughy	Hoplostethus atlanticus	Búrfiskur	Fish	High

Pollack	Pollachius pollachius	Lýr	Fish	High
Rabbit fish	Chimaera monstrosa	Geirnyt/Havmus	Fish	Low
Roughhead grenadier	Macrourus berglax	Snarphali	Fish	Low
Roundnose grenadier	Coryphaenoides rupestris	Slétti langhali	Fish	Low
White hake	Urophycis tenuis	Stóra brosma	Fish	High
Whiting	Merlangius merlangus	Lýsa	Fish	High
RAYS & CEPHALOPODS				
English Name	Species	Icelandic Name	Type	Resilience
Blue/Common Skate	*Dipturus flossada*	Skata	Ray	Low
Starry ray	Amblyraja radiata	Tindaskata	Ray	Low
Fuller's ray	Leucoraja fullonica	Náskata	Ray	Low
Sharp-nosed skate	Dipturus linteus	Hvítaskata	Ray	Low
MOLLUSCS				
English Name	Species	Icelandic Name	Type	Resilience
Common whelk	Buccinum undatum	Beitukóngur	Mollusc	Low
SHARKS				
English Name	Species	Icelandic Name	Type	Resilience
Black dogfish	Centroscyllium fabricii	Svartháfur	Shark	Low
Greenland shark	Somniosus microcephalus	Hákarl	Shark	Low
Portuguese dogfish	Centroscymnus coelolepis	Gljáháfur	Shark	Low
Spiny / Picked dogfish	Squalus acanthias	Háfur	Shark	Low
Porbeagle shark	Lamna nasus	Hámeri	Shark	Low

Table 16: 'Out of scope' secondary species. Applicable to (cod) gillnets, anglerfish gillnets, lumpfish gillnets and longlines.

SEABIRDS		
English Name	Species	Icelandic Name
Black-legged kittiwake	Rissa tridactyla	Rita
Bruennich's guillemot	Uria lomvia	Stuttnefja
Common eider	Somateria mollissima	Æðarfugl
Common guillemot	Uria aalge	Langvía
Common loon	Gavia immer	Himbrimi
European shag	Phalacrocorax aristotelis	Toppskarfur
Great black-backed gull	Larus marinus	Svartbakur
Great cormorant	Phalacrocorax carbo	Dílaskarfur
Northern fulmar	Fulmarus glacialis	Fýll
Northern gannet	Morus bassanus	Súla
Razorbill	Alca torda	Álka
MARINE MAMMALS		
English Name	Species	Icelandic Name
Harbour porpoise	Phocoena phocoena	Hnísa
Harbour seal	Phoca vitulina	Landselur
Harp seal	Pagophilus groenlandicus	Vöðuselur
Grey seal	Halichoerus grypus	Útselur
Ringed seal	Phoca hispida	Hringanóri

3.4.6.1 Outcome status – 'in scope' species

All finfish landings of secondary species are minor, and in many cases negligible. Overall, the capacity of the fleets has been reduced so that fishing effort is commensurate with the productivity of the main target stocks (cod, haddock, saithe, ling, herring, capelin etc.). This provides some protection for non-target species as well.

Discarding is likely to occur, but is not expected to be high. Discarding is however a requirement for viable Atlantic halibut. In 2012 a regulation was issued to ban all targeted fishing for this species, stipulating that all viable fish must be released. These measures were adopted because the recruitment and biomass indices decreased rapidly between 1985 and 1992, and have remained low since (MRI, 2016). Atlantic halibut is now only caught as bycatch in bottom gears (MRI, 2016). Catches of Atlantic halibut recorded for the UoAs under assessment are very low, ranging from 4 tonnes (gillnets) to 264 tonnes (bottom trawlers) in total in the years 2011-2016, and only making up between 0.003 - 0.1% of total catches of the UoAs (see landings profiles above). Moreover, since the ban on Atlantic halibut landings was introduced in 2012, catches have almost ceased completely (see Figure 3-9).

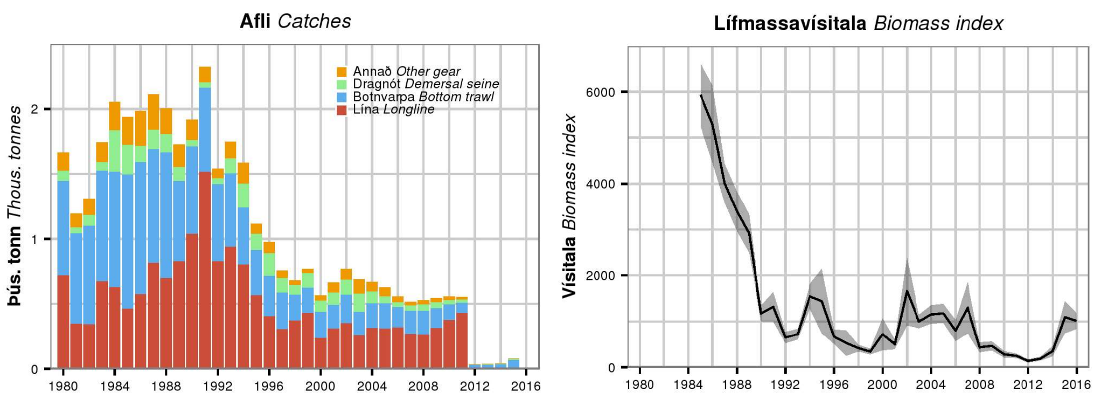


Figure 3-9: Atlantic halibut (*Hippoglossus hippoglossus*) catch by gear type, and biomass indices from 1980 to 2016. Source: MRI, 2016.

3.4.6.2 Outcome status – ‘out of scope’ species

Although Icelandic fishers are required to land all catches, based on the current practical interpretation of Icelandic fisheries laws, seabirds and mammals can be discarded at sea, as long as such catches are recorded in logbooks by fishers (MFRI, pers. communication). Pálsson et al. (2015) used data from observers, the scientific cod gillnet surveys (conducted in April each year) and self-reported data, to estimate bycatch of seabirds in Icelandic waters for the years 2009-2014, and marine mammals for the period 1997-2014. Although bycatch reporting is mandatory for Icelandic fisheries, returns of logbooks in general, and returns of electronic log books in particular, have however been low. In order to improve the available bycatch data, DF observers have stepped up efforts since 2014 to monitor bycatch of seabirds in cod gillnets, lumpfish gillnets and longlines. At present a coverage of ca. 1% of fishing trips is achieved. The number of individuals taken as bycatch during the fishing trips monitored by onboard observers is raised by MFRI to the total fishing fleet by taking into account the observed and the total fishing effort (annual bycatch estimate = observed bycatch * total fishing effort / observed fishing effort). In the case of cod gillnets a more detailed calculation is made which takes into account fishing effort by month as well as an index of monthly abudance for marine mammals and seabirds (annual bycatch estimate = sum [bycatch per month * (netdays by the fleet per month / netdays by the fleet per month)] * abundance index) (MFRI, pers. communication).

Bycatch estimates provided by the MFRI are generally higher than those previously estimated by Pálsson et al. (2015). Taking a precautionary approach, and considering the improved quality of the new data due to the increase in onboard observations, the present assessment is based on the updated MFRI dataset. Seabird and marine mammal population size estimates based on the most recent data available and average annual percentage of populations impacted by the UoAs included in the present assessment were calculated and the mortality rates considered during scoring.

In several cases there are significant variations in estyimated annual by-catch numbers, for instance for harbour seal bycatch in lumpfish nets increased by a factor of 5.5 (232 individuals to 1288) between 2014 and 2015. In some cases such variations can be explained by differences in fishing effort between 2014 and 2015 (Table 17), but the quality of the by-catch data remains a concern. Consequently in all cases the 'worst case scenario' approach to estimating by-catch rates was adopted: (i) the maximum number of individuals caught as by-catch in either 2014 or 2015 was taken into account, and (ii) in the case of cormorants the assessment team took the precautionary approach of first assuming all bycatch was European shag and then assuming all bycatch was great cormorant (since the available data does not distinguish between great cormorant and European shag). Conditions were imposed to improve the quality of the by-catch data.

Table 17: Number of observed (obs.) trips/netdays/sets and the total number of trips/netdays/sets by the Icelandic fishing fleet in 2014-2015.

Year	Lumpfish Gillnet		Cod Gillnet		Longline	
	Obs.	Total	Obs.	Total	Obs.	Total
2014	37	3000	4020	308254	434	16557
2015	21	3769	3828	412243	346	15310

Seabirds

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

Based on the 2014-2015 MFRI by-catch data made available to the assessment team during the site visit, seabird interactions with fisheries took place for (cod) gillnets, lumpfish gillnets, and longlines (Table 18). Interactions with towed gears such as trawls and Danish seines are minimal (MFRI, pers. communication).

Table 18: Secondary out-of-scope seabird species bycatch (total number of individuals) taken in Icelandic (cod) gillnet, lumpfish gillnet and longline fisheries based on data recorded by onboard observers in 2014 and 2015 and raised to the total fishing fleet by the MFRI. Source: MFRI pers. communication.

	(Cod) Gillnet		**Lumpfish Gillnet**		**Longlines**	
Species	**2014**	**2015**	**2014**	**2015**	**2014**	**2015**
Bruennich's guillemot			46	0		
Common guillemot	113	1127	208	216		
European shag*			487	930	113	104
Great black-backed gull					0	207
Great cormorant*			487	930	113	104
Northern fulmar	2717	1628			2490	1555
Northern gannet	151	292			113	207
Razorbill	0	83				

* Data does not distinguish between these morphologically very similar species.

Table 19: Impacts on Icelandic populations of secondary out-of-scope seabird species by (cod) gillnet, lumpfish gillnet and longline fisheries. Population size estimates based on the most recent data available (source: BirdLife International (2015) European Red List of Birds) and percentage of population impacted based on maximum bycatch rates estimated by the MFRI in the years 2014-2015 are presented. Bycatch data was provided by MFRI scientists following the site visit.

		% Population Impacted		
Species	**Icelandic Population Size (Individuals)**	**(Cod) Gillnet**	**Lumpfish Gillnet**	**Longlines**
Bruennich's guillemot	153,000-520,000		0.01 - 0.03	
Common guillemot	368,000-1,060,000	0.11 - 0.31	0.02-0.06	
European shag	9800		9.49	1.15
Great black-backed gull	30,000-40,000			0.52 - 0.69
Great cormorant	8200		11.34	1.38
Northern fulmar	2,300,000	0.12		0.11
Northern gannet	63,000	0.46		0.33
Razorbill	625,000	0.01		

[1] Only outdated (1992) estimates of the Icelandic population size exist

In the case of anglerfish gillnets a limited number of onboard observations were carried out by the MFRI 2016 (0.6% coverage of anglerfish gillnet fishing trips was achieved), but the final 2016 bycatch estimates were not available at the time of writing. Consequently, a PSA analysis had to be conducted to assess the outcome status of out-of-scope secondary seabird species for this UoA, based on species identified by stakeholders during the site visit: northern fulmar (identified during a meeting with NASBO) and common guillemot (identified by the MFRI bycatch expert).

Brünnich's guillemot

Brünnich's guillemot (*Uria lomvia*), also known as 'thick-billed murre', is native to both Greenland and Iceland, where it breeds on coastal cliffs and islands in areas supporting rich planktonic biomass near cliffed coasts. It winters mostly offshore near the edge of the continental shelf, and along sea coasts and in bays where concentrations of fish and invertebrates occur (Snow and Perrins 1998). At sea this species tends to be found in large flocks, likely related to the non-random distribution of it's prey. Brünnich's guillemots feeds on fish, squid and crustaceans throughout the year, as well as polychaetes and molluscs (Nettleship and Christie 2013). The European population is estimated at 1,920,000-2,840,000 mature individuals; the Icelandic population has been estimated at 153,000-520,000 individuals (Table 19). No information is available on population trends (BirdLife International, 2015). Since the species has an extremely large population size it has an IUCN status of 'Least Concern' in Europe (see status on http://www.iucnredlist.org/).

Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 46 Brünnich's guillemot deaths per year, which accounts for 0.01-0.03% of the total estimated Icelandic population per year.

Common guillemot

The common guillemot has a circumpolar distribution, occurring in the low-arctic and boreal waters of the north Atlantic. The common guillemot is a pursuit-diving marine bird which forages primarily during daylight. One parent remains at the colony with the chick whilst the other is on a foraging trip. Birds departing colonies usually splash-down to form large rafts close to the colony before departing to foraging areas. The European population is estimated at 2,350,000-3,060,000 mature individuals; the Icelandic population has been estimated at 368,000-1,060,000 individuals (Table 19). Since 2005 a sharp decline has been observed in Iceland (where nearly a quarter of the European population is found) (BirdLife International, 2015). As a result of the reported decline in Iceland, the estimated and projected rate of decline of the European population size over the period 2005-2050 (three generations) varies from 25% to more than 50%, and the species was recently given an IUCN status of just ‘Near Threatened’ in Europe (see status on http://www.iucnredlist.org/). However, since 2000 a number of populations have been increasing elsewhere, including in the UK (which holds nearly half the European population) (JNCC 2014; BirdLife International, 2015).

Based on the most recent MFRI data available, gillnets account for a maximum of 1127 common guillemot deaths per year, which accounts for only 0.11-0.31% of the total estimated Icelandic population per year. In addition a maximum of 216 common guillemots were caught annually by lumpfish gillnets in 2014 - 2015, which accounts for another 0.02-0.06% of the total Icelandic common guillemot population per year. Indeed, local experts do not consider that gillnet fisheries are a threat to the population status of this species (Dr. Erpur Snær Hansen, Náttúrustofa Suðurlands / South Iceland Nature Research, Vottunarstofan Tún pers. communication, 24 May 2016).

European Shag / Great cormorant

The great cormorant (*Phalacrocorax carbo*) inhabits both marine and freshwater areas, whilst the European Shag (*Phalacrocorax aristotelis*) is exclusively marine. Shags typically breed on (steep) sea cliffs whilst cormorants breed on top of small islands where they build their nests. Both shag and cormorant breed in the Breiðafjörður region of Iceland. During the winter, they can be found all along the coast. 4100 pairs of great cormorant and 4900 pairs of European shag are estimated to breed in Iceland (BirdLife International, 2015), representing 1% and 6% respectively, of the overall North

Atlantic population. The populations of the great cormorant are expected to increase both in the short and the long term, whilst the status of the European shag is less clear, with suspected decreasing short and long term population trends for unknown reasons. Nevertheless, both species were recently given a status of 'Least Concern' in Europe by IUCN (see http://www.iucnredlist.org/).

Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 930 European shag / great cormorant deaths per year. Moreover, according to 2014-2015 bycatch estimates available from the MFRI, longlines account for a maximum of 113 cormorant / shag deaths a year. Since it is not known what percentage of the bycatch are cormorant and what percentage are shag (although breeding populations of the two species are similar in Iceland), the assessment team took the precautionary approach to assume all bycatch were one species and then the other. Based on these precautionary calculations, a maximum of 11.34% of the total estimated Icelandic population per year would be affected for great cormorant, and 9.49% per year for shag by lumpfish gillnets, which is concerning. For longlines the precautionary estimates are 1.38% for great cormorant and 1.15% for European shag. It is likely that the actual values are much lower for both species / gears. Indeed local experts do not consider that fisheries are a threat to the population status of this species (Dr. Erpur Snær Hansen, Náttúrustofa Suðurlands/South Iceland Nature Research, Vottunarstofan Tún pers. communication, 24 May 2016).

Greater black-backed gull

This species can be found breeding on coasts from the extreme north-west of Russia, along Scandinavia, on Baltic Sea coasts, on the coasts of north-western France, the United Kingdom and Ireland, across the north Atlantic in Iceland and southern Greenland and on the Atlantic coasts of Canada and the USA down to North Carolina. Individuals breeding in harsher environments will migrate south, wintering on northern coasts of Europe from the Baltic Sea to southern Portugal, and down North America as far south as the Caribbean (del Hoyo et al. 1996). In Iceland, they are common all along the coast, but more common in the south. The Icelandic population was estimated to number 15,000 to 20,000 breeding pairs by the Icelandic Institute of Natural History in 2000. The short-term trend of the Icelandic population is unknown, whilst the projected long term trend is decreasing (Birdlife International, 2015). This could possibly be due to the declining availability of discarded offal from ships and land-based waste (Dr. Erpur Snær Hansen, Náttúrustofa Suðurlands/South Iceland Nature Research, Vottunarstofan Tún pers. communication, 24 May 2016). However, this species was recently given a status of 'Least Concern' by IUCN (see http://www.iucnredlist.org/).

According to the most recent bycatch estimates available from the MFRI, longlines account for a maximum of 207 black-backed gull deaths a year. Based on the lower estimated Icelandic population size of 30,000 individuals, this would account for only 0.69% of the total estimated Icelandic population per year.

Fulmar

The northern fulmar is found throughout the north Atlantic and North Sea, north of 45°N (Hagemeijer and Blair 1997). Its boreal distribution has increased over the last 250 years to Iceland, the Faroes, Spitsbergen and suitable areas of coastline in Britain (Hagemeijer and Blair 1997, Snow and Perrins 1998). Based on the most recent estimates the European fulmar population is estimated at 3,380,000-3,500,000 pairs. Despite fluctuations in the fulmar population, it remains a common breeder in Iceland; in 1983-2009 the Icelandic population was estimated to number 1,150,000 breeding pairs. More recent estimates are not available, but both short and long term population trends for this species have been estimated to be decreasing in Iceland. Historically 3,300 and 10,500 fulmars were hunted annually in Iceland, but this practice is far less frequently nowadays. The species was recently given an IUCN status of 'Least Concern' in Europe (see http://www.iucnredlist.org/).

Based on the most recent MFRI data available, gillnets account for a maximum of 2717 fulmar deaths per year, and longlines account for around 2490 fulmar deaths per year. This is the equivalent to 0.1% of the total estimated Icelandic population per year for each of these gears. Indeed, local experts do not consider that fisheries are a threat to the population status of this species (Dr. Erpur Snær Hansen, Náttúrustofa Suðurlands/South Iceland Nature Research, Vottunarstofan Tún pers. communication, 24 May 2016).

<u>Northern gannet</u>

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

According to the most recent bycatch estimates available from the MFRI, gillnets account for a maximum of 292 gannet deaths a year. Based on the estimated Icelandic population size of 63,000 individuals, an average annual catch of northern gannets caught as bycatch would account for only 0.46% of the total estimated Icelandic population per year. Moreover, according to the most recent bycatch estimates available from the MFRI, longlines account for around a maximum of 207 gannet deaths a year. Based on the estimated Icelandic population size of 63,000 individuals, an average annual catch of northern gannets caught as by-catch by longlines would account for 0.33% of the total estimated Icelandic population per year. Indeed, local experts consider that longline fisheries are not a threat to the population status of this species (Dr. Erpur Snær Hansen, Náttúrustofa Suðurlands / South Iceland Nature Research, Vottunarstofan Tún pers. comm., 24 May 2016).

<u>Razorbill</u>

The species breeds on northern Atlantic coasts, in Greenland and in Western Europe from north-western Russia to northern France. The Icelandic population has been estimated at 625,000 individuals (Table 19). This auk began declining in parts of its European breeding range during the 2000s, primarily in Iceland, which holds at least 60% of the European population, but where the population declined by 18% over the period 2005-2008 (BirdLife Internationa, 2015). This overall decline is estimated to range between 20-29% over a three year generation period (41 years), resulting in an IUCN classification of 'Near Threatened' in Europe (see http://www.iucnredlist.org/).

Based on the most recent MFRI data available, gillnets account for a maximum of 83 razorbill deaths per year, which accounts for 0.01% of the total estimated Icelandic population per year.

Table 20: Secondary out-of-scope marine mammal species bycatch (total number of individuals) taken in Icelandic (cod) gillnet and lumpfish fisheries based on data recorded by onboard observers in 2014 and 2015 and raised to the total fishing fleet by the MFRI.Source: MFRI pers. communication.

	(Cod) Gillnet		**Lumpfish Gillnet**	
Species	**2014**	**2015**	**2014**	**2015**
Harbour porpoise	551	553	139	215
Harbour seal	0	46	232	1288
Harp seal	92	212	23	72
Grey seal			162	1216
Ringed seal	38	0	46	143

Marine Mammals

Based on the 2014-2015 MFRI by-catch data made available to the assessment team during the site visit, marine mammal interactions with fisheries took place for (cod) gillnets, and lumpfish gillnets. No marine mammal interactions were observed for longlines, and interactions with towed gear such as trawls and Danish seines are minimal (MFRI, pers. communication).

Marine mammal population size estimates based on the most recent data available (data source for all species is the latest data available the MFRI taking into account the calculated 95% confidence intervals, mostly provided by Þorsteinn Sigurðsson during pers. communication with Vottunarstofan Tún in May 2016) and average annual percentage of populations impacted by the UoAs included in the present assessment are presented in
Table 21 below.

In the case of anglerfish gillnets a limited number of onboard observations were carried out by the MFRI 2016 (0.6% coverage of anglerfish gillnet fishing trips was achieved), but the final 2016 bycatch estimates were not available at the time of writing. Consequently, a PSA analysis had to be conducted to assess the outcome status of out-of-scope secondary marine mammal species for this UoA, based on species recorded during onboard observations by the MFRI: harbour porpoise and harbour seal.

Table 21: Impacts on Icelandic populations of secondary out-of-scope marine mammal species by (cod) gillnet and lumpfish gillnet fisheries. Population size estimates based on the most recent data available (see table footnotes for source information), and percentage of population impacted based on maximum bycatch rates estimated by the MFRI in the years 2014-2015 are presented. Bycatch data was provided by MFRI scientists following the site visit.

		% Population Impacted	
Species	**Icelandic Population Size (Individuals)**	**(Cod) Gillnet**	**Lumpfish Gillnet**
Harbour porpoise	43,179[1]	1.28	0.50
Harbour seal	7,652[2]	0.60	16.83
Harp seal	470,540-784,280[3]	0.03 - 0.05	0.01 - 0.02
Grey seal	3,400-5,000[3]		24.32 - 35.76
Ringed seal	2,000,000-5,000,000[3]	0.001 - 0.002	0.003 - 0.01

[1] Source: Gilles et al., 2011.
[2] Source: Þorbjörnsson, 2017.
[3] Source: Þorsteinn Sigurðsson (MFRI) / Vottunarstofan Tún pers. communication, 30 May 2016.

Harbour Porpoise

Harbour porpoises are found in the cold temperate to sub-polar waters of the Northern Hemisphere (Gaskin 1992, Read 1999). In the North Atlantic, harbour porpoise can be divided into two separate populations, one in the Northwest Atlantic and the other in the Northeast Atlantic (Gaskin 1984, Andersen 1993, Andersen 2003). Within these populations, Gaskin (1984) identified 14 putative sub-populations, based primarily upon coincident summer distribution patterns and the assumption that harbour porpoise is confined largely to continental shelf areas. However, sighting data, satellite telemetry and records of bycatches indicate that harbour porpoise are capable of considerable movements and are not restricted to nearshore areas (Stenson and Reddin, 1990).

Harbour porpoise is common in shallow waters all around Iceland in spring to autumn, but less during the winter months (Ólafsdóttir et al., 2002). Abundance estimates of harbour porpoise, based on the North Atlantic Sightings Surveys programme (NASS) conducted in 1987, 1989 and 1995, indicated a population size of around 27,000 animals (Sigurjónsson and Víkingsson 1997; Stenson, 2003). The estimate was based on the shipboard part of NASS in 1987 and mostly on offshore observations (Gilles et al. 2011). This rough estimate most likely represents an underestimation of abundance, as the proportion of porpoise sightings missed during ship surveys can be quite high (Gilles et al. 2011). The NASS programme aimed at estimating the summer distribution and abundance of cetacean populations in the North East Atlantic. The results demonstrated great variation in distribution of harbour porpoise sightings between surveys but their occurrence was mainly inshore. In 2007 an aerial survey was conducted which specifically was designed to get reliable estimates of harbour porpoise distribution and abundance in Icelandic waters (Gilles et al. 2011). Highest densities were estimated in Breiðafjörður and to the NW of the fjord as well as in inshore waters off East Iceland (see figure below). The estimated population size of harbour porpoise in Icelandic waters is estimated at 43,179 animals (95% confident interval: 31,755 – 161,899 animals), but current population trend is unknown.

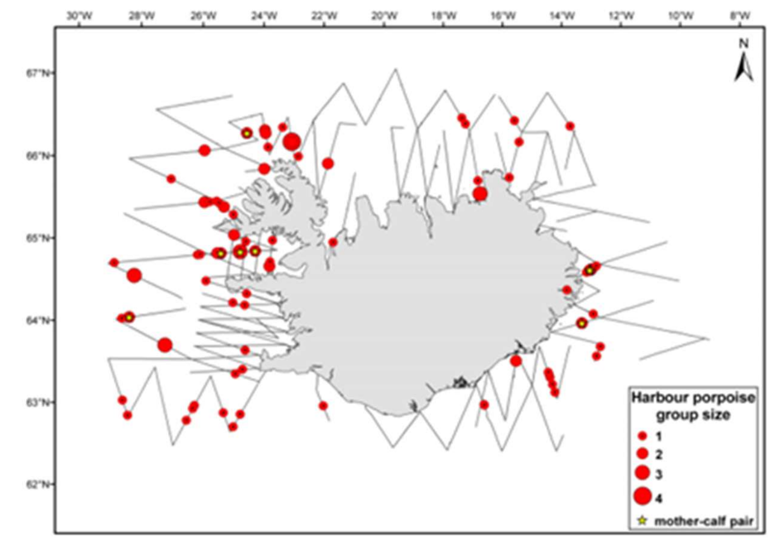


Figure 3-10. Aerial survey of harbour porpoise distribution in Iceland (2007). Results of aerial surveys conducted in the summer of 2007 in Icelandic waters based on sightings made by experienced observers. Grey line indicates effective survey effort in good or moderate harbour porpoise sighting conditions (Beaufort Sea states lower than 3), equivalent to 88% of the total effort. Source: Gilles et al. 2011.

The North Atlantic population of this species is large, and there is no evidence to suggest that any significant declines have occurred (although the population trend has not been quantified). This part of the European population should be considered ‘Least Concern’ (IUCN Cetacean Specialist Group, 2007).

According to the most recent MFRI data available, gillnets account for a maximum of 553 harbour porpoise deaths per year; based on the most recent estimates of population size available an estimated 1.28 % of the total population per year is impacted. In addition a maximum of 215 harbour porpoises were caught annually in 2014 and 2015 by lumpfish gillnets, accounting for another 0.5% of the Icelandic population.

Harbour seal

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

However, despite the species' potential for long-distance movements, harbour seals are known to be regionally philopatric on a scale of several hundred kilometres. Studies of the *Phoca vitulina* population structure have shown that there are in fact a number of distinct population units in the North Atlantic, including a distinct population in Iceland (Stanley et al., 1996; Goodman, 1998; Andersen and Olsen, 2010; Andersen et al., 2011). A census of the Icelandic harbour seal population carried out in 2016 indicated a continuing decline in the harbour seal population. The estimated population size (7652 individuals) was 77% smaller than when first estimated in 1980, and 32% smaller than in 2011, when the last complete population census was undertaken (Figure 3-11). In addition, the estimate was 36% lower than a government issued management objective for the minimum population size of harbour seals in Iceland. The study concluded that based on criteria used by the International Union for Conservation of Nature and Natural Resources (IUCN), the conservation status of the Icelandic population should be considered as 'Endangered'. The reasons for the observed population decline are poorly understood, but the most likely factors contributing to the downward population trend are likely to be by-catch as well as direct hunting, which still takes place in Iceland (Þorbjörnsson, 2017).

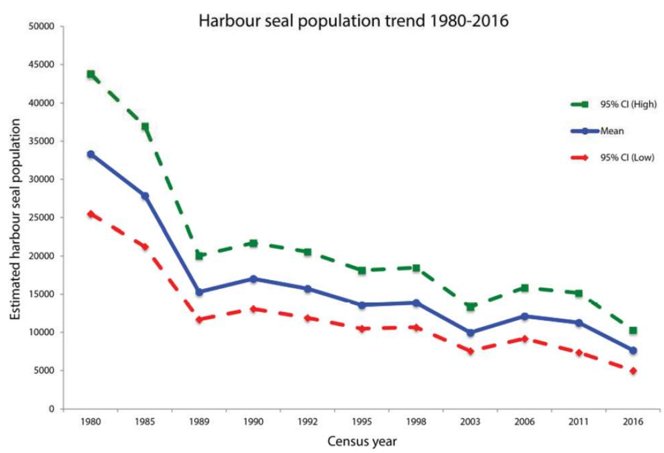


Figure 3-11: Icelandic harbour seal population trend in 1980-2016. Mean values (blue), as well as the 95% confidence intervals are shown. Source: Þorbjörnsson, 2017.

Based on the most recent MFRI data available, gillnets account for a maximum of 46 harbour seal deaths per year, which would account for 0.6% of the total estimated Icelandic population per year. Lumpfish gillnets were responsible for an estimated maximum of 1288 harbour seal deaths in 2014 - 2015, which would have impacted 16.83% of the estimated Icelandic population. Given the recent evidence of harbour seal population trends, this percentage bycatch is of concern.

<u>Harp seal</u>

Harp seals are widespread in the North Atlantic and the adjacent Arctic Ocean and shelf seas. The Harp Seal is the most abundant pinniped species in the northern hemisphere, and it is found in three separate populations, each of which uses a specific breeding site. The western North Atlantic stock, which is the largest, is located off eastern Canada. A second stock breeds on the "West Ice" off eastern Greenland, which contributes to Icelandic individuals. The third stock is found in the Barents Sea / White Sea. Globally this species numbers close to nine million animals with an annual pup production for all breeding sites combined of approximately 1.2 million (ICES 2013, Hammill et al. 2014). The Icelandic population has been estimated at 470,540-784,280 individuals
Table 21). Due to its large population size, and the increasing trend in two of the three major population groups, the harp seal is currently classified by IUCN as 'Least Concern' (Kovacs, 2015).

Based on the most recent MFRI data available, gillnets accounted for a maximum of 212 harp seal deaths per year in 2014 and 2015, which accounts for 0.03-0.05% of the total estimated Icelandic population per year. Lumpfish gillnets were responsible for a maximum of 72 additional harp seal deaths during the same period, which impacted an additional 0.01-0.02% of the population.

Grey seal

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

There are three populations isolated both geographically and by timing of reproduction (Bonner 1981): (i) the western Atlantic population (centered in northeastern North America); (ii) the eastern Atlantic population, which is concentrated around the coast of the United Kingdom and Ireland but also includes breeding colonies in Iceland, the Faroe Islands and along the mainland coast of northern Europe as far south as Brittany in France (iii) the Baltic Sea. The Icelandic population has been estimated at 3,400-5,000 individuals
Table 21). Grey seal numbers are known to have increased strongly in recent years (including the northeast Atlantic population which is found in Iceland) as a result of measures to protect this species (Klimova et al., 2014). Based on the overall increasing population trends, this species is classified as 'Least Concern' by IUCN (European Mammal Assessment team, 2007).

Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 1216 grey seal deaths per year, which accounts for a concerning 24.32-35.76% of the total estimated annual number of grey seals which visit Icelandic waters to feed.

Ringed seal

Ringed seals have a circumpolar distribution throughout the Arctic basin including near the North Pole (Rice 1998), and range widely into adjacent seas. The species is not native to Iceland and only found as a vagrant species since it uses seas ice exclusively as a breeding, molding and resting habitat, rarely coming onto land (Frost and Lowry 1981, Kelly 1988). There are currently five recognized subspecies of ringed seal (Rice 1998, Committee on Taxonomy 2014), the Arctic ringed seal (*P. h. hispida*), the Okhotsk ringed seal (*P. h. ochotensis*), the Baltic ringed seal (*P. h. botnica*), the Ladoga seal (*P. h. ladogensis),* and the Saimaa seal (*P. h. saimensis*).

The Icelandic population has been estimated at 2,000,000-5,000,000 individuals (

Table 21). The species which is found in Iceland is the Arctic ringed seal, which was given a status of 'Least Concern' by IUCN in 2016 due to its very large population size and broad distribution (Boveng, 2016). Based on the most recent MFRI data available, gillnets accounted for a maximum of 38 ringed seal deaths per year in 2014 and 2015, which accounts for only 0.001-0.002% of the total Icelandic population per year. Lumpfish gillnets were responsible for a maximum of 143 additional ringed seal deaths during the same period, which impacted an additional 0.003-0.01% of the population.

3.4.6.3 Management of Secondary Species

There are no direct management interventions for in-scope secondary species (finfish, crustaceans, sharks and rays), with the exception of Atlantic halibut. Landings of in-scope secondary species are however small (all are minor species), and in most cases negligible. Many input controls limiting exploitation of the main target stocks (cod, haddock, saithe etc.), such as limits on capacity, mesh size and so on, will also protect non-target stocks. With very low catches of secondary species, it is quite likely that further action is not required, but this has not been formally determined. Improved management of these stocks would likely lead them to be classified as primary species.

There is a requirement to discard Atlantic halibut if it is viable and all directed fishing of halibut has been prohibited. These measures were adopted because the recruitment and biomass indices decreased rapidly between 1985 and 1992, and have remained low since, most likely due to bottom trawl and longline activities (MRI, 2016). Evidence from the surveys indicates that the population size has been increasing in recent years, suggesting that the current management strategy is successfully rebuilding the stock (

Figure 3-9).

Various measures are taken to ensure the protection of juvenile fish and vulnerable habitats. This includes regulations on the type of fishing gear allowed in different areas, rules on the minimum mesh size, use of sorting grids on trawls and the closing of fishing grounds. If on board monitoring reveals that the percentage of small fish in the catch or the bycatch exceeds guideline limits, the MFRI may close the relevant fishing area for a short period of time, or for a longer period if small fish or by-catch repeatedly exceeds guideline limits. Also, temporary closures of areas are in force to protect spawning grounds of demersal species (Figure 3-12, Figure 3-1). Furthermore, various long-term area closures are in place, which may apply to specific fishing gear, fishing-vessel size or all fishing for certain periods of time. For instance, in order to protect the spawning stock of cod, extensive seasonal closures are in operation during the spawning season (Regulation Nr. 30/2005); all cod fisheries are closed within 12 miles along the south and west coast and within 6 miles along the north and east coast in April each year.

Such measures will serve to reduce bycatch of secondary out of scope seabird and marine mammal species; although not established to protect such species, area closures will also serve to maintain bycatch of marine mammals and seabirds at low levels since bycatch of many sensitive species is highest in inshore areas, which is where the closures are located (MFRI, pers. communication).

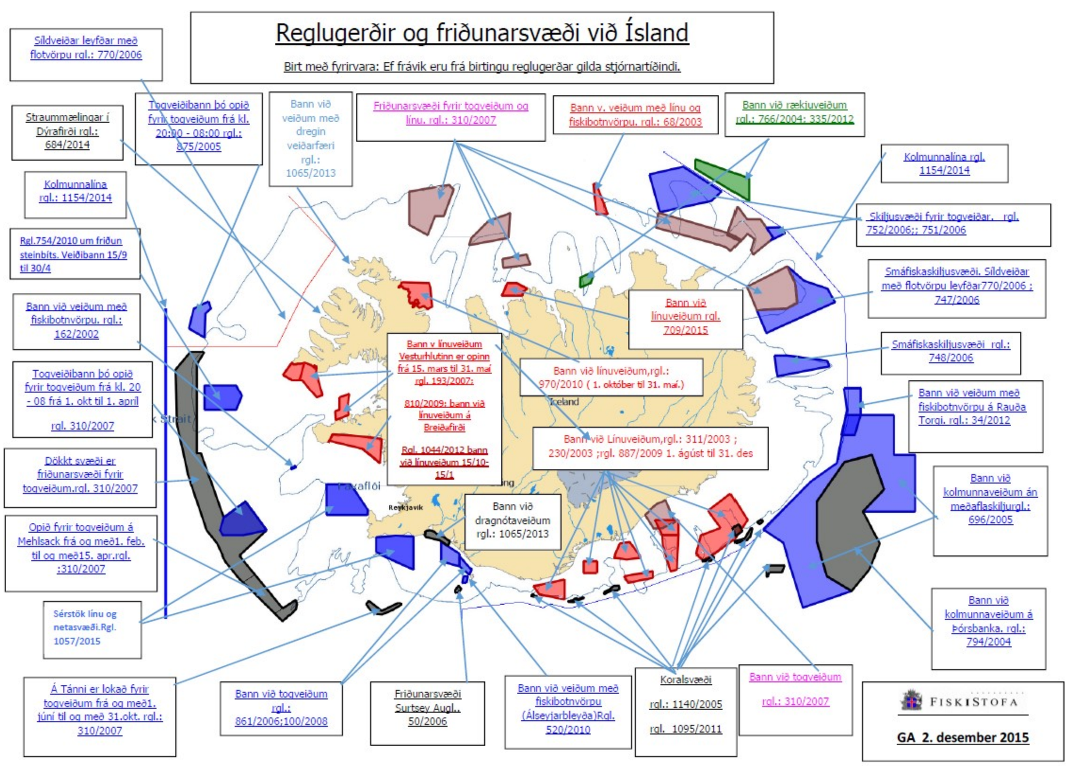


Figure 3-12. Map with information on temporarily closed areas in Icelandic waters. Source: Directorate of Fisheries (2015). A larger version is available here: http://www.fisheries.is/management/fisheries-management/area-closures/

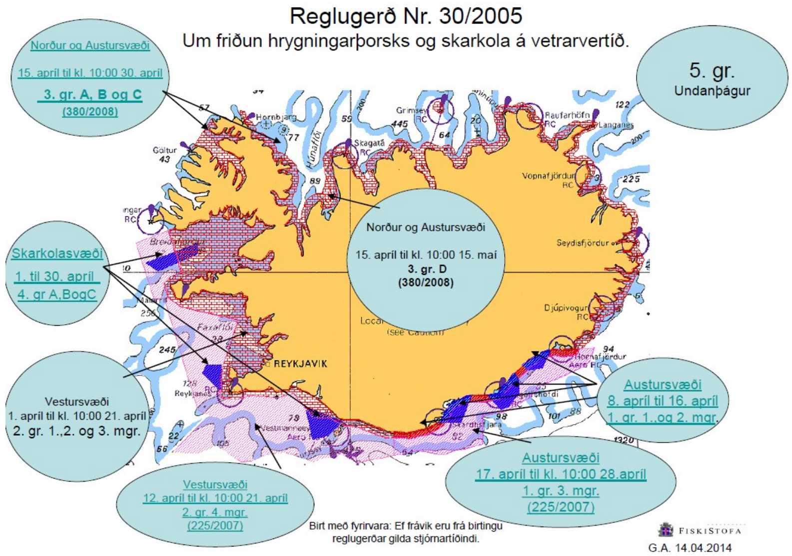


Figure 3-13. Map with information on spawning area closures in Icelandic waters. Source: Directorate of Fisheries (2015). A larger version is available here: http://www.fisheries.is/management/fisheries-management/area-closures/

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

- Marine mammal and seabird bycatch is monitored by mandatory eLog system, through the cod gillnet surveys (conducted in April each year), and onboard observers from the DF and the MFRI, although to date returns from the eLog system have been poor. The association of Small Boat Owners has taken steps to improve logbook reporting of marine mammal bycatch. In the effort to step up monitoring of such bycatch, the DF issued in 2014 a new simplified logbook form that is believed to improve reporting of bycatch[2]. This will allow a comprehensive strategy to manage fishing impacts be implemented in the future. Observers monitored ca. 1% of all fishing trips by the gillnet and longline fleets in 2014 and 2015, and overall the quality of the data has improved in the last 5 years (MFRI pers. communication).
- Icelandic longline fisheries use mitigation measures in order to reduce bycatch of seabirds (pers. comm. Gunnlaugur Eiriksson, ISF; Vottunarstofan Tún 2011). The longliners use either bird-scaring buoy lines or a gas alarm which is sounded when the line is shot. During the winter time, the lines are often shot in the dark, which reduces the possible bycatch of seabirds.
- Fishers are not allowed to offer for sale, give away, nor accept as a gift, any bird that has been killed in fishing nets.
- Any birds or mammals caught alive must be released.

A project to evaluate and mitigate bycatch in the lumpfish fishery is currently underway; project partners are BirdLife International, BioPol ehf. (a marine biotechnology company based in Skagaströnd), and the Icelandic National Association of Small Boat Owners (NASBO). The project has increased observer coverage on lumpfish fishing vessels, focusing in particular on areas which are known bycatch hotspots, and areas with high fishing effort. Twelve fishing trips with observers on board took place in 2015, and thirty-one in 2016. The project is also testing practical bycatch mitigation measures such as black and white scarer pannels sown into lumpfish gillnets, and the potential use of flashing lights to scare away seabirds and marine mammals. Efforts are underway to

[2] http://www.hafro.is/undir.php?ID=242&REF=3

identify sustainable sources of funding for ongoing monitoring and to extend the project to other fisheries. The project is ongoing, but once results are available it is expected that additional measures to further minimise the impacts of the lumpfish gillnet fishery will be implemented. Although the focus is on lumpfish gillnets, the mitigation measures being tested may well be transferrable to other types of gillnets such as (cod) gillnets and anglerfish gillnets. Moreoever, in 2017 research trials using the 'banana' pinger (from Fishtek Marine) were carried out to try to reduce porpoise bycatch in the cod gillnet fishery. Three commercial vessels were used for the experiment, one in Breidafjordur in west Iceland, one in Hunafloi in North Iceland and one off the south east coast. Analysis of the data collected during this initiative conducted in April 2017 is still ongoing, and will be presented at the ICES 2018 WGBYC meeting (ICES, 2017).

3.4.6.4 Information on Secondary Species

Information on fishing impacts on in-scope secondary species is available from the same data sources as for primary species (including both fisheries dependent and fisheries independent data), except that they may be somewhat less well studied since such species are not the focus of scientific sampling programmes and research projects. The Icelandic Fisheries Management Act requires that all catches shall be landed. Discarding is thus illegal, and landings of all in-scope species, are routinely recorded. All catches landed in Iceland must be weighed using specially authorized scales and the landing data is instantly transmitted to the database of Directorate of Fisheries (DF). There are strict requirements for the keeping of log books on-board all fishing vessels, containing information on fishing practices such as location, dates, gear and catch quantity. Log books must be made available to inspectors from the DF and to MRI for scientific purposes. A team of inspectors from DF monitors landing and weighing practices and inspectors may board fishing vessels to monitor catch composition, handling methods and fishing equipment. Following a random investigation, inspectors can join the vessel crew to the same fishing ground the vessel visited during the previous fishing trip, in order to examine their fishing practices. Also, the system of instant recordings of landings allows for the use of DF database to trace the origin and date of catch and to compare catches by an individual vessel to other vessels fishing at the same location and date. Discrepancies in catch proportion can lead to further inspections (see section 3.4.4.3 for further details).

Landings of some out-of-scope species secondary, such as harbour seals, have also been reported, but these are rare. Although Icelandic fishers are required to land all catches, based on the current practical interpretation of Icelandic fisheries laws, seabirds and mammals can be discarded at sea, as long as such catches are recorded in logbooks by fishers (MFRI, pers. communication). Icelandic regulations however do require that all bycatch should be recorded. The registration of bird and mammal bycatch in commercial cod gillnets (other than lumpfish) started in 2002. Bycatch registration was received from 5% of the cod gillnet vessels until 2009, although no birds were registered. In 2009 fishers were required to switch to electronic logbooks and after that no information on marine mammals or bird bycatch has been returned. More recently discussion have taken place between the competent authorities (MII, MRI and DF) and the National Association of Small Boat Owners in order to improve logbook reporting of marine mammals and seabirds bycatch. In the effort to step up monitoring of such bycatch DF has issued a new simplified logbook form that is believed to improve reporting of bycatch[3]. In order to further improve the available data, the DF observers have stepped up efforts to monitor bycatch rates of cod gillnets, lumpfish gillnets nets and longlines (coverage at present is ca. 1% of fishing trips). All data recorded by onboard observers is routinely made available to the MFRI for analysis. In addition, to such fisheries dependent data, the registration of marine mammals caught in the MRI spring gillnet survey was initiated in 1997, and for birds in 2009. The MRI spring gillnet survey is equivalent to 2% of the total cod gillnet fishing effort in April. The first year's the gillnet survey was only conducted in the south and west of the country but since 2002 it is also done in the north. The most recent estimates of marine mammal and seabird bycatch compiled by the

[3] http://www.hafro.is/undir.php?ID=242&REF=3

MFRI make use of all the available data sources to get the best possible estimate: data from observers, the scientific cod gillnet surveys (conducted in April each year), the limited amount of landings data available, and data from logbooks wherever feasible.

Information on the status of secondary species is available from fisheries independent scientific surveys, include the annual cod gillnet survey and the spring and autumn groundfish surveys. Data coming from such surveys is not publicly available, but routinely used for scientific purposes, for instance to assess the most recent population trends of Atlantic halibut (see

Figure 3-9).

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

Quantitative data is available to assess the magnitude of UoA-related impacts on the identified out-of-scope secondary species (see Table 19,

Table *21*), however logbook returns have been poor, and variations in estimated numbers of bycatch species evident in the most recent data indicate that the available information may not be accurate and verifiable for all bycatch species, including for the out-of-scope secondary species being considered in the present assessment. The low number of trips monitored by observers in the smaller fisheries, including gillnets, continues to make extrapolation of bycatch estimates difficult (MFRI, pers. communication); although the quality of the data has improved in the last 5 years. The most reliable by-catch data comes from observer trips, which covered 0.87% of fishing trips of the (cod) gillnet fleet in 2014, and 0.93% in 2015 / 0.9% of fishing trips by the longline fleet in 2014 and 1% in 2015 (MFRI pers. communication). Moreover, uncertainties remain on total population sizes of several species of birds and marine mammals, with only outdated information available on total population sizes for some species.

3.4.7 Endangered, Threatened and Protected Species

The MSC defines ETP species as those that are recognized as such by national legislation and/or binding international agreements to which the jurisdictions controlling the assessed fishery are party. 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.

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.

Twelve bird, eight cetaceans, one terrestrial mammal, one seal and one marine reptile species have been identified as ETP species that have the potential to interact with marine fisheries in Iceland (see Table 22 and Table 23).

Table 22: ETP species list, including English, scientific and Icelandic name.

English Name	Species	Icelandic Name	Type
Atlantic Puffin	*Fratercula arctica*	Lundi	Bird
Black Guillemot	*Cheppus grylle islandicus*	Teista	Bird
Black-legged kitiwake	*Rissa tridactyla*	Rita	Bird
Black-tailed godwit	*Limosa limosa islandica*	Jaðrakan	Bird
Common eider	*Somateria mollissima*	Æður	Bird
Common loon	*Gavia immer*	Himbrimi	Bird
Common Pochard	*Aythya ferina*	Skutulönd	Bird
Gyrfalcon	*Falco rusticolus*	Fálki	Bird
Horned Grebe	*Podiceps auritus*	Flórgoði	Bird
Long-tailed Duck	*Clangula hyemalis*	Hávella	Bird
White-tailed eagle	*Haliaeetus albicilla*	Haförn	Bird
Whooper swan	*Cygnus cygnus*	Álft	Bird
Blue Whale	*Balaenoptera musculus*	Steypireyður	Cetacean
Bowhead whale	*Balaena mysticetus*	Norðhvalur/Grænlandshvalur	Cetacean
Fin Whale	*Balaenoptera physalus*	Langreyður	Cetacean
Humpback whale	*Megaptera novaeangliae*	Hnúfubakur	Cetacean
Minke whale	*Balaenoptera acutorostrata*	Hrefna	Cetacean
North Atlantic Right Whale	*Eubalaena glacialis*	Sléttbakur	Cetacean
Sei Whale	*Balaenoptera borealis*	Sandreyður	Cetacean
Sperm Whale	*Physeter macrocephalus*	Búrhvalur	Cetacean
Hooded Seal	*Cystophora cristata*	Blöðruselur	Pinneped
Leatherback	*Dermochelys coriacea*	Leðurskjaldbaka	Reptile
Polar Bear	*Ursus maritimus*	Ísbjörn	Mammal

Table 23: ETP species designations in Icelandic marine waters

English Name	***Species***	***Type***	***IUCN Status***	***IUCN Pop. Trend***	***CITES, App. I***	***AEWA***
Atlantic Puffin	*Fratercula arctica*	Bird	VU	Decreasing		
Black Guillemot	*Cheppus grylle islandicus*	Bird				Y
Black-legged kitiwake	*Rissa tridactyla*	Bird	VU	Decreasing		
Black-tailed godwit	*Limosa limosa islandica*	Bird				Y
Common eider	*Somateria mollissima*	Bird	VU	Decreasing		

Common loon	*Gavia immer*	Bird	VU	Decreasing		
Common Pochard	*Aythya ferina*	Bird	VU	Decreasing		
Gyrfalcon	*Falco rusticolus*	Bird			Y	
Horned Grebe	*Podiceps auritus*	Bird	VU	Decreasing		Y
Long-tailed Duck	*Clangula hyemalis*	Bird	VU	Decreasing		
White-tailed eagle	*Haliaeetus albicilla*	Bird			Y	
Whooper swan	*Cygnus cygnus*	Bird				Y
Blue Whale	*Balaenoptera musculus*	Cetacean	EN	Increasing	Y	
Bowhead whale	*Balaena mysticetus*	Cetacean			Y	
Fin Whale	*Balaenoptera physalus*	Cetacean	EN	Unknown	Y	
Humpback whale	*Megaptera novaeangliae*	Cetacean			Y	
Minke whale	*Balaenoptera acutorostrata*	Cetacean			Y	
N-Atlantic Right Whale	*Eubalaena glacialis*	Cetacean	EN	Unknown		
Sei Whale	*Balaenoptera borealis*	Cetacean	EN	Unknown	Y	
Sperm Whale	*Physeter macrocephalus*	Cetacean	VU	Unknown	Y	
Hooded Seal	*Cystophora cristata*	Pinniped	VU	Decreasing		
Leatherback	*Dermochelys coriacea*	Reptile	VU	Decreasing	Y	
Polar Bear	*Ursus maritimus*	Mammal	VU	Unknown		

Based on the by-catch data supplied to the assessment team by the MFRI and a literature review, five bird species (Atlantic puffin, black guillemot, black-legged kitiwake, common eider, and common loon) and one marine mammal (the hooded seal) were identfied as ETP species which have interactions with three of the UoAs (gillnets, lumpfish gillnets, and longlines) under assessment (Table 24). These three species are examined in more detail below. No ETP species were recorded during onboard observations of anglerfish gillnets carried out by the DF in 2016, and none of the stakeholders interviewed during the site visit indicated that bycatch of any ETP species are taking place with this gear. Interactions of ETP marine mammal and seabird species with towed gear such as trawls and Danish seines are minimal (MFRI, pers. communication).

Table 24: ETP species bycatch (total number of individuals) taken in Icelandic (cod) gillnet, lumpfish gillnet and longline fisheries based on data recorded by onboard observers in 2014 and 2015 and raised to the total fishing fleet by the MFRI. Source: MFRI pers. communication.

	(Cod) Gillnet		**Lumpfish Gillnet**		**Longlines**	
Species	**2014**	**2015**	**2014**	**2015**	**2014**	**2015**
Atlantic puffin	0	42	0	72		
Black guillemot			1019	859	0	311
Black-legged kittiwake			23	0		
Common eider			950	6580		
Common loon			46	0		
Hooded seal	0	46				
Long-tailed duck			23	0		

Table 25: Impacts on Icelandic populations of ETP species by (cod) gillnet, lumpfish gillnet and longline fisheries. Population size estimates based on the most recent data available (source: BirdLife International (2015) European Red List of Birds, and MFRI pers. communications) and percentage of population impacted based on maximum bycatch rates estimated by the MFRI in the years 2014-2015 are presented. Bycatch data was provided by MFRI scientists following the site visit.

		% Population Impacted		
Species	**Icelandic Population Size (Individuals)**	**(Cod) Gillnet**	**Lumpfish Gillnet**	**Longlines**
Atlantic puffin	4,000,000-6,000,000[1]	0.0007 - 0.001	0.001 - 0.002	
Black guillemot	10,000-15,000		6.79 - 10.19	2.07 - 3.11
Black-legged kittiwake	1,160,000		0.002	
Common eider	600,000		1.10	
Common loon	400-600		7.67 - 11.50	
Hooded seal	67,104-98,573[2]	0.05 - 0.07		
Long-tailed duck	4,000-6,000		0.38 - 0.58	

[1] Only outdated (1992) estimates of the Icelandic population size exist

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

Since the bycatch estimates provided by the MFRI are higher than those previously estimated by Pálsson et al. (2015), the present assessment is based on the updated MFRI dataset. As for the out-of-scope secondary species, in all cases the 'worst case scenario' approach to estimating by-catch rates was adopted: (i) the maximum number of individuals caught as by-catch in either 2014 or 2015 was taken into account.

3.4.7.1 Outcome Status

<u>Atlantic puffin</u>

The species can be found throughout the North Atlantic Ocean. It occurs in north-west Greenland, from north Norway down to the Canary Islands, and Spain, where it nests on grassy maritime slopes, sea cliffs and rocky slopes (Nettleship et al. 2014). The species is a pursuit-diver catching most of its prey within 30 m of the water surface, although it is capable of diving to 60 m (Piatt and Nettleship 1985, Burger and Simpson 1986). Prey includes pelagic fish, such as herring, capelin, sandeel (Barrett et al. 1987), and on occasion demersal fish such as gadids (Rodway and Montevecchi 1996). Sandeels usually form the majority of the prey which are fed to chicks, and chicks are known to starve during periods of low sandeel abundance (Martin 1989). The Icelandic population has been estimated at 4,000,000-6,000,000, however this estimate dates back to 1992 and is thus outdated (

Table 25). The population in Iceland and Norway, which together account for 80% of the European population, decreased markedly since the early 2000s and, although the population size was estimated to be increasing in the UK during 1969-2000, evidence suggests that it has undergone declines or probable declines since 2000 (Harris and Wanless 2011). As a result, the population size in Europe is estimated and projected to decrease by 50-79% between 2000-2065 (three generations) (BirdLife International, 2015). These declines resulted in an IUCN classification of 'Endangered' in Europe (see status on *http://www.iucnredlist.org/*).

Based on the most recent MFRI data available, gillnets accounted for a maximum of 42 Atlantic puffin deaths per year in 2014 and 2015. Only outdated Icelandic population data (Umhverfisráðuneytið, 1992 cited in BirdLife International, 2015) exists, based on which an estimated 0.0007-0.001% of the Icelandic Atlantic puffin population would have been impacted. An additional maximum of 72 Atlantic puffins were caught as annual bycatch by lumpfish gillnets during the same period, which impacted a further 0.001-0.002% of the Icelandic population.

Black guillemot

According to IUCN (BirdLife International 2012), Iceland has about 3% of the North Atlantic breeding population with about two thirds breeding in Greenland or Norway (see 'supplementary material' to BirdLife International 2012). The species has a circumpolar distribution including the north coast of Russia as well as Alaska and Canada. Due to its very large population size in Europe, and only moderate decreases in the overall population size (less than 25% in 32.7 years, i.e. three generations), this species was recently given an IUCN status of 'Least Concern' in Europe (seee http://www.iucnredlist.org/).

The Icelandic population was estimated to number 10,000 to 15,000 individuals by the Icelandic Institute of Natural History in 2000. More recent estimates are not available, but both short and long term population trends for this species in Iceland have been estimated to be decreasing at a moderate rate. The reasons for this decline are not fully understood, although various factors have been suggested as explanations including: human disturbance, incidental capture in fishing nets, competition for nest sites with puffins, tick parasitism, changes in food resources and other environmental factors (Petersen, 2001). Black guillemots are nearshore feeders, and several studies (at the Bay of Fundy, Finland, Denmark and Iceland) found that black guillemots foraged between 0.5 and 4 km from nest sites, and occasionally beyond 7 km away (Birdlife International, 2000). As such they are more susceptible to inshore gillnets, such as those targeting lumpfish, rather than cod gillnets that are usually operated further offshore.

Recent estimates of bycatch made available by the MFRI show that bycatch rates are low in longlines, although these estimates are based on observer reports which cover ca. 1% of fishing trips and there were considerable differences between estimated bycatch levels in 2014 and 2015 (2014: 0 / 2015: 311 black guillemots caught as bycatch). Using the lower estimated Icelandic population size of 10,000 individuals, and the maximum annual recorded bycatch of 311 black guillemots caught as by catch, the fishery would have impacted 3.11% of the total estimated Icelandic population per year. More concerning are estimated bycatch levels for lumpfish gillnets, where a maximum of 1019 black guillemots caught as bycatch were recorded during the same period, which accounts for 6.79-10.19% of the total Icelandic population size.

Black-legged kittiwake

This small gull (*Rissa tridactyla*) is found along most Atlantic coastlines, including those of Iceland and Greenland. The species winters at sea across much of the north Atlantic, before migrating to breeding grounds where black-legged kittiwakes nest in huge single- or mixed-species colonies (Burger et al. 2013). Its diet consists predominantly of marine invertebrates and fish, although during the breeding season it may also take intertidal molluscs, crustaceans, earthworms, small mammals and plant matter (Burger et al. 2013). Many species of fish have been recorded in its diet, but sandeels, capelin, and herring are particularly important (Burger et al. 2013). The European population is estimated at

3,460,000-4,410,000 mature individuals; the Icelandic population has been estimated at 1,160,000 individuals (Table 19). The European population size is estimated and projected to decrease by 30-49% over the period from 1983, the start year of the reported trend for Iceland, which accounts for more than 30% of the European population) to 2020 (three generations) (BirdLife International, 2015). As a result common eider was recently given an IUCN status of 'Vulnerable' in Europe (see status on http://www.iucnredlist.org/).

Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 23 black-legged kittiwake deaths per year, which accounts for 0.002% of the total estimated Icelandic population per year.

Common eider

The common eider (*Somateria mollissima*) is a widespread sea duck, which is distributed over the northern coasts of Europe, Iceland and southern Greenland. The species breeds in northern temperate regions and the Arctic, but its range expands south in winter, as far as the western Mediterranean (Carboneras et al. 2017a). Common eiders are widely distributed along the coast of Iceland, where nesting eiders are considered economically important because of their down.. As a result, the breeding colonies of this species are protected, so that valuable down (ca. 3 tonnes annually) can be harvested from the nests (Skirnisson, 2015). Common eiders prey on a large variety of benthic invertebrate species such as molluscs, crustaceans and echinoderms in intertidal and subtidal areas; in Iceland the main prey of adult eiders are chitons and blue mussels (Skirnisson and Jonsson, 1996; Kristjansson et al. 2013). The European population is estimated at 1,580,000-1,910,000 mature individuals, but the species underwent rapid declines across the majority of its European breeding range during the 2000s. The Icelandic population has been estimated at 600,000 individuals (Table 19). The European population size is estimated and projected to decrease by 30-49% over the period 2000 - 2027 (three generations) (BirdLife International, 2015). As a result common eider was recently given an IUCN status of 'Vulnerable' in Europe (see status on http://www.iucnredlist.org/).

Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 6580 common eider deaths per year, which accounts for 1.1% of the total estimated Icelandic population per year.

Common loon

The common loon (*Gavia immer*), also known as the great northern diver, breeds in southern parts of Greenland and throughout Iceland. In winter the species inhabits coastal areas and large lakes over a wide area including the Atlantic coasts of Europe from Finland to Portugal, and the western Mediterranean (Carboneras et al. 2017b). The European wintering population is estimated at 5,100-6,300 individuals, of which ca. 3,400-4,200 are mature individuals. The Icelandic population has been estimated at just 400-600 individuals (Table 19). The European population is estimated and projected to be decreasing by 30-49% between 2000 and 2029 (three generations) (BirdLife International, 2015). As a result the common loon has an IUCN status of 'Vulnerable' (see status on http://www.iucnredlist.org/).

Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 46 common loon deaths per year, which accounts for 7.67-11.5% of the total estimated Icelandic population per year.

Hooded seal

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

Table 25). With changing sea ice conditions reducing the pack ice habitat needed by all hooded seals, there is good reason to believe that numbers in all stocks might be declining. For instance, hooded seals in the Greenland 'West Ice' area continue to show a declining trend. Comparing pup production estimates for 1997 and 2012 indicates a population decrease of 3.7% per year and a reduction in population size of 43% in 15 years (Kovacs, 2016). The most recent estimate of the total size of this population is 82,830 (SE=8,028) and models suggest a continued decline of approximately 7% per year in the coming decade (Øigård et al. 2014). Overall, this stock is less than 10% of its abundance observed some 60 years ago (ICES, 2013). Overhunting was clearly involved in the collapse of this stock as quotas were being set for a population size much larger than it actually was. However, the cause of the significant on-going decline in this population is thought to be related to climate change induced alternation of its sea ice breeding habitat and increased predation by polar bears and killer whales in the pupping areas (Øigard et al., 2014); prey availability might also be an issue. As a result of these population declines this species is currently classified by IUCN as 'Vulnerable' (Kovacs, 2016).

Based on the most recent MFRI data available, gillnets account for a maximum of 46 hooded seal deaths per year in 2014 and 2015, which accounts for 0.05-0.07% of the total estimated annual number of hooded seals which visit Icelandic waters to feed.

<u>Long-tailed duck</u>

This seaduck is circumpolar, and breeds on the coasts of Greenland, Iceland and Norway. Besides coastal sites, this species nests on small lakes, pools, bogs and rivers; it is for example known to breed at Lake Mývatn in the north-east of Iceland (Bengtson, 1972). It winters at sea further south, where it can be found as far as south the United Kingdom and other areas including the Black Sea and Caspian Sea (Carboneras and Kirwan 2014). The species shows a preference for marine foods and its diet consists predominantly of animal matter such as crustaceans, molluscs, other marine invertebrates and fish (Snow and Perrins 1998). In Europe the breeding population is estimated at 676,000-890,000 mature individuals, which increases to 954,000-2,350,000 mature individuals in winter. The Icelandic population has been estimated at 4,000-6,000 (

Table 25). The winter population size is estimated to have been decreasing by 30-49% in 27 years (three generations); due to the rapid wintering population size decreases across Europe this species has an IUCN classification of 'Vulnerable' (BirdLife International, 2015; see http://www.iucnredlist.org/).

Based on the most recent MFRI data available, lumpfish gillnets account for a maximum of 23 long-tailed duck deaths per year in 2014 and 2015, which accounts for 0.38-0.58% of the total estimated Icelandic population of this species.

3.4.7.2 Management

Various measures taken to ensure the protection of juvenile fish and vulnerable habitats in Icelandic waters (e.g. regulations on the type of fishing gear allowed in different areas, rules on the minimum mesh sizes, use of sorting grids on trawls and the closing of fishing grounds) will serve to reduce bycatch of ETP seabird and marine mammal species (see also section 3.4.6.3). For instance, although not established to protect such species, area closures (see Figure 3-12, Figure 3-1) will also serve to maintain bycatch of marine mammals and seabirds at low levels since bycatch of many sensitive species is highest in inshore areas, which is where the closures are located (MFRI, pers. communication).

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

- Marine mammal and seabird bycatch is monitored by mandatory eLog system, through the cod gillnet surveys (conducted in April each year), and onboard observers from the DF and the MFRI, although to date returns from the eLog system have been poor. The association of Small Boat Owners has taken steps to improve logbook reporting of marine mammal bycatch. In the effort to step up monitoring of such bycatch, the DF issued in 2014 a new simplified logbook form that is believed to improve reporting of bycatch[4]. This will allow a comprehensive strategy to manage fishing impacts be implemented in the future. Observers monitored ca. 1% of all fishing trips by the gillnet and longline fleets in 2014 and 2015, and overall the quality of the data has improved in the last 5 years (MFRI pers. communication).
- Icelandic longline fisheries use mitigation measures in order to reduce bycatch of seabirds (pers. comm. Gunnlaugur Eiriksson, ISF; Vottunarstofan Tún 2011). The longliners use either bird-scaring buoy lines or a gas alarm which is sounded when the line is shot. During the winter time, the lines are often shot in the dark, which reduces the possible bycatch of seabirds.
- Fishers are not allowed to offer for sale, give away, nor accept as a gift, any bird that has been killed in fishing nets.
- Any birds or mammals caught alive must be released.

A project to evaluate and mitigate bycatch in the lumpfish fishery is currently underway; project partners are BirdLife International, BioPol ehf. (a marine biotechnology company based in Skagaströnd), and the Icelandic National Association of Small Boat Owners (NASBO). The project has increased observer coverage on lumpfish fishing vessels, focusing in particular on areas which are known bycatch hotspots, and areas with high fishing effort. Twelve fishing trips with observers on board took place in 2015, and thirty-one in 2016. The project is also testing practical bycatch mitigation measures such as black and white scarer pannels sown into lumpfish gillnets, and the potential use of flashing lights to scare away seabirds and marine mammals. Efforts are underway to identify sustainable sources of funding for ongoing monitoring and to extend the project to other fisheries. The project is ongoing, but once results are available it is expected that additional measures to further minimise the impacts of the lumpfish gillnet fishery will be implemented. Although the focus is on lumpfishnets, the mitigation measures being tested may well be transferrable to other types of

[4] http://www.hafro.is/undir.php?ID=242&REF=3.

gillnets such as (cod) gillnets and anglerfish gillnets. Moreoever, In 2017 research trials using the 'banana' pinger (from Fishtek Marine) were carried out to try to reduce porpoise bycatch in the cod gillnet fishery. Three commercial vessels were used for the experiment, one in Breidafjordur in west Iceland, one in Hunafloi in North Iceland and one off the south east coast. Analysis of the data collected during this initiative conducted in April 2017 is still ongoing, and will be presented at the ICES 2018 WGBYC meeting (ICES, 2017).

There are no Icelandic requirements for protection and rebuilding black guillemot or hooded seals. However, in 2007 the NAMMCO Management Committee for Seals and Walruses recommended a commercial catch level of zero for hooded seals, only allowing limited research catches. This species is nevertheless still being caught in large numbers by Greenland; the average catches over the last 5 years are around 1,850 animals, compared to the previous five years when the annual catch was 3,400 (NAMMCO, 2016). There are no formal Icelandic requirements for protection and rebuilding of Atlantic puffin, but in recent years hunting restrictions have been agreed by locals and implemented for the biggest colony located in Vestmannayeyjar (MFRI, pers. communication).

3.4.7.3 Information

The sources of information available to assess the impacts of the UoAs on ETP seabird and marine mammal species / to assess the status of such species are the same as those described in detail for out-of-scope secondary species in section 3.4.6.4. They include: data from routine recoding of landings, logbook data, onboard observations, scientific surveys (in particular the annual cod gillnet survey), population censuses carried out by various entities (including but not limited to the MFRI, the Icelandic Seal Center, the Vör Marine Research Center and the Icelandic Institute of Natural History), and scientific research projects.

As for the out-of-scope secondary species, quantitative data is available to assess the magnitude of UoA-related impacts on the identified ETP species (see

Table 25), however logbook returns have been poor, and variations in estimated numbers of bycatch species evident in the most recent data indicate that the available information may not be accurate and verifiable for all bycatch species, including for the ETP species being considered in the present assessment. The low number of trips monitored by observers in the smaller fisheries, including gillnets, continues to make extrapolation of bycatch estimates difficult (MFRI, pers. communication); although the quality of the data has improved in the last 5 years. Moreover, uncertainties remain on total population sizes of several species of birds and marine mammals, with only outdated information available on total population sizes for some species, including Atlantic puffins identified as an ETP species in the present assessment.

3.4.8 Habitats

3.4.8.1 Outcome Status

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

In the following section we will examine the impact of the assessed fisheries upon to specific elements, (i) ***commonly encountered habitats*** and (ii) ***vulnerable marine ecosystems***.

3.4.8.2 Commonly encountered habitats

Commonly encountered habitats are those with which the gear regularly comes into contact; such habitats are considered separately from vulnerable marine ecosystems (VMEs) for the purpose of this assessment. The benthic habitats around Iceland are characterized by sandy and gravel bottoms in shallow waters and on the ridges, with frequent lava intrusions, and muddy, high organic bottoms in deeper waters (Figure 3-14). The deeper bottoms may have dense aggregations of mobile megabenthos, particularly in organic matter−rich regions. Dropstones in a muddy or sandy environment were observed to provide a substrate for various diverse sessile epifauna (Meißner *et al*, 2014).

Anglerfish occur over a very wide depth range from shallow waters down to dephts of over 1000 m, but in Icelandic waters the species is most common from 20 m to 500 m, where they are found on muddy to gravelly, occasionally rocky bottoms (Thangstad et al., 2002). In the past the distribution of anglerfish was restricted to the warmer waters of southern Iceland, but at present the species' distribution has expanded to the waters west / north-west off Iceland. The only UoA specifically targetting anglerfish considered in the present assessment are anglerfish gillnets; anglerfish are caught as bycatch in bottom trawl, *Nephrops* trawl, Danish seine, cod gillnets, lumpfish gillnets and longlines. The distribution of anglerfish catches taken in 2011 and 2015 with the three different types of gillnets considered in the present assessment is shown in Figure 3-16.

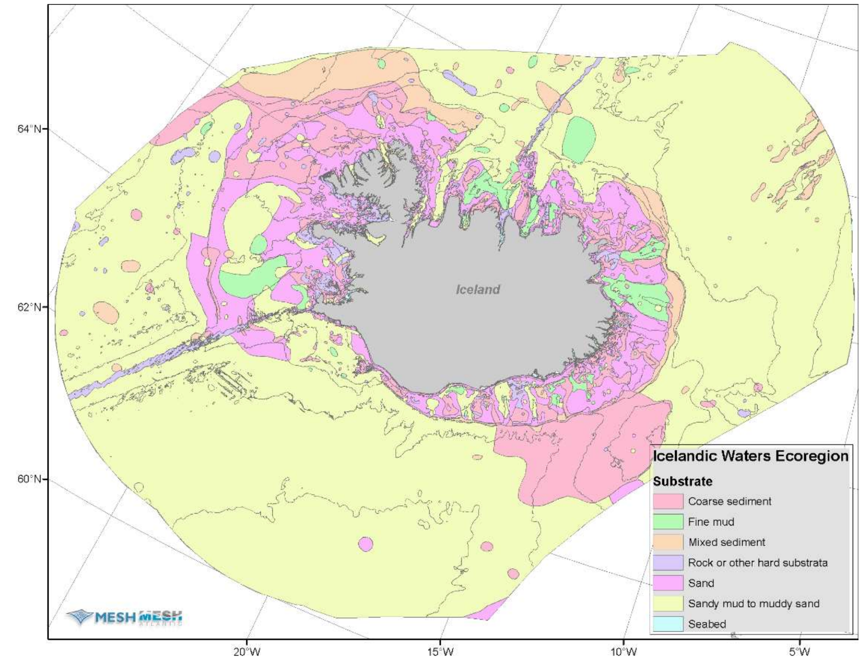


Figure 3-14: Major substrates in the Icelandic Waters ecoregion (compiled by EMODNET substrate habitats; www.emodnet-seabedhabitats.eu). Source: ICES, 2017.

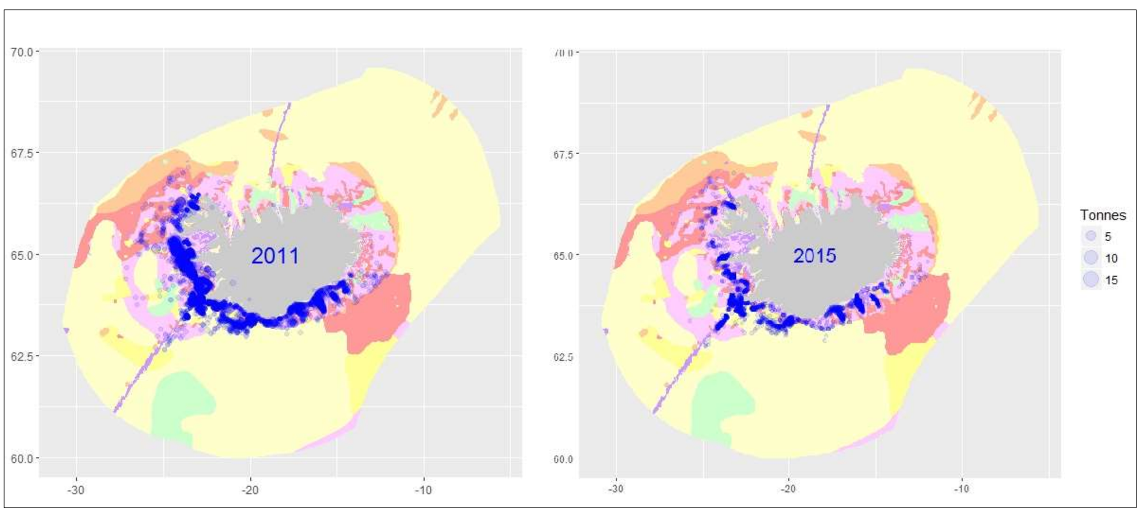


Figure 3-15: Distribution of 2011 and 2015 anglerfish (Lophius piscatorius) catches around Iceland. All gears, dark areas indicate highest catch (tonnes/nmi²). Coloured shading indicates major sustrates in the Icelandic Waters ecoregion (see legend of Figure 3-14). Source: MFRI pers. communication.

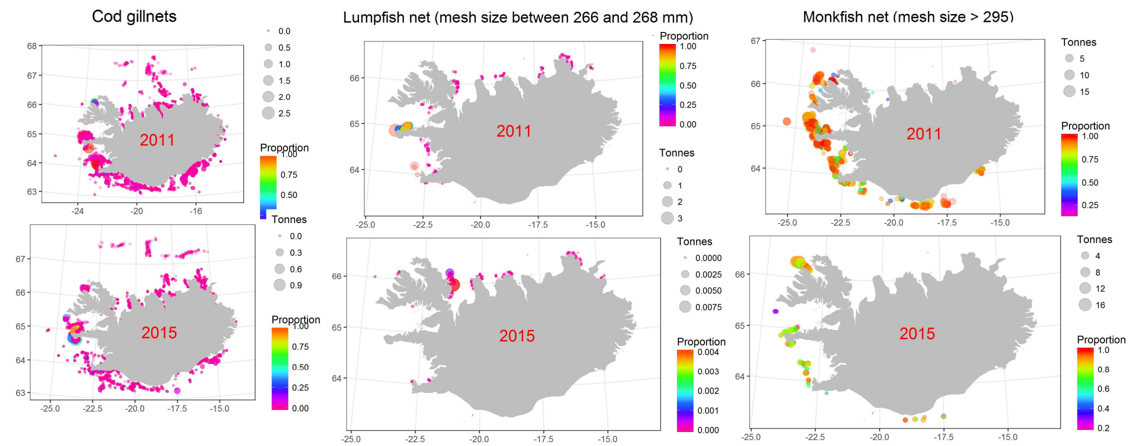
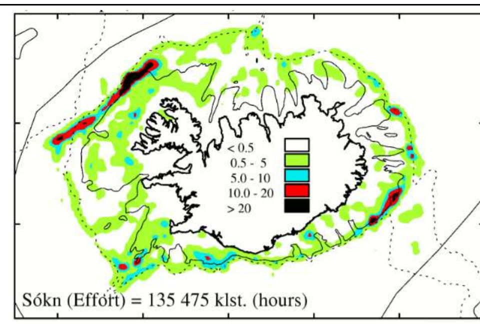
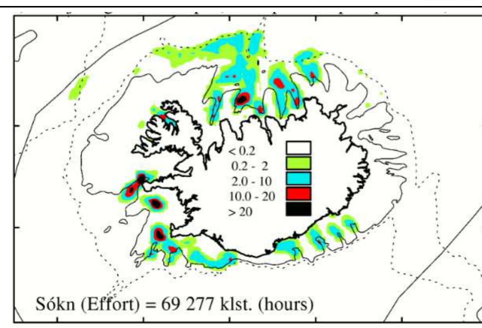
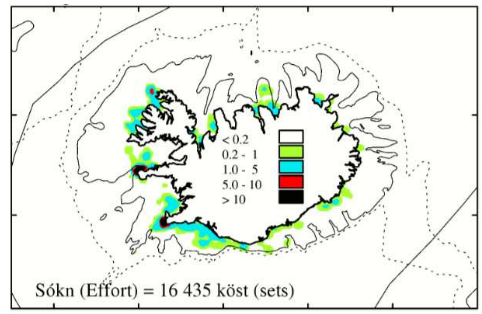
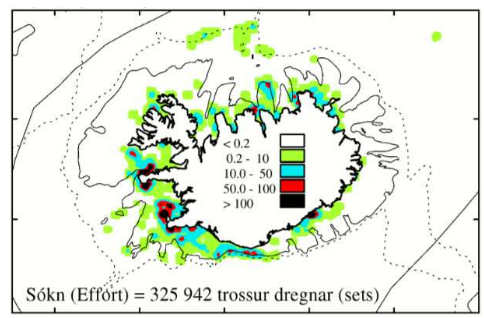
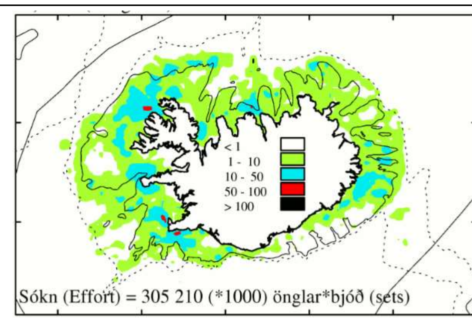


Figure 3-16: Distribution of 2011 and 2015 anglerfish (Lophius piscatorius) catches taken by cod gillnets (left), lumpfish gillnets (centre) and anglerfish nets (right) around Iceland.(NB anglerfish is also known as 'monkfish')

The commonly encountered habitats are briefly considered for each gear type in the table below.

Table 26: Commonly encountered habitats. Maps of gillnet fishing effort include cod gillnets, anglerfish gillnets and lumpfish gillnets; Figure 3-16 shows the distribution of anglerfish catches around Iceland for each of the three types of gillnets considered as separate UoAs in the present assessment.

Gear type (water depth)	***Commonly encountered habitats***	***Fishing intensity distribution***
Bottom trawl (100 – 500 m)	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 (compare Figure 3-14 with map of fishing intensity distribution; Ragnarsson & Steingrímsson, 2003).	
Nephrops trawl (100 – 500 m)	Soft ground, usually soft mud that provides good burrowing habitat for *Nephrops.*	

<table>
<tr><th>Gear type (water depth)</th><th>Commonly encountered habitats</th><th>Fishing intensity distribution</th></tr>
<tr><td>Danish seine
(40 – 60 m)</td><td>Danish seine cannot be used to work on rough grounds and is used on relatively flat sandy or muddy seabeds (Thórarinsdóttir et al, 2010; MFRI pers. communication).</td><td>
</td></tr>
<tr><td>Gillnets
(0 – 100 m)</td><td>Largely pelagic habitat, although 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.</td><td rowspan="3">
</td></tr>
<tr><td>Anglerfish Gillnets
(60-80 m)</td><td>Largely pelagic habitat, although footrope has contact with the ground. Fishing effort is concentrated in areas characterised by coarse sediments, but gillnets may also be deployed on hard and soft bottom habitats.</td></tr>
<tr><td>Lumpfish Gillnets
(0 – 40 m)</td><td>Largely pelagic habitat, although footrope has contact with the ground. Fishing effort is concentrated in areas characterised by hard bottoms in highly turbulent waters and coarse sediments.</td></tr>
<tr><td>Longline
(50 – 300 m)</td><td>Fishing effort is concentrated in areas characterised by hard bottoms and coarse sediments, but longlines may also be deployed in soft bottom habitats (compare Figure 3-14 with map of fishing intensity distribution).</td><td>
</td></tr>
</table>

3.4.8.3 Vulnerable Marine Ecosystems (VMEs)

The MESH (OSPAR/JNCC) habitat map for OSPAR threatened and/or declining habitats for Iceland and around is presented in Figure 3-17. Information on sensitive habitats in the Northeast Atlantic is available from OSPAR (2008a) and habitat related maps for Icelandic waters are provided in variety of published reports (e.g. Steingrímsson and Einarsson 2004, Garcia et al. 2006, Ólafsdóttir and Burgos 2012).

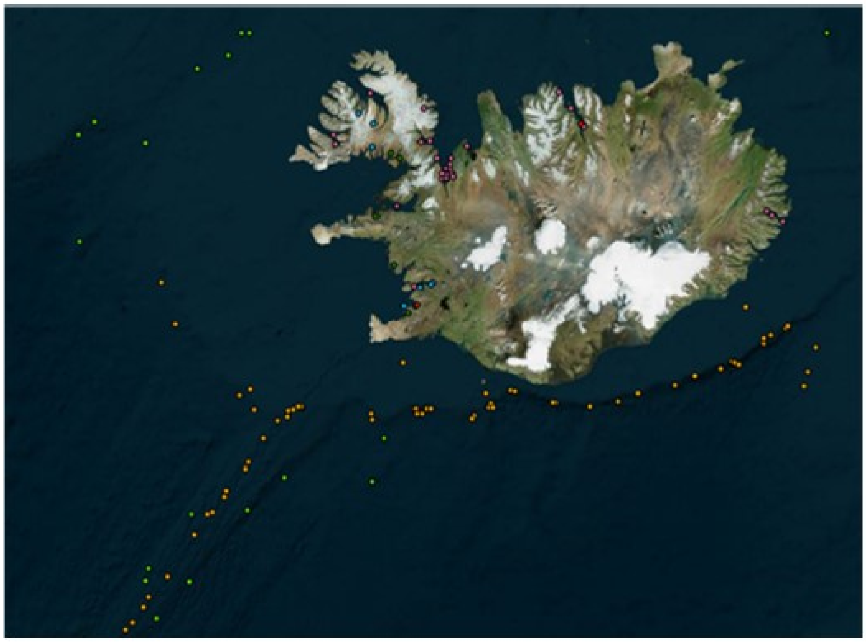


Figure 3-17: MESH (OSPAR/JNCC) habitat map for OSPAR threatened and/or declining habitats for Iceland. Yellow = Lophelia, green = deep-sea sponge aggregation, pink = maerl beds, red = hydrothermal vents, dark green = Zostera beds, blue = intertidal Mytilus edulis beds.

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

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

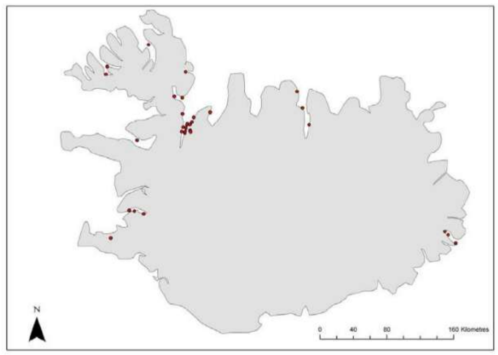
In general, vulnerable habitats around Iceland occur in deep waters and are commonly close to the continental shelf break or deeper. However, maerl beds, *Modiolus* reefs and hydrothermal vents in the Eyjafjörður fjord are examples of vulnerable habitats that occur in coastal waters.

Maerl beds

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

In Iceland maerl beds appear to be most common off the northern coast (see Table 27). Aðalsteinsdóttir and Garðarsson (1980) sampled a grid of stations in central Hvalfjord, showing coralline algae to be present close to the northern shore from Grunartangi to Katanes. Karl Gunnarsson (pers. communication cited in OSPAR, 2010) reports that maerl is widely distributed in northern Icelandic fjords, deep within the fjords but probably exposed to some wave action. His study at Langanes, Arnafjörður (Gunnarsson, 1977) shows the maerl to be situated on an exposed headland within the fjord. This is similar to its distribution at Hvammur, Hvalfjörður (K. Collins and J. Mallinson, unpublished observations cited in OSPAR, 2010). Icelandic maerl beds have rarely been reported below 20 m depth in Icelandic waters (MFRI, pers. communication).

Table 27: Maerl beds

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

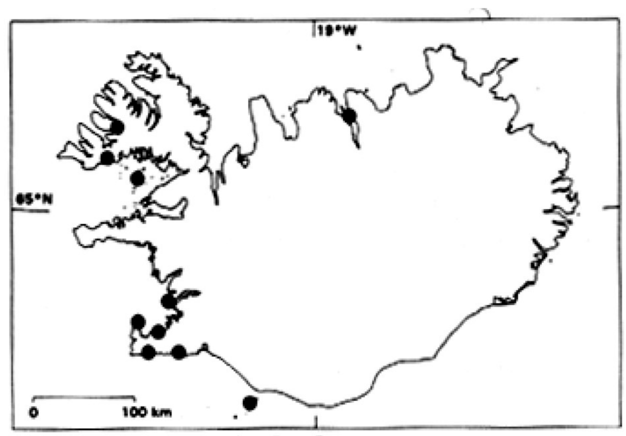
Mechanical disturbance and re-suspension of nearby sediments, particularly by direct targeted extraction (e.g. for use as fertilisers), and through bottom trawling, are the most destructive human activities affecting maerl beds. Other threats include pollution (e.g. wastewater discharge, aquaculture), which results in increased turbidity and sedimentation, but also direct habitat destruction through artisanal and recreational fishing, coastal or offshore construction activities (including submarine cables), unregulated diving activities and anchoring. Climate change is also known to affect several key species that are part of coralligenous habitats (Martin et al., 2014). The main impacts on maerl beds in Iceland come from dredging for fertilisers and bycatch in the scallop dredges (Chen 2012 and references therein). Harvesting of maerl in Iceland is currently taking place at 3 locations within Arnarfjörður (MFRI, pers. communication), whilst scallop fishing in Iceland has declined significantly in recent years (in 2000 a total of 9081 tonnes of scallops were fished; during 2004-2013 there was no fishing of scallops in Iceland; in 2014 and 2015 the catch was 281 and 351 tonnes respectively).

Modiolus reefs

The horse mussel (*Modiolus modiolus*) normally occurs in the form of dense beds, at depths up to 70 m 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.

In a survey carried out in 1994 looking for fishable blue mussel beds in Icelandic waters, horse mussel beds were observed in the mouth of Hvalfjördur and in Grundarfjördur at 10-18 m depth (Stofnstærðarmat og kortlagning kræklings í Faxaflóa í júní 1994, unpublished report). In 1998 another survey was carried out in the northern part of Breidafjördur and in most of the small fjords there, horse mussels were found at 5-50 m depth (Stofnstærðarmat og kortlagning kræklings í Breidafirði 1998, unpublished report). In a stock assessment survey for green sea urchin in southern Breidafjördur in 2016, horse mussel beds were observed in Breidasund at 15-50 m depth (report in preparation; MFRI pers. communication). Overall, the distribution of *M. modiolus* appears to be mainly concentrated near the coast on the western coast of Iceland.

Table 28: Modiolus *reefs*

Description	Dense mussel beds formed by the horse mussel *Modiolus modiolus* which support diverse communities of epibiota and infauna.
Occurrence in Icelandic waters	*Modiolus* reefs are concentrated on the western coast of Iceland.  *Distribution of Modiolus modiolus around Iceland. Source: Ingolfsson, 1996.*
Depth range	*Modiolus* reefs have been reported at depths ranging from 5 - 50m in Icelandic waters.
Depth range of fishery	20-500 m
Overlap of fishery with habitat	Potential for limited overlap with Danish seine, (cod) gillnet, anglerfish gillnet, lumpfish gillnet and longline off the W- / SW-coast of Iceland.
Protection measures	None; the main impacts on *Modiolus* reefs in Iceland come bycatch in the scallop dredges. Scallop fishing in Iceland has declined significantly in recent years.
References	Ingolfsson, 1996; Ospar, 2009a; MFRI pers. communication.

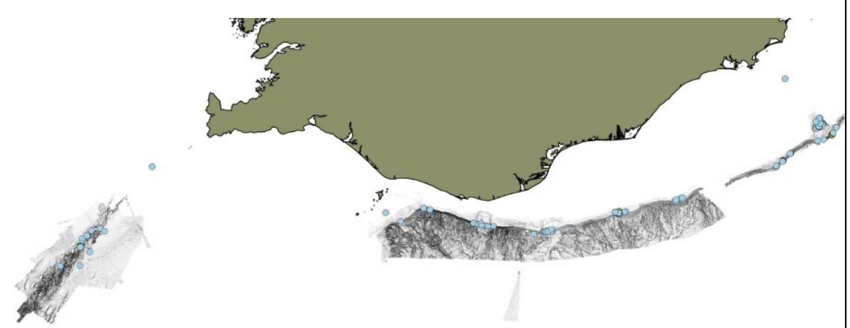
Activities which may impact horse mussel beds include dredge fisheries for scallops, beam and otter trawling, coastal developments, and run-off from agriculture, forestry and aquaculture. In Iceland reports from studies of the impacts of scallop dredging in Breidafjordur (off the western coast of Iceland)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

Reef forming corals

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

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

Table 29: Cold-water coral (Lophelia pertusa)

Description	*Lophelia pertusa*, a cold-water, reef-forming coral
Occurrence in Icelandic waters	Slope areas off S and W-coast of Iceland and on the Reykjanes Ridge  Present occurrence (light blue dots) of *Lophelia pertusa* in Icelandic waters. Source: Ólafsdóttir et al. 2014
Depth range	Found 200-1,400 m, but concentrated 400 – 800 m
Depth range of fishery	20-500 m
Overlap of fishery with habitat	On the continental shelf close to the slope area. Several coral areas were lost to bottom trawling in the past. Several remaining areas are out of reach for bottom trawling or have been protected.
Protection measures	14 coral areas have been closed for fishing. There is some natural protection along the ridges due to the complex lava rock formations. Included as a threatened or declining species and habitats (OSPAR agreement 2008-6).
References	OSPAR, 2009b; Buhl-Mortensen *et al*, 2014; Burgos *et al*. 2014; Ólafsdóttir & Burgos 2012; Steingrímsson & Einarsson 2004.

In common with many other corals, *Lophelia* is brittle which makes it vulnerable to physical damage, in particular from fishing gear (ACE, 2002). In the Norwegian EEZ, for example, *L. pertusa* is estimated to cover somewhere between 1,500 and 2,000 km² of seabed, mostly concentrated between depths of 200–400 m (Fosså et al., 2002). Analysis of information indicates that one half of the total reef area of Norway has been damaged to an observable extent (Mortensen et al., 2001). The current and past distribution of *L. pertusa* reefs around the Faroe Islands also show changes, and these are thought to be due to fishing (ICES, 2001). The MFRI has an ongoing programme mapping the seabed, including the location and distribution of *Lophelia* reefs. What remains uncertain is the length of time that apparent trawl damage can be identified in reef areas after the incident. At the depths involved it is quite probably decades rather than months. Economic self-interest means that skippers tend to avoid known reef areas due to the potential damage to trawls or loss of nets and lines with concomitant loss of catch and loss of fishing time to repair or recover gear.

MFRI interviewed retired fishermen who fished actively prior to 1970, and carried out a questionnaire to fishermen working in the fisheries more than 30 years later (Steingrímsson and Einarsson, 2004). This information was used to assess the current status of coral areas by comparing their historical and present distribution off Iceland. It was concluded that during the 1980s and 1990s some relatively large coral grounds vanished, e.g. one on the Reykjanes Ridge (36km²) and two near the Öræfagrunn Bank (68 and 30km², respectively; Garcia et al, 2007).

Based on analysis of logbook data about 79 km² were fished with towed bottom fishing gears in 2013, comprising 10% of the Icelandic ecoregion (MFRI, 2016). The total fishing effort by bottom trawls targeting fish and shrimp has decreased between 2000 and 2014 by around 40% while the *Nephrops* trawling effort has remained at similar level. 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.

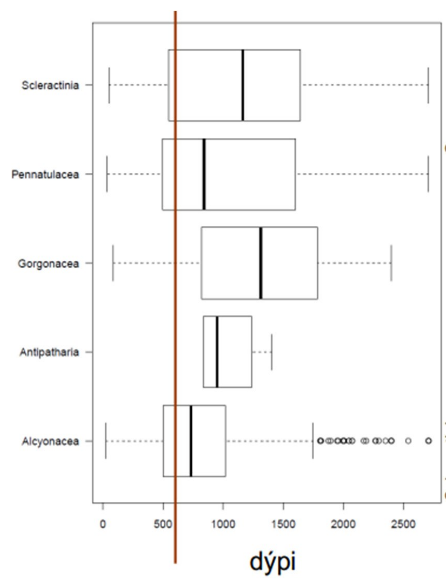


Figure 3-18. Boxplots showing the distribution of various groups of corals making up 'coral garden' habitat by depth (dýpi) around Iceland. (The red line should be ignored for these purposes.) Source: Ólafsdóttir et al. 2014.

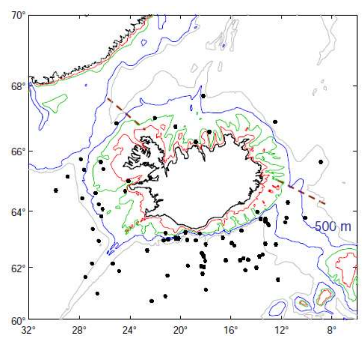
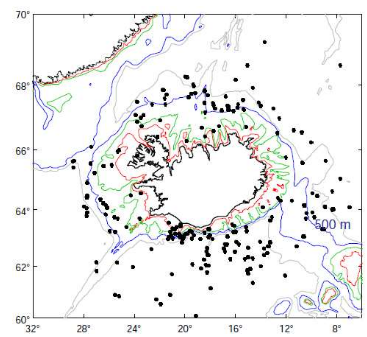
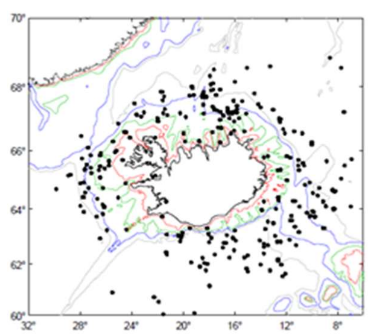
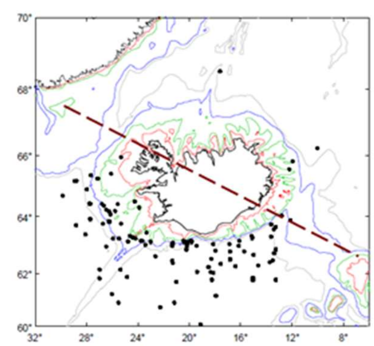
Coral gardens

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

Taxonomic groups that make up coral garden habitats in Icelandic waters are found primarily in the depth range of approx. 500-1700 m. Soft corals do not form coral reefs, but where they occur they tend to be in high densities (Tendal 1992; Klitgaard and Tendal, 2001; Klitgaard and Tendal, 2004).

Gorgonacea corals occur all around Iceland. They are relatively uncommon on the shelf (< 500 m depth) but are generally found in relatively high numbers in deep waters (>500 m) off the South, West and North Iceland. Similar patterns were observed in the distribution of Pennatulaceans off Iceland, which are relatively rare in water shallower than 500 m but more common in deep waters, especially off South Iceland. Alcyoneacea occur at depths of 500 m to 1000 m (average depth 700 m), whilst Scleractinia have a wider depth distribution of 500 m to 1500 m with an average depth of 1200 m (Figure 3-18). Both Alcyoneacea and Scleractinia are only found in the warmer waters off the southern and western Icelandic coast. Alcyoniina are found at an average depth of 700 m and have a wide distribution around Iceland.

Table 30: Coral gardens

Description	Relatively dense aggregation of colonies or individuals of one or more coral species of leather corals (*Alcyonacea*), (*Gorgonacea*), sea pens (*Pennatulacea*), black corals (*Antipatharia*), hard corals (*Scleractinia*).
Occurrence in Icelandic waters	Found in relatively high numbers in deep waters (> 500m) off Iceland  *Alcyonacea (average depth 700 m)*  *Pennatulacea (average depth 800 m)*  *Alcyoniina (average depth 700 m)*  *Scleractinia (average depth 1200 m)* *Distribution of coral species found in Icelandic coral gardens.* *Source: Ólafsdóttir et al. 2014.*
Depth range	Primarily found at depths of 500-1700 m
Depth range of fishery	20-500 m
Overlap of fishery with habitat	Limited overlap with bottom trawl, Nephrops trawl and longline fisheries at a variety of locations off the Icelandic coast.
Protection measures	None. However, a number of seasonal or annual closures to bottom trawling existwhich might have beneficial effects on the coral garden habitats occurring there.
References	Klitgaard and Tendal, 2004; Garcia et al. 2007, OSPAR 2010b, Ólafsdóttir et al. 2014.

As with the hard-coral reef features such as *Lophelia*, the soft coral species are vulnerable to direct impact damage by trawling, not least from *Nephrops* trawlers which work on mud grounds favoured by soft-coral species. Studies on the impact of Nephrops trawling indicate that fishing intensity is the major factor controlling long-term negative trends in the benthos (Ball et al. 2000). However, compared to early 1970s fishing effort had decreased by some 60–70% by the year 2000 (Garcia et.al. 2006), and during the period 2001-2013 the number of boats in the Nephrops fishery had reduced by around 50% (Figure 3-19).

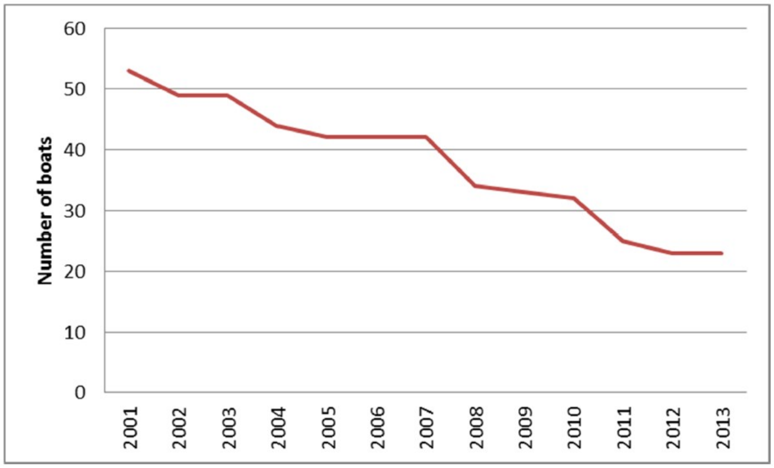


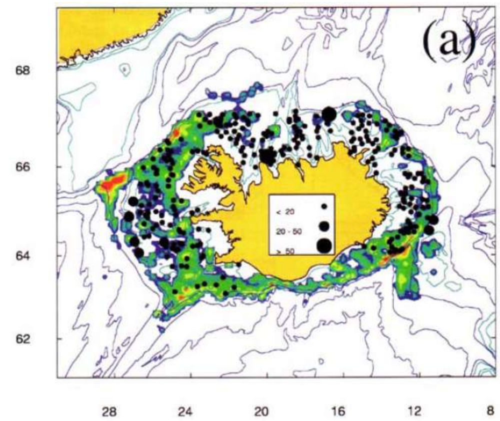
Figure 3-19. Number of boats licensed for Nephrops fishery during 2001-2013. Source: Icelandic Directorate for Fisheries database.

Sponges

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

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

Table 31: Deep-sea sponge aggregations

<table>
<tr><td>Description</td><td>Principally composed of sponges from two classes: Hexactinellida and Demospongiae. They are known to occur between water depths of 250-1300m</td></tr>
<tr><td>Occurrence in Icelandic waters</td><td>

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 2010d</td></tr>
<tr><td>Depth range</td><td>250-1300 m</td></tr>
<tr><td>Depth range of fishery</td><td>20-500 m</td></tr>
<tr><td>Overlap of fishery with habitat</td><td>Limited overlap with bottom trawl, Nephrops trawl and longline fisheries at a variety of locations off the Icelandic coast.</td></tr>
<tr><td>Protection measures</td><td>None. However, a number of seasonal or annual closures to bottom trawling exist which might have beneficial effects on the sponge habitats occurring there.</td></tr>
<tr><td>References</td><td>Copley et al, 1996; Garcia et al. 2007; OSPAR 2010d.</td></tr>
</table>

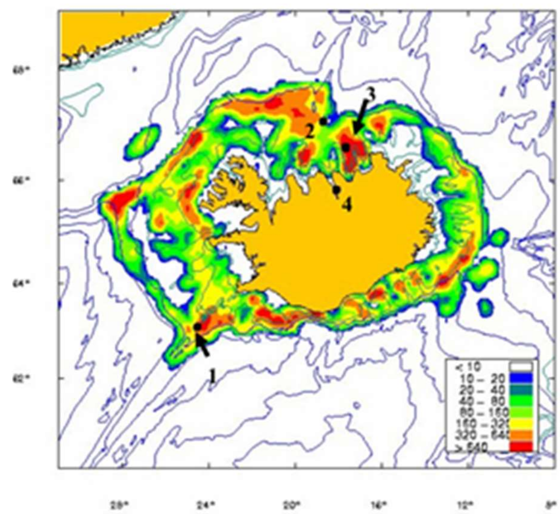
Self-evidently, direct trawl-gear impact will damage and break sponge colonies. The size structure within sponge populations indicates slow reproduction and recruitment, and high age of the large specimens. No exact aging has so far been done but both size structure and comparable investigations in Antarctica point to specimen which are decades if not centuries old (Dayton 1979; Gatti 2002). Consequently, it will take a long time for a sponge-dominated area to recover even after partial destruction, and repeated disturbance may lead to permanent extirpation of the species in the area. These risks, however, are mitigated by skippers' preference to avoid known areas of ostur for reasons of safety and economic common-sense. If a trawler strays into such an area it is all too easy to fill the net to an extent where it is difficult to haul, the net may burst and/or the sponge bycatch can damage the catch in the net to an extent that renders it unsalable (DNV, 2012).

Hydrothermal vents

Hydrothermal vents are found in volcanic active areas including spreading ridges and fracture zones. They are formed by seawater penetrating the upper layers of the earth's crust through channels formed in cooling lava. The seawater reacts chemically inside the crust and rises back to the sea-bed, where hydrothermal vents are formed. The biological communities associated with such vents are unique since the communities contain a high diversity of chemo-autotrophic bacteria, which form the basis of the food webs found around hydrothermal vents (OSPAR, 2010c). The main hydrothermal vent fields in Icelandic waters are located on the Reykjanes Ridge (250–350 m) (Ernst et al. 2000; German et al. 1994), near the island of Kolbeinsey on the Jan Mayen Ridge (100 m) (Fricke et al. 1989), east of Grimsey (400 m) (Hannington et al. 2001), and at Eyjafjordur, a fjord in northern Iceland (Omarsdottir, 2013). 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 (Valtysson 2011), with the exception of the top venting opening. The main threats to hydrothermal vent systems and their associated biological communities are from unregulated scientific research (including collecting), seabed mining, tourism and bioprospecting (InterRidge, 2000). In order to ensure bottom otter trawling do not affect Icelandic hydrothermal vents, the area at Steinahóll is protected within a closed area where trawling has been prohibited since 1994 (Figure 3-20).

Table 32: Hydrothermal vents

<table>
<tr><td>Description</td><td>Hydrothermal vents are formed by seawater penetrating the upper layers of the earth's crust through channels formed in cooling lava in volcanically active areas. Such vents support unique biological communities characterised by a high diversity of chemo-autotrophic bacteria, which form the basis of food chains.</td></tr>
<tr><td>Occurrence in Icelandic waters</td><td>Hydrothermal vents are found in volcanically active areas off the N and SW-coast of Iceland.



Location of areas of hydrothermal activity in Icelandic waters in relation to bottom trawling effort (total trawling hours 2003 [combined groundfish, shrimp and Nephrops fisheries]). (1) Steinahóll on the Reykjanes Ridge (2-4) Hydrothermal vents in the Tjornes Fracture Zone; Kolbeinsey vent fields (2), Grímsey vent fields (3) and in Eyjafjörður (4). Source: Garcia et al. 2006.</td></tr>
<tr><td>Depth range</td><td>65 - 400 m
(Eyjafjordu: 65 m; Kolbeinsey: 100 m; Steinahóll: 250 - 350 m; Grímsey: 400 m)</td></tr>
<tr><td>Depth range of fishery</td><td>20-500 m</td></tr>
<tr><td>Overlap of fishery with habitat</td><td>Limited overlap with the bottom trawl, Nephrops trawl, (cod) gillnet, anglerfish gillnet and longline fisheries.</td></tr>
<tr><td>Protection measures</td><td>The area at Steinahóll is protected within a closed area where trawling has been prohibited since 1994.</td></tr>
<tr><td>References</td><td>Garcia et al. 2006; OSPAR 2010c.</td></tr>
</table>

3.4.8.4 Management

The Ministry of the Environment has developed a National Strategy Plan for the preservation of biological diversity (Ministry of Environment 2010). Two of the key elements of this strategy are (a) develop fishing methods with less impact on marine ecosystems, and (b) protect vulnerable benthic ecosystems. Act 97/1997 ("um veiðar í fiskveiðilandhelgi Íslands") 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 species and habitats and within them a number of mechanisms have been developed to detect and reduce impacts. For example, the OSPAR Strategy on the Protection and Conservation of the Ecosystems and Biological Diversity of the Maritime Area has identified a number of key species and habitats which are considered threatened or declining (OSPAR 2008a, 2008b). Iceland has nominated 14 areas to the OSPAR Network of Marine Protected Areas (OSPAR 2013).

Large areas of Icelandic waters are closed for fishing (see Figure 3-12 and Figure 3-1), some of them temporarily (hours per day, days in total or seasonal) and others permanently (years). Areas are usually closed for fishing with bottom trawl or longline due to the presence of juvenile fish over extended periods of time or in order to protect spawning grounds. Although area closures are aimed at protecting juvenile fish, the measures have a secondary effect, i.e. protecting seabed habitats from being damaged by fishing activities. In addition, several areas have been closed to fishing explicitly to protect *Lophelia pertusa* reefs (Figure 3-20, Figure 3-21). The Icelandic Coast Guard monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing.

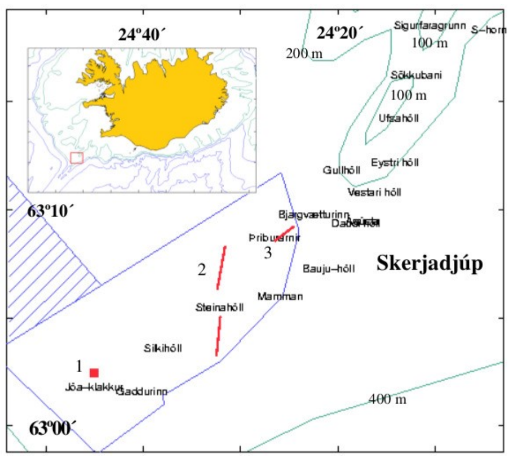


Figure 3-20: Position of the Steinahóll hydrothermal vent and occurrence of coral (indicated with red lines or square) on the Reykjanes Ridge. Area closed for otter trawling (since 1994) is outlined with a blue line (closed throughout the year) and blue hatched area (trawling allowed 1 st February – 15 th April). Source: Steingrimsson and Einarsson 2004.

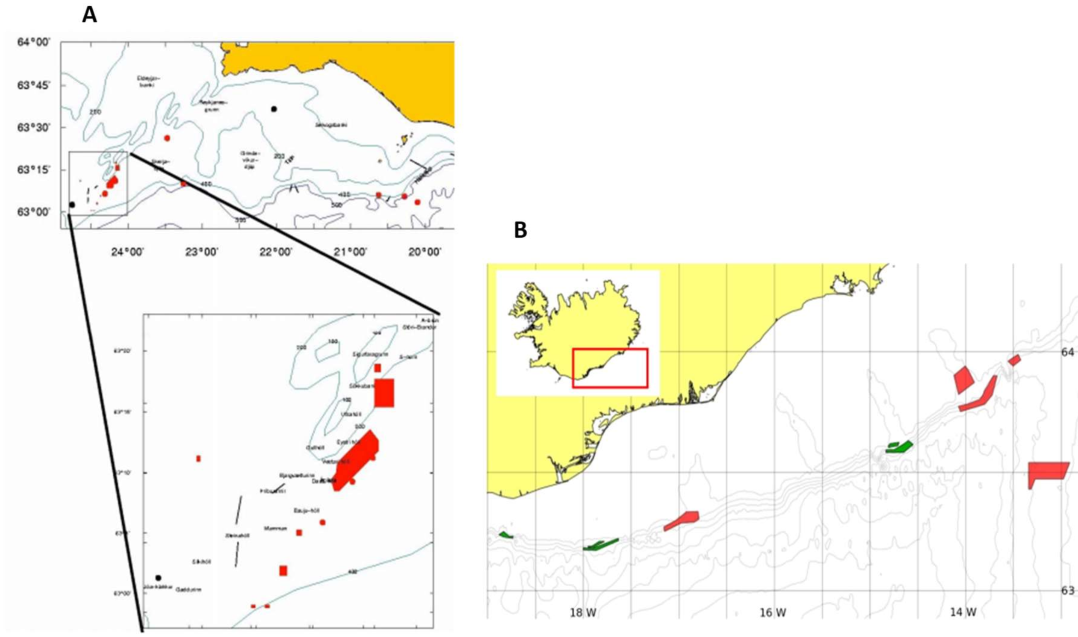


Figure 3-21. A: Coral areas off the SW coast of Iceland. B: Coral areas off SE Iceland where fishing operations have been banned since 2005 (green) and 2011 (red). Source: Ólafsdóttir and Burgos 2012.

3.4.8.5 Information

The BIOICE (Benthic Invertebrates of Icelandic waters) program was in operation in 1992-2004, and had the aim of producing a basic inventory of benthic fauna within Icelandic territorial waters. The objectives were to map the distribution of benthic invertebrates within the Icelandic EEZ, and to evaluate the species composition and biodiversity. Extensive sampling took place within Icelandic waters to achieve the project's objectives; in total, 1050 samples at 579 stations (Figure 3-22) were collected during 19 cruises at depths between 20 - 3000 m (Omarsdottir et al., 2013). Benthic samples have been collected from a variety of habitats, characterised by a range of temperature conditions (12° to -0.9°C) using a variety of sampling gear including benthic sleds, trawling, sediment sampling and deep-sea photographs. The BIOICE project has provided information on the benthic invertebrates in Icelandic waters, from which the nature, distribution and vulnerability of habitats can be inferred. The analysis of data on benthic diversity patterns has shown that a maximum of species diversity if found between 300 and 1000 m, and that species diversity appears to be particularly high south of the Greenland-Iceland-Faroe Ridge (Svavarsson, 1997; Brix and Svavarsson, 2010; Stransky and Svavarsson, 2006; Omarsdottir et al., 2013).

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

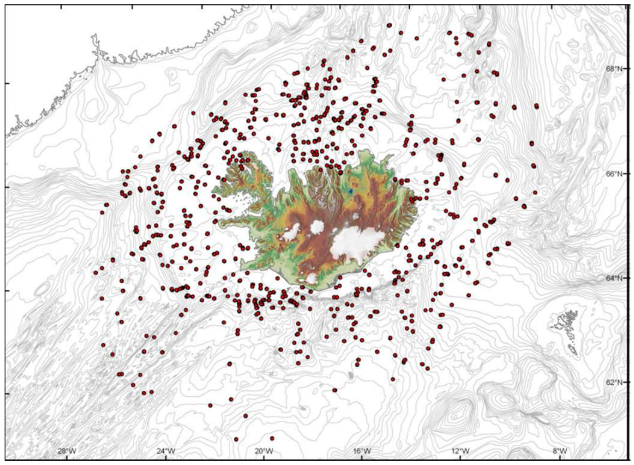


Figure 3-22: A map of the 579 sampling stations of the BIOICE (Benthic Invertebrates of Icelandic waters) research program. Source: Omarsdottir et al. (2013).

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

- Since 2000, the Marine Research Institute maintains a programme of mapping the seabed habitats and fishing grounds using multibeam echo-sounding in co-operation with other domestic organisations, such as Reykjavík Energy and the Science Institute of the University of Iceland; together, they contribute towards the BIOICE and IceAGE habitat mapping projects. The aim is to compile a comprehensive picture of the entire continental shelf; to date ca. 11% of the entire Iceland EEZ habitats has been mapped in detail using multi-beam echo-sounders (Burgos et al., 2014; Figure 3-23).
- The EU funded CoralFISHproject (http://eu-fp7-coralfish.net/) was recently completed and a report detailing the CoralFISH project is in progress. Manuscripts from the CoralFISH project have recently been submitted, one comparing fish communities inside and outside cold-water coral habitats based on longline catches, and another examining bottom fishing activities. A manuscript on coral habitat classification observed during this project has also been published (Davies et al., 2017).
- Since 2015, the bycatch of invertebrates is being monitored during the annual autumn ground fish survey in deep water carried out by MFRI. All invertebrates in the catch are identified by benthologist in those trawls observed; half of the trawls are currently observed. This data will give considerable amount of information on benthos, including sponges and corals, as well as other species vulnerable to fishing.
- In 2016, MFRI conducted a specific survey with the primary objective to map and explore possible different habitat areas in several locations north and south of Iceland. This survey was part of the general mapping of habitats within Icelandic waters, where previous surveys targeted areas with previously reported high abundance of vulnerable species, particularly coral.
- In 2017, several potential vent sites on the Reykjanes Ridge will be surveyed.
- The Icelandic Institute of Natural History has been leading a project involving mapping of coastal intertidal habitats, including intertidal *Mytilus* beds, *Zostera* beds and intertidal mudflats.

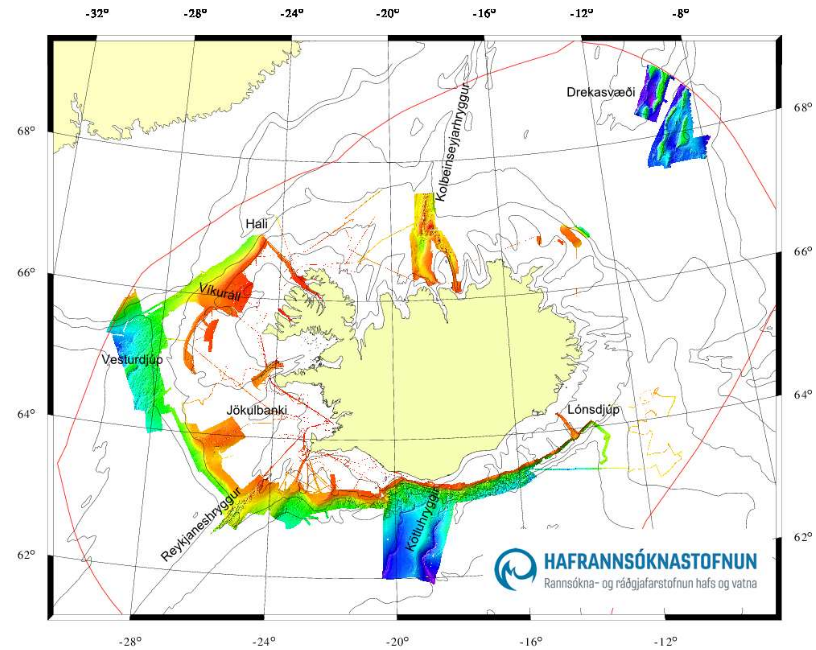


Figure 3-23: Iceland EEZ habitats which have been mapped in detail using multi-beam echo-sounders (coloured shading). Source: Burgos et al., 2014.

3.4.9 Ecosystem

3.4.9.1 Outcome Status

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

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

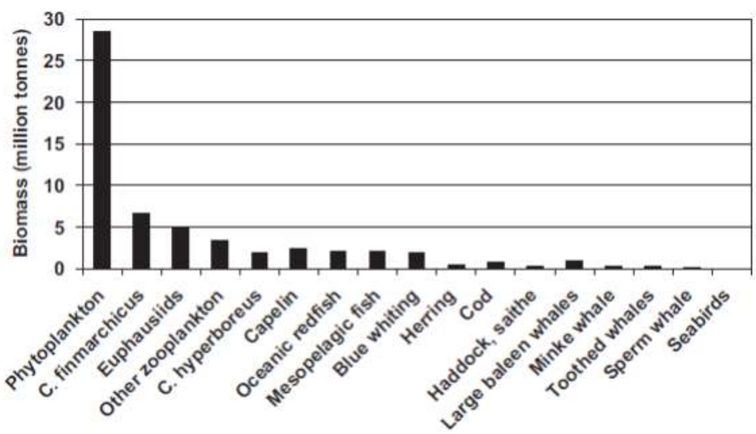


Figure 3-24: Ecosystem Biomass. Estimated wet biomass of the main components in the Icelandic marine ecosystem. Source: Astthorsson et al. 2007.

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

Anglerfish are opportunistic, non-selective lie-and-wait predators (Farina et al., 2008), usually lying partially-buried on muddy to gravely bottoms. This species makes use of its specialised illicium as a 'fishing rod' to lure unsuspecting prey. Research on anglerfish diet composition has found that juveniles consume mainly invertebrates (Farina et al, 2008), whilst a wide variety of pelagic and benthic fish constitute the diet of larger juveniles and adult anglerfish, including gadoid fish, sandeels, flatfish, and cephalopods (Thangstad et al., 2002). A study on adult anglerfish caught in lumpfish nets deployed in different parts of Iceland revealed regional variations in the diet of this species. Anglerfish caught in Breidafjordur consumed mainly *Gadus morhua*, *Myoxocepahlus scorpius*, *Cyclopterus lumpus*, and *Pholis gunnellus*; in Isafjardardjup: *Hippolossoides platessoides*, *Anarhichas lupus*, *Pleuronectes platessa*, and *Ghadus morhua*; and in Strandir: *Ghadus morhua*, *Limanda limanda*, *Hippoglossoides* platessoides and *Anarhichas lupus* (Nebel et al, 2011 cited in Rajuden, 2013). Whilst it is likely that pelagic anglerfish larvae as well as anglerfish juveniles are preyed upon by other species (Thangstad et al., 2002), there are only few reports of predators specifically targeting anglerfish. According to Choisy and Jones (1983), cormorants (*Phalacrocorax* sp.) may prey on *L. piscatorius*, and Best (1999) report that male sperm whales (*Physeter macrocephalus*) may sometimes move into continental slope waters off Namibia to feed on benthic species including the anglerfish *Lophius upsicephalus*. Overall, anglerfish are not thought to be a key prey species for any particular piscivorous fish, mammal or bird, although they may be taken opportunistically by a range of predators.

Around 30–50 million seabirds, consisting of 22 species, are found in Icelandic waters, including substantial proportions of the total North Atlantic populations of some species (ICES, 2017). Auks and petrels are the most important groups, comprising almost 3/5 and 1/4 of the total abundance and biomass in the area, respectively (ICES, 2012). It has been estimated that the six common seabird species consume 171 000 tonnes of capelin, 184 000 tonnes of sandeel and 34 000 tonnes of euphausiids on an annual basis (ICES, 2017). Since the early eighties the populations of seabirds have in general declined by 18-43% (Umhverfisráðuneytið, 2011). The abundance of breeding Brünnich's guillemot *Uria lomvia*, common guillemot *Uria aalge*, razorbill *Alca torda*, Northern fulmar, and kittiwake *Rissa* spp. have declined by 43%, 30%, 18%, 35%, and 12% between 1985 and 2008 respectively. The number of kittiwakes and European shags *Phalacrocorax aristotelis* breeding in western Iceland declined by 44% and 31%, respectively between 1993 and 2007 (ICES, 2017). Furthermore, in the Látrabjarg sea cliff which is inhabited by the largest breeding colony of seabirds in Iceland, the number of nesting birds declined annually by 7-24% (depending on species) from 2006 to 2009. These trends may be influenced by changes in density, composition, and spatial distribution of the main fish prey species targeted by birds, in particular sandeel (ICES, 2017). A recruitment failure of sandeel 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 (ICES, 2017).

Based on the most recent bycatch data made available to the assessment team by the MFRI, Northern fulmar, common eider, black guillemot and common guillemot are the species most frequently caught as bycatch in bottom set nets, in particular in cod gillnets and lumpfish nets.

Six pinniped species occur in the Icelandic waters but only grey seals and harbour seals breed locally. Both species are currently in decline. The harbour seal population has decreased from 33 000 individuals in 1980 to 7700 individuals in 2016 (Figure 3-11), the lowest in the time-series (ICES, 2017). The Icelandic grey seal population has also decreased from an estimated 9000 animals in 1982 to 4200 animals in 2012; a census is planned in 2017 to update these figures (ICES, 2017). 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. Humpback whales have shown high rates of increase and fin whales have become more abundant in the Irminger Sea between Iceland and Greenland in 1987–2015 (ICES, 2017). The abundance of minke whales 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).

Based on the most recent bycatch data made available to the assessment team by the MFRI, harbour porpoise, harbour seal and grey seals are the species most frequently caught as bycatch in bottom set nets, in particular in cod gillnets and lumpfish nets.

3.4.9.2 Management

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

Key elements of the Icelandic management strategy include:

1. Closed areas: closed areas have been long-established for both bottom trawl and longlines fishing fleets
2. Multi-species stock management: trophic relationships between key predatory commercial species such as cod and haddock with commercial prey species such as capelin, sandeel and shrimp are well understood, and integrated into fisheries management planning.
3. Key target species management: considerations include discard and other mortality, environmental changes on target stocks, multi-species considerations in mixed fisheries,

physical environmental issues related to area and gear; and the understanding of ecosystem components by species / stock complexes.

3.4.9.3 Information

The MFRI maintains extensive research programmes on a number of topics, including on the status and productivity of commercial stocks, mapping of vulnerable habitats, multispecies interactions, ecosystem and fishery interactions and oceanography. Programmes are ongoing and results are routinely published in scientific literature, through ICES, and through MFRI reports. Considerable information on the Icelandic ecosystem can be accessed through the MFRI website[5].

Information on feeding habits has been used in studies on predator-prey interactions and multi-species and ecosystem modelling (Pálsson 1997, Stefánsson 2003, Barbaro et al. 2008). The multi-species programme BORMICON (Stefánsson and Pálsson 1998) is a model for an ecosystem approach to fisheries, and was developed in the 1990's using information on the Icelandic marine ecosystems, such as feeding habits of demersal fish, migration patterns of predator and prey, predation, mortality and fish growth. The programme was developed for modelling marine ecosystems in a fisheries management and biology context. BORMICON is now developed under the name GADGET[6] (Globally applicable Area-Disaggregated General Ecosystem Toolbox), which has been applied to various commercial species in Icelandic waters, such as cod (Taylor *et al*, 2007).

3.5 Principle Three: Management System Background

3.5.1 Jurisdiction

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

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.”[7]

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.

[5] See http://www.hafro.is/index_eng.php
[6]See http://www.hafro.is/gadget/
[7] https://www.neafc.org

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.

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. [8]

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 handling of seafood products; enforcing laws and regulations in fisheries management; monitoring of fishing activities and penalizing transgressions pertaining to illegal catches; 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, 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 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.

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

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

industry and how measures are taken to ensure responsible fisheries and the proper treatment of the marine ecosystem around Iceland."[9]

There are no NGOs that focus on fisheries management in Icelandic waters. 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 has participated in previous Icelandic assessments and continues to be actively involved in the development of by-catch mitigation measures in Icelandic fisheries. Local NGOs are more concerned with nature protection on land.

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, withdrawl of fishing permit, leading up to imprisonment for serious or repeat violations.

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. This indicates that compliance levels are high. The main infringement is failure by small coastal vessels to submit the catch log after a fishing trip (4% of the instances). The bigger vessels all have electronic logbooks and do not report this problem.

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.

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

4 Evaluation Procedure

4.1 Harmonised Fishery Assessment

At the time of the assessment there was no other anglerfish fishery in assessment within the Icelandic EEZ for certification against the Marine Stewardship Council's (MSC) Principles and Criteria for Sustainable Fishing. Full reference was made to fisheries for ling, saithe, golden redfish, blue ling, tusk, plaice, Atlantic wolffish, cod and haddock, which have been certified. ISF Greenland Halibut is in assessment using version 2.0 and two of the team are involved in both assessments, enabling effective harmonisation with these assessments.

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

4.2 Previous assessments

There have been no previous assessments of this fishery.

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".*

The assessment team proposed the use of the Default Assessment Tree. No comments or objections were received in response to the proposed methodology. The Default Assessment Tree was therefore used.

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 2nd to 5th of May 2017, see Table 33 below.

4.4.2 Consultations

Stakeholders were invited to submit comments and to consult the assessment team from the onset of the assessment process. Public notification of the assessment, its scope, methodology and assessment team, was issued with an invitation to comment and consult the team, and the same was sent out by e-mail to a list of stakeholders. Meetings were arranged with representatives of the client and key stakeholders, as summarized in Table 33.

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

Table 33: Itinerary of site visit and stakeholder consultation in the Icelandic cod fishery assessment.

Meetings with Client and other Stakeholders	Subjects of Consultation
02.05.2017: Meeting with the Client (ISF). Erla Kristinsdóttir (ISF), Members of the Assessment team.	Meeting with the project management of the Client; general discussion on Iceland Sustainable Fisheries (ISF), the fishery practice and its management;

	relations of the fishery to research, management and control bodies; chain of custody issues.
02.05.2017: Ministry of Industries and Innovation. Annas Jón Sigmundsson (MII), Brynhildur Benediktsdóttir (MII), Members of the Assessment team	Fisheries policy. Management practices and objectives. Ecosystem and habitat protection.
02.05.2017: Marine and Freshwater Research Institute. Steinunn Ólafsdóttir (MFRI), Magnús Thorlacius (MFRI), Guðmundur Þórðarson (MFRI), Members of the Assessment team.	Scientific research and data on the fishery. Stock information, habitat and ecosystem issues.
03.05.2017: Meeting with the National Association of small boat owners. Axel Helgason (NASBO), Members of the Assessment team.	Overview of the association and the anglerfish fishery.
03.05.2017: Meeting with the client and an anglerfish captain. Erla Kristinsdóttir (ISF), Arnar Kristinsson (IMJ), Members of the Assessment team.	Location of fishing, bycatch and fishing gear.
04.05.2017: Directorate of Fisheries. Þorsteinn Hilmarsson (DF), Áslaug Eir Hólmgeirsdóttir (DF), Sævar Guðmundson (DF), Members of the Assessment team	Enforcement of fishery policies and management decisions. Monitoring, surveillance and landing statistics.
05.05.2017: Marine and Freshwater Research Institute. Guðjón Már Sigurðsson (MFRI), Members of the Assessment team.	Scientific research and data on the fishery. Bycatch issues.

4.4.3 Evaluation Techniques

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

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

Each team member was responsible for a single principle to develop scoring justifications, with the team member responsible for Principle 1 also primarily responsible for PI 2.1 (Primary Species). A group consensus was developed for each scoring issue and this determined the final scores for each performance indicator. The standard MSC decision rule was applied for the final recommendation (i.e. aggregate category-level scores must all exceed 80 and each individual PI must score 60 or above).

A total of 75 species scoring elements, evaluated in PI 2.1 – 2.3, were identified. These were clearly separated into Primary, Secondary and ETP. Of the 75 species/stocks identified as potentially having an interaction with the fishery, 27, including the target species, have been identified as primary species (Table 13). 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 7 species have been identified as ETP mainly based on their presence on international lists of vulnerable and endangered species (CITES Appendix 1, IUCN Redlist Status for out-of-scope species, AEWA table1 column A) that overlap with fishing operations (Table 24). Information was available on ETP from various scientific sources to assess their risks from fishing. All species not allocated to primary or ETP are considered secondary species.

All in-scope species were allocated between main and minor species based on the gear-specific landings data (Table 6 - Table 12). This included consideration of their resilience in setting landings references between 2% for less resilient and 5% for more resilient species. Where information was lacking, lower resilience was assumed. The results were not sensitive to this determination.

For all primary species, stock assessment information was used to determine their status. For out-of-scope species (main), information was available to determine risks. All secondary in-scope species were minor components of the landings. Information was lacking on these minor species and this is reflected in the scoring (they did not meet the relevant guideposts). The Risk based Framework was invoked for PI 2.2.1, UoA anglerfish gillnets.

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

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

Table 34: Scoring elements: see Table 6 - Table 12 for gear specific main/minor allocations of primary and secondary species.

Component	Scoring elements	Main or minor	Data-deficient or not
P1	Anglerfish (*Lophius piscatorius*) in Icelandic EEZ	Target species	Not
P2: Primary Species	27 species (see Table 13)	Main	Not
P2: Primary Species		Minor	Not
P2: Secondary Species	41 species (see Table 15 and Table 16)	Main	Not
P2: Secondary Species		Minor	Data-deficient
P2: ETP Species	7 species (see Table 24)	N/A	Not
P2: Habitats	Coarse sediments; fine mud; mixed sediment; rock / hard substrata; sand; sandy mud / muddy sand; maerl beds; Modiolus reefs; Lophelia reefs; coral gardens; deep-water sponge aggregations; hydrothermal vent habitats.	N/A	Not
P2: Ecosystems	Icelandic Marine Ecosystem	N/A	Not
Principle 3	Icelandic Management Authority	N/A	Not

The assessment team interviewed representatives of the client, Iceland Sustainable Fisheries ehf. The assessment team conducted separate meetings with representatives of the Ministry of Industries and Innovation (MII), of the Marine Research Institute (MRI) and the Directorate of Fisheries (DF) to discuss matters related to marine biological research data, fisheries advice, fisheries management and government policy, as well as the enforcement and monitoring of official regulations.

5 Traceability

5.1 Eligibility Date

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

5.2 Traceability within the Fishery

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

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

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

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

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

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

The unit of certification allows for catch from the entire Icelandic EEZ to enter chain of custody. All registered fishing vessels operating bottom trawl, *nephrops* trawl, Danish seine, gillnet, anglerfish gillnet, lumpfish gillnet or 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 anglerfish 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;
- to ensure full segregation of catch of each species by management region, i.e. fish caught inside the Icelandic EEZ is kept separate, in the event a vessel catches the same species on the same trip inside and outside the Icelandic EEZ – and –
- to observe and implement appropriate measures of packing and labelling certified products prior to moving them to sub-contracting cooler or freezer storages upon landing, to ensure client members´ responsibility for product integrity prior to sale or further handling.

Table 35: Traceability Factors within the ISF Iceland anglerfish 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 certified gears, anglerfish in the Icelandic EEZ is caught in shrimp trawls, sea pole, handline and pelagic trawl. Reported catches from these gears combined were 0.3% of the total anglerfish catch in 2011-2016. Fish is segregated on board, landed and recorded by reference to vessel, date and gear. The use of certified and non-certified gears during the same fishing trip is considered quite rare and the risk of mixing catch of same species from the two is minimal. Fishing vessels – Icelandic and foreign operating within the Icelandic EEZ – are required to keep logbooks for the recording of fishing by species, gear and area. Furthermore, all landings in Iceland are recorded and monitored by registered weighmasters. Landings of anglerfish from non-certified gear used within the Icelandic EEZ are segregated from anglerfish caught in certified gear, both physically and in records prior to entry into chain of custody.
Potential for vessels from the UoC to fish outside the UoC or in different geographical areas (on the same trips or different trips)	Vessels are unlikely to catch anglerfish 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	Anglerfish 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 anglerfish, or 0.3%, of the total catches in 2011-2016. A small proportion (0.2% in 2016) of Anglerfish is caught by Faroese vessels, operating within the Icelandic EEZ through bilateral agreement. Both the Icelandic vessels operating gear that is not a part of the UoC and the Faroese vessels are subject to the monitoring and logging requirements outlined above. Such catch is therefore traceable to vessel and gear.
Risks of mixing between certified and non-certified catch during storage, transport, or handling activities (including transport at sea and on land, points of landing, and sales at auction)	Fishers are required to separate catch by species. All fish landed in Iceland by the fishing fleet must be reported in Iceland to Port Authorities who are responsible for weighing catch on certified scales either by licensed operators or processing plants approved for this purpose. Foreign vessels landing fish from the Icelandic EEZ in Iceland are subject to the same requirements. In the event that eligible vessels are landing anglerfish 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 anglerfish from vessels within the UoC and anglerfish from foreign vessels outside the UoC may simultaneously be handled at auctions. The majority of foreign vessels fishing under bilateral agreement in Iceland do not land their catch in Iceland, but are required to report all details of catches by species, quantity, area, gear type and vessel to the Icelandic Directorate of Fisheries. However, if such vessels were to land fish anywhere in Iceland, information are recorded by official weighmasters upon landing, in the same manner as for all Icelandic vessels and can thus be traced back to species, quantity, area, gear and vessel. Icelandic regulation require fish from foreign vessels to be kept and processed separate from all other fish throughout the chain of custody. At first point of sale, i.e. entry into chain of custody, the tracing of the fish back to UoC will require verification by the buyer and its CoC CAB.
Risks of mixing between certified and non-certified catch during processing activities (at-sea and/or before subsequent Chain of Custody)	Chain of Custody is required for all post-landing processing activities. Risk to the integrity of certified fish processed on-board, which would be confined almost solely to large trawlers, may potentially emanate from fishing in areas not identified as part of the UoA during the same fishing trip. This risk is minimised and mitigated by the mandatory logging, as well as physical identification, of fish catch by management regions. Fishing by vessels with on-board processing facilities is monitored by weighing landed products in a similar way and converting to catch weight by means yield indices, estimated by sampling catch and processed products on board. Basic handling of the catch, such as gutting and possibly heading, is commonly conducted by most types of vessels at sea, during which a risk of mixing certified and non-certified catch is considered minimal or none.
Risks of mixing between certified and non-certified catch during transhipment	The DF monitors, via the vessel monitoring systems (VMS), that trans-shipment of fish is not conducted. Some Icelandic fishery practices export fish directly from vessels, without involvement of domestic processing operations, and typically after being transferred to containers. However, recent law stipulates that any

	unprocessed fish must be landed and weighed in Icelandic ports prior to export[10]. 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.

5.3 Eligibility to Enter Further Chains of Custody

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

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

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

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

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

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

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

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

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

6 Evaluation Results

6.1 Principle Level Scores

Table 36: Final Principle Scores

Principle		***Score***
Principle 1 – Target Species		82.5
Principle 2 – Ecosystem	UoA1: Bottom Trawl (TB)	90.0
	UoA2: Nephrops Trawl (TN)	90.3
	UoA3: Danish Seine (SD)	92.0
	UoA4: Gillnet (GN)	83.3
	UoA5: Anglerfish gillnet (GA)	82.7
	UoA6: Lumpfish gillnet (GL)	fail
	UoA7: Longline (LL)	85.0
Principle 3 – Management System		92.9

6.2 Summary of PI Level Scores

Table 37: PI level scores by gear
(TB: Bottom trawl; TN: Nephrops trawl; SD: Danish seine; GN: Gillnet; AGN: Anglerfish gillnet; LGN: Lumpfish gillnet; LL: Longline)

Fishery Assessment Scoring Worksheet version 1 - issued 8 October 2014				UoA1	UoA2	UoA3	UoA4	UoA5	UoA6	UoA7
				TB	TN	SD	GN	AGN	LGN	LL
Principle	Component	Performance Indicator (PI)		Score	Score	Score	Score	Score	Score	Score
One	Outcome	1.1.1	Stock status	80	80	80	80	80	80	80
	Management	1.2.1	Harvest strategy	80	80	80	80	80	80	80
		1.2.2	Harvest control rules & tools	75	75	75	75	75	75	75
		1.2.3	Information & monitoring	100	100	100	100	100	100	100
		1.2.4	Assessment of stock status	80	80	80	80	80	80	80
Two	Primary species	2.1.1	Outcome	95	95	95	95	100	95	95
		2.1.2	Management strategy	95	95	95	95	95	95	95
		2.1.3	Information/Monitoring	100	100	100	100	100	100	100
	Secondary species	2.2.1	Outcome	80	80	80	75	75	Fail	80
		2.2.2	Management strategy	95	95	95	65	65	65	75
		2.2.3	Information/Monitoring	90	90	90	75	75	75	75
	ETP species	2.3.1	Outcome	90	90	90	80	80	70	80
		2.3.2	Management strategy	100	100	100	65	65	65	70
		2.3.3	Information strategy	100	100	100	70	70	70	70
	Habitats	2.4.1	Outcome	75	80	95	90	85	85	95
		2.4.2	Management strategy	75	75	80	80	80	80	80
		2.4.3	Information	85	85	85	85	85	85	85
	Ecosystem	2.5.1	Outcome	100	100	100	100	100	100	100
		2.5.2	Management	85	85	85	85	85	85	85
		2.5.3	Information	85	85	90	90	80	90	90
Three	Governance and policy	3.1.1	Legal &/or customary framework	100	100	100	100	100	100	100
		3.1.2	Consultation, roles & responsibilities	95	95	95	95	95	95	95
		3.1.3	Long term objectives	100	100	100	100	100	100	100
	Fishery specific management system	3.2.1	Fishery specific objectives	90	90	90	90	90	90	90
		3.2.2	Decision making processes	85	85	85	85	85	85	85
		3.2.3	Compliance & enforcement	95	95	95	95	95	95	95
		3.2.4	Monitoring & management performance evaluation	80	80	80	80	80	80	80

6.3 Summary of Conditions

Table 38: Summary of Conditions

No.	Condition	Performance Indicator	Related to previously raised condition? (Y/N/NA)
1	A well-defined harvest control rule should be put in place that is consistent with the harvest strategy and defines how the exploitation rate will be reduced as the stock approaches the limit reference point. Evidence should be provided that the HCR is precautionary within 4 years.	**PI 1.2.2 Harvest control rules and tools**	**N**
2	Harbour seal (gillnet, anglerfish gillnet) and harbour porpoise (anglerfish gillnet) must be shown highly likely to be within biologically based limits, or it must be demonstrated that there is a partial strategy of demonstrably effective mitigation measures in place such that the UoAs do not hinder recovery and rebuilding.	**PI 2.2.1 Secondary species outcome** (Gillnet, anglerfish gillnet)	**N**
3	A demonstrably effective partial strategy should be put in place such that the gillnet, anglerfish gillnet and longline fisheries do not hinder recovery and rebuilding of vulnerable out-of-scope secondary marine mammal and seabird species. This should include a regular review of the potential effectiveness and practicality of alternative measures to minimise fishery related mortality of unwanted catch of vulnerable species such as harbour seal, harbour porpoise, European shag, greater black-backed gull and fulmar, as well as regular reviews to ensure that the relevant measures are implemented as appropriate.	**PI 2.2.2 Secondary species management** (Gillnet, anglerfish gillnet, longline)	**N**
4	By the second surveillance audit electronic logbook reporting provides some quantitative information on of seabird and marine mammal bycatch that is both available and adequate to assess the impact of the UoA on main secondary species with respect to their status. The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals. This condition is harmonised with that for ISF Iceland golden redfish, ISF Iceland saithe & ling, ISF cod and ISF halibut fisheries.	**PI 2.2.3 Secondary species information** (gillnet, anglerfish gillnet, longline)	N
5	A strategy should be put in place that is expected to ensure the UoAs do not hinder the recovery of ETP marine mammal and seabird species. This should include a regular review of the potential effectiveness and practicality of alternative measures to minimise fishery related mortality of unwanted catch of vulnerable seabird and marine mammal species, as well as regular reviews to ensure that the relevant measures are implemented as appropriate. This condition can be implemented together with condition 3.	**PI 2.3.2 ETP species management** (Gillnet, anglerfish gillnet, longline)	**N**
6	By the second surveillance audit electronic logbook reporting provides some quantitative information on seabird and marine mammal bycatch that is both available and adequate to assess the impact of the UoAs on ETP marine mammal and seabird species with respect to their status. The returns from electronic	**PI 2.3.3 ETP species information** (gillnet, anglerfish gillnet, longline)	N

	logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals. This condition can be implemented together with condition 4.		
7	By the fourth surveillance audit necessary conservation and management measures for all vulnerable marine habitats shall be in place and implemented, such that the trawl fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. This condition is harmonised with that for ISF Iceland haddock, ISF Iceland golden redfish, ISF Iceland saithe & ling, ISF cod and ISF halibut fisheries.	**PI 2.4.1 Habitats outcome** (Bottom trawl)	**N**
8	By the fourth surveillance audit necessary conservation and management measures for deep-sea sponge aggregation and coral gardens shall be in place and implemented, such that there is a partial strategy in place and implemented for these habitat types specifically, ensuring that the bottom and *Nephrops* trawl fisheries do not cause serious or irreversible harm to habitat structure and function in Icelandic waters. This strategy will include, where necessary, appropriate move-on measures to avoid interactions will ALL forms of VME. With regard to the bottom trawl fishery, this condition is harmonised with that for ISF Iceland haddock, ISF Iceland golden redfish and the ISF Iceland saithe & ling fisheries, ISF cod and halibut fisheries.	**PI 2.4.2 Habitats management** (Bottom trawl, *Nephrops* trawl)	**N**

6.4 Recommendations

Table 39: *Recommendations*

Recommendation 1 UoA: Bottom trawl, Nephrops trawl, Danish seine.	
Performance Indicator	**PI 2.2.3 Secondary species information** Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species
Purpose	Interactions with seabird and marine mammals should be recorded in the electronic logbooks of client vessels. However, logbook returns since their introduction in 2009 have indicated very few such entries, which contradicts the results of formal MFRI surveys, such as the MFRI spring gillnet survey.
Recommendation	The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals. This recommendation applies to all gears except gillnets, anglerfish gilnets, lumpfish gillnets and longlines (where this issue is covered in Condition 4).

Recommendation 2 UoA: All gears	
Performance Indicator	Traceability
Purpose	Management of risks to segregation and traceability within the fishery
Recommendation	The team requests that the client issues a reminder to all of the client members, as well as auctions, to observe the following: - to ensure full segregation of catch of each species by gear in the event more than one gear is applied during the same fishing trip; - to ensure full segregation of catch of each species by management region, i.e. fish caught inside the Icelandic EEZ is kept separate, in the event a vessel catches the same species on the same trip inside and outside the Icelandic EEZ – and – - to observe and implement appropriate measures of packing and labelling certified products prior to moving them to sub-contracting cooler or freezer storages upon landing, to ensure client members´ responsibility for product integrity prior to sale or further handling.

6.5 *Draft* Determination, Formal Conclusion and Agreement

The assessment team has passed a draft determination to recommend that:

(a) the following six Units of Assessment of the ISF Iceland anglerfish fishery should be certified for the scope specified in section 3.1 of this report as well-managed and sustainable fisheries against the MSC fishery standard v2.0: **Bottom trawl, *Nephrops* trawl, Danish seine, gillnet, anglerfish gillnet and longline**;

(b) the ISF Iceland anglerfish **lumpfish gillnet** Unit of Assessment is **not** certified against the MSC fishery standard v2.0.

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Appendices

Appendix 1: Scoring and Rationales

Appendix 1.1: Performance Indicator Scores and Rationale

PI 1.1.1 Evaluation Table for – Stock status

PI 1.1.1		The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing		
Scoring Issue		SG 60	SG 80	SG 100
a	Stock status relative to recruitment impairment			
	Guidepost	It is likely that the stock is above the point where recruitment would be impaired (PRI).	It is highly likely that the stock is above the PRI.	There is a high degree of certainty that the stock is above the PRI.
	Met?	Y	Y	N
	Justification	The biomass index has been relatively low in the period 1985-2002, followed by a strong increase towards a maximum in 2005. From 2005 to 2011 the biomass remained at high levels fluctuating around 3 kg/km^2. Since then the biomass has decreased but it remained above the levels observed at in the first part of the series. The recruitment index showed a similar pattern (MFRI, 2016). Taking into account that the biomass observed in 2015 is still higher than the biomass observed in the period 1985-2002 and that the high recruitment observed in 2000 has orginated from the biomass observed in 1998, which was lower than 2015, it can be argued that the stock is highly likely to be above the point where recruitment would be impaired. Therefore SG80 is met. Considering the decreasing pattern of biomass index and recruitment observed in recent years, although these declining trends may relate to movements of the stock related to environmental conditions, it is not possible to argue that there is an high degree of certainty that the stock is above PRI (MFRI, 2016). On this basis, SG100 is not met.		
b	Stock status in relation to achievement of MSY			
	Guidepost		The stock is at or fluctuating around a level consistent with MSY.	There is a high degree of certainty that the stock has been fluctuating around a level consistent with MSY or has been above this level over recent years.
	Met?		Y	N
	Justification	The advice for anglerfish follows the ICES framework for stocks where reliable stock biomass indices are available, but analytical age-length based assessments are not possible (Category 3 stocks; ICES, 2012). IS-SMB biomass index of anglerfish 40 cm and larger, along with catch, is used to calculate Fproxy (catch/survey biomass). The target Fproxy was defined as 80% of the mean Fproxy from the reference period of 2001–2015 (MFRI, 2016a). Taking into consideration that the value of Fproxy in the period where high values of biomass were observed (2005-2011) was around 1 it is possible to argue that the Fproxy was around a level consistent with F_{MSY} since 2002 and is below Fproxy target in the last two years. According to GSA2.2.4 (MSC CRV2.0), the use of fishing mortality as a means of scoring PI 1.1.1, when biomass information is not available, is allowed. The history of fishing mortality should be examined to determine whether the stock biomass could be assumed to be at the required level for each SG. In particular, an 80 score is justified (b - highly likely above the PRI and at or fluctuating around BMSY) if F is likely to have been at or below FMSY for at		

		least two generation times (or for at least four years, if greater). Assuming a generation time of 6.5 year (Age at maturity = 4; M = 0.4), it is possible to argue that Fproxy has been at level consistent with FMSY for 2 GT (= 13 years). On this basis, SG 80 is met but not SG 100.
References		ICES (2012). ICES Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM 68. 42 pp. MFRI (2016a). Marine Research Institute. 2016. State of Marine Stocks in Icelandic Waters 2015/2016 and Prospects for the Quota Year 2016/2017. Marine Research in Iceland 185. 188 pp. Available at: http://www.hafro.is/Bokasafn/Timarit/fjolrit-185.pdf.

Stock Status relative to Reference Points			
	Type of reference point	**Value of reference point**	**Current stock status relative to reference point**
Reference point used in scoring stock relative to PRI (SIa)	Fproxy target	0.80	0.71
Reference point used in scoring stock relative to MSY (SIb)	Fproxy target	0.80	0.71

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

PI 1.1.2 Evaluation Table for Stock rebuilding

PI 1.1.2		Where the stock is reduced, there is evidence of stock rebuilding within a specified timeframe		
Scoring Issue		SG 60	SG 80	SG 100
a	**Rebuilding timeframes**			
	Guidepost	A rebuilding timeframe is specified for the stock that is **the shorter of 20 years or 2 times its generation time**. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years.		The shortest practicable rebuilding timeframe is specified which does not exceed **one generation time** for the stock.
	Met?	Not relevant		Not relevant
	Justification	The stock is not depleted		
b	Rebuilding evaluation			
	Guidepost	Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within the specified timeframe.	There is evidence that the rebuilding strategies are rebuilding stocks, **or it is likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.	There is **strong** evidence that the rebuilding strategies are rebuilding stocks, **or it is highly likely** based on simulation modelling, exploitation rates or previous performance that they will be able to rebuild the stock within the specified timeframe.
	Met?	Not relevant	Not relevant	Not relevant
		The stock is not depleted		
References				
OVERALL PERFORMANCE INDICATOR SCORE:				**N/A**
CONDITION NUMBER (if relevant):				**-**

PI 1.2.1 Evaluation Table for Harvest strategy

<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 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">Harvest strategy design</td></tr>
<tr><td>Guidepost</td><td>The harvest strategy is expected to achieve stock management objectives reflected in PI 1.1.1 SG80.</td><td>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.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3">The MSC defines a harvest strategy as the combination of the following elements:
- Monitoring
- stock assessment
- harvest control rule
- management actions
There is an appropriate monitoring and stock assessment process in place via MFRI – full details are given in the rationales for PI 1.2.3 and 1.2.4 below.
In terms of the harvest control rule, the MFRI has provided advice based on the long-term objective of keeping Fproxy at or below the long-term average (target reference point). The suggested target reference point Fproxy=0.8 is expected to keep the stock at a sustainable level. While there is no formally adopted management plan, the Ministry has formally committed in writing to follow the advice of MFRI, which is given on this basis (http://www.fisheries.is/management/government-policy/responsible-fisheries/). This therefore constitutes a formal harvest control rule (see further details rationale for PI 1.2.2 below).
On the basis of this harvest control rule, MFRI propose a TAC based on the IS-SMB survey. The TAC is therefore based on the latest information of the stock. Thus, the proposed harvest strategy by MFRI is responsive to the state of the stock.
Overall, the elements of the harvest strategy include effective data collection, scientific advice and appropriate management response. Under the precautionary approach, these appear to be working together and have recently achieved target exploitation levels in this stock. As the management system includes evaluation of performance (annual estimates of fishing mortality compared to the target levels) and it is responsive to this, SG80 is met.
There is no evidence that the harvest strategy is designed to achieve objectives for this stock. The strategy for the multispecies fishery is based on the sum of single species management, and the strategy is the result of various responses to conflicts concerns within the fishery. Without further evidence of an overarching design to the current monitoring and set of controls, the SG100 cannot be met.</td></tr>
<tr><td rowspan="3">b</td><td colspan="4">Harvest strategy evaluation</td></tr>
<tr><td>Guidepost</td><td>The harvest strategy is likely to work based on prior experience or plausible argument.</td><td>The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
</table>

	Justification	Currently, the harvest strategy is not fully evaluated by ICES or any other relevant scientific institution. Nevertheless, taking into account that the Fproxy is below the Fproxy target in 2015 and 2016 it is possible to argue that the HS is achieving its objectives. This meets the second guideline for SG80 but not at SG100.		
c	Harvest strategy monitoring			
	Guidepost	Monitoring is in place that is expected to determine whether the harvest strategy is working.		
	Met?	Y		
	Justification	Monitoring is in place through annual surveys and monitoring of commercial landings, for further details see rationale for PI 1.2.3.		
d	Harvest strategy review			
	Guidepost			The harvest strategy is periodically reviewed and improved as necessary.
	Met?			N
	Justification	MFRI annually reviews all management advice. However, there has been no formal review of the overall strategy with respect to anglerfish. Therefore, SG100 is not met.		
e	Shark finning			
	Guidepost	It is likely that shark finning is not taking place.	It is highly likely that shark finning is not taking place.	There is a high degree of certainty that shark finning is not taking place.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	Anglerfish is not a shark.		
f	Review of alternative measures			
	Guidepost	There has been a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock.	There is a **regular** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate.	There is a **biennial** review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock, and they are implemented, as appropriate.
	Met?	Y	Y	N
	Justification	Iceland requires that all target stock caught within its waters are landed. This applies a strong discouragement for unwanted catch which is avoidable. In addition, the application of a system of temporary closed areas to reduce the catch of small fish is foreseen by Iceland. These are not necessarily "unwanted" in the sense usually implied by discarding, but the management system seeks to reduce catch of fish below the optimum size (e.g. juveniles). This control has predominantly applied to cod, but could be applied to other species as appropriate. These measures imply ongoing review of ways to reduce unwanted catch (as real time closure), and that measures are implemented when considered appropriate and desirable. According to the available statistics discard of anglerfish is negligible. In the statement on responsible fisheries in Iceland (see points 10. on discards and by-catch in: http://www.fisheries.is/management/government-policy/responsible-fisheries) it is clearly stated that the Directorate of Fisheries and the Marine Research Institute conduct research and estimate discarded catches and the results indicate insignificant discards by the		

		Icelandic fishing fleet. The research can be considered a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of the target stock and they are implemented as appropriate, considering the negligible discards of anglerfish. Therefore, SG 80 is met. However is not clearly stated if this review is conducted every two years or more frequently. Therefore SG 100 is not met.
References		http://www.fisheries.is/management/government-policy/responsible-fisheries/.
OVERALL PERFORMANCE INDICATOR SCORE:		**80**
CONDITION NUMBER (if relevant):		

PI 1.2.2 Evaluation Table for Harvest control rules and tools

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
Scoring Issue		SG 60	SG 80	SG 100
A	HCRs design and application			
	Guidepost	Generally understood HCRs are in place or available that are expected to reduce the exploitation rate as the point of recruitment impairment (PRI) is approached.	Well defined HCRs are in place that ensure that the exploitation rate is reduced as the PRI is approached, are expected to keep the stock fluctuating around a target level consistent with (or above) MSY, or for key LTL species a level consistent with ecosystem needs.	The HCRs are expected to keep the stock fluctuating at or above a target level consistent with MSY, or another more appropriate level taking into account the ecological role of the stock, most of the time.
	Met?	Y	N	N
	Justification	The ICES framework for category 3 stocks (ICES, 2012) is being used for advice. A management plan has not been formally developed for this stock and there are no formal management reference points. Advice is based on the ICES default HCR, which uses the survey to adjust the TAC relative to survey trends, which ICES considers consistent with the precautionary approach. The catch advice provided by MFRI allows managers to set a reasonable target catch level based on a precautionary approach. HCRs can be considered 'generally understood', as required to achieve a 60 score, because as showed in Table 5 the recommended TAC by MFRI is followed by MII as National TAC since 2013/14 fishing season and, according to the status of the stock there was not evidence of status close to PRI since the begin of the series (2010/11). Therefore, SG 60 is met. However, to what extent exploitation might be reduced as biomass index shows low values is not formally defined. Implicitly Ministry of Industry and Innovation (MII) stated that appropriate actions are foreseen in the case MFRI advices further reductions in TAC below Fproxy target, but what would be done is not well defined. Therefore, SG 80 is not met.		
B	HCRs robustness to uncertainty			
	Guidepost		The HCRs are likely to be robust to the main uncertainties.	The HCRs take account of a wide range of uncertainties including the ecological role of the stock, and there is evidence that the HCRs are robust to the main uncertainties.
	Met?		Y	N
	Justification	The harvest control rule is implicitly taking into account some uncertainties based upon the empirical data and variability available from the survey time series. TACs are adjusted within a year based on the survey. The main uncertainties considered in the framework of the HRCs are the stock fluctuactions observed in the biomass index coming from the scientific survey. The HCRs are robust tot the main uncertinities because the reference point chosen as Fproxy of 0.8, presumably, is going to maintain the stock at level of high biomass. However, uncertainties in the influence of juvenile declines remain an issue and are not fully considered in the present HCRs. Therefore, SG100 is not met.		
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	**Evidence clearly shows** that the tools in use are effective in achieving the exploitation levels required under the HCRs.

PI 1.2.2		There are well defined and effective harvest control rules (HCRs) in place		
			levels required under the HCRs.	
	Met?	Y	Y	N
	Justification	Tools used to implement the harvest control rule include TAC based on the annual surveys and monitoring of catch, as well as the technical measures and licencing system described in section 3.3.2 These tools are appropriate and proven to be effective in controlling exploitation levels and resulted in Fproxy levels that were below the Fproxy target in the last two years. Available evidence (Table 5) indicates that the exploitation levels of the last three fishing seasons are in line with the national TAC issued by the Iceland government (MII), even if in 2014/15 the TAC was overshot by 8%. The likely reason of such overshooting is quota transfers between species. Within the context of multispecies fisheries, opportunities to reduce the catch of a single species relative to other species are more limited, which may limit effectiveness of TACs in controlling exploitation. However taking into account that such situation occurred only once in the last 3 fishing season and for a relative small percentage, SG80 is met. Since the HCR has only been utilised for few fishing seasons and in the past the observed catches and national TAC were above the TAC recommended by MFRI, there is not a clear evidence showing the tools are effective in achieving the exploitation levels required under the HCR. Thus, SG 100 is not met.		
References		ICES (2012). ICES Implementation of Advice for Data-limited Stocks in 2012 in its 2012 Advice. ICES CM 2012/ACOM 68. 42 pp.		
OVERALL PERFORMANCE INDICATOR SCORE:				**75**
CONDITION NUMBER (if relevant):				**1**

PI 1.2.3 Evaluation Table for Information and monitoring

PI 1.2.3		Relevant information is collected to support the harvest strategy		
Scoring Issue		SG 60	SG 80	SG 100
a	Range of information			
	Guidepost	Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy.	Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy.	A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, UoA removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available.
	Met?	Y	Y	Y
	Justification	Information is comprehensive across fleet, stock distribution and catch for all Iceland fisheries. All vessels are registered and licensed. Vessels are required to retain VMS and AIS equipment on board and use log-books for reporting fishing operations. AIS is mandatory for all vessels and is primarily for safety purposes. The VMS is for fisheries control, in which certain vessels must participate according to their fishery and fishing area. Fisheries control authorities have full access to all data in both systems. Discarding is not allowed within Iceland. Environmental information is also collected by MFRI (oceanographic data,		

		topography, temperature, salinity, waves, tides, etc.) which is relevant to the population dynamics of all Iceland stocks. Therefore, the SG100 is met.		
b	Monitoring			
	Guidepost	Stock abundance and UoA removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule.	Stock abundance and UoA removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule.	All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty.
	Met?	Y	Y	Y
	Justification	The authorities of the countries involved in the fishery regularly monitor the UoA removals. The stock abundance is regularly monitored by scientific institutions in Iceland with IS-MDB survey every year. The biomass index resulting from the survey and the catches are used in the assessment to estimate yearly level of fishing mortality relative to reference point employed in the estimation of the TAC. Therefore, SG 60 and 80 are met. SG100 requires that all information for the HCR are monitored with high frequency and a high degree of certainty, this has been confirmed by the Directorate of Fisheries and is clearly stated in the statement on responsible fisheries in Iceland (see specifically point 5 in: http://www.fisheries.is/management/government-policy/responsible-fisheries). Moreover, SG 100 requires that there is a 'good understanding of the uncertainties in the information and the robustness of assessment and management to this uncertainty'. A key uncertainty is migration patterns observed in the last years as well as drivers for reduction in recruitment. MFRI recently started a specific beam trawl survey (ICES, 2016) in order to improve the understanding of the dynamic of anglerfish as well as other stocks. During the site visit, MFRI stated that the number of stations sampled during the beam trawl survey are going to be increased in the next years. Therefore, taking into consideration that MFRI understands the uncertainties in the data provided by the IS-MDB survey and is improving the stock dynamic understanding implementing a new survey. MFRI carries out every year the evaluation on the stock status of anglerfish based on the survey data. Such evaluation is utilized yearly for the catch advice. Therefore, SG100 is met.		
c	Comprehensiveness of information			
	Guidepost		There is good information on all other fishery removals from the stock.	
	Met?		Y	
	Justification	All the other fisheries removals are well monitored with the data collection regulation foreseen in Iceland, as well as the catches from other countries (e.g. Faroe). This meets SG80.		
References		http://www.fisheries.is/management/government-policy/responsible-fisheries ICES (2016) Report of the Working Group on Beam Trawl Surveys (WGBEAM), 12-15 April 2016, La Rochelle, France. ICES CM 2016/SSGIEOM:20. 148 pp.		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				**NA**

PI 1.2.4 Evaluation Table for Assessment of stock status

<table>
<tr><td colspan="2">PI 1.2.4</td><td colspan="3">There is an adequate assessment of the stock status</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">Appropriateness of assessment to stock under consideration</td></tr>
<tr><td>Guidepost</td><td></td><td>The assessment is appropriate for the stock and for the harvest control rule.</td><td>The assessment takes into account the major features relevant to the biology of the species and the nature of the UoA.</td></tr>
<tr><td>Met?</td><td></td><td>Y</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3">Stock is mainly assessed through IS-IMB survey (see 1.1.1), which provides a biomass index for adults and juveniles. The biomass index (current and previous year) is used as a basis for setting a TAC, such that Fproxy (catch/biomass index) is not greater than 0.8.
As evidenced in ICES WKLIFE 3 (ICES, 2013), this is an appropriate approach for stocks with this type of data. During such workshop simulated populations were generated and HCRs were tested for estimating current exploitation based on available limited information (for instance, catch and survey data). The results of the workshop allowed to build a strong framework for Data-Limited Stocks and identified preferred options for determining proxies for FMSY for stocks without quantitative forecasts, using life-history traits, exploitation characteristics and fishery indipipendent inforamation.The assessment carried out takes into account such outcomes and is therefore appropriate for the stock and the HCR. There are uncertainties regarding migration pattern observed in the last years, so SG100 is not met.</td></tr>
<tr><td rowspan="4">b</td><td colspan="4">Assessment approach</td></tr>
<tr><td>Guidepost</td><td>The assessment estimates stock status relative to generic reference points appropriate to the species category.</td><td>The assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated.</td><td></td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td></td></tr>
<tr><td>Justification</td><td colspan="3">The status can be evaluated relative to the proposed reference points that according to ICES WKLIFE 3 (ICES, 2013) are appropriate for the stock. Therefore SG 80 is met.</td></tr>
<tr><td rowspan="4">c</td><td colspan="4">Uncertainty in the assessment</td></tr>
<tr><td>Guidepost</td><td>The assessment identifies major sources of uncertainty.</td><td>The assessment takes uncertainty into account.</td><td>The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3">The survey forms the basis for the assessment of stock status. The autumn survey covers the full depth range of the fisheries, and the uncertainties of the survey index are considered low (see Figure 5-6, Biomass index). Therefore, SG80 is met. The assessment does not use a probabilistic framework to evaluate stock status, therefore SG100 is not met.</td></tr>
</table>

PI 1.2.4		There is an adequate assessment of the stock status		
d	Evaluation of assessment			
	Guidepost			The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored.
	Met?			N
	Justification	MFRI reported that other assessment approaches will be explored in the future, such as length or age based GADGET model. However, currently the team saw no evidence that other assessment methodologies are tested or that alternative approaches have been explored. Therefore, SG 100 is not met.		
e	Peer review of assessment			
	Guidepost		The assessment of stock status is subject to peer review.	The assessment has been internally and externally peer reviewed.
	Met?		Y	N
	Justification	There is regular internal review of all stock assessments conducted by MFRI. The assessments are not reviewed externally e.g. by ICES. Therefore, SG 100 is not met		
References		ICES. 2013. Report of the Workshop on the Development of Quantitative Assessment Methodologies based on LIFE-history traits, exploitation characteristics, and other key parameters for Data-limited Stocks (WKLIFE III), 28 October–1 November 2013, Copenhagen, Denmark. ICES CM 2013/ACOM:35. 98 pp. ICES. 2016. Report of the Working Group on Beam Trawl Surveys (WGBEAM), 12-15 April 2016, La Rochelle, France. ICES CM 2016/SSGIEOM:20. 148 pp.		
OVERALL PERFORMANCE INDICATOR SCORE:				80
CONDITION NUMBER (if relevant):				

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

PI 2.1.1 Evaluation Table Primary species outcome

PI 2.1.1		**The UoA aims to maintain primary species above the PRI and does not hinder recovery of primary species if they are below the PRI.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Main primary species stock status			
	Guidepost	Main primary species are likely to be above the PRI OR If the species is below the PRI, the UoA has measures in place that are expected to ensure that the UoA does not hinder recovery and rebuilding.	Main primary species are highly likely to be above the PRI OR If the species is below the PRI, there is either evidence of recovery or a demonstrably effective strategy in place between all MSC UoAs which categorise this species as main, to ensure that they collectively do not hinder recovery and rebuilding.	There is a high degree of certainty that main primary species are above the PRI and are fluctuating around a level consistent with MSY.
	Bottom trawl			
	Met?	Y	Y	4 Y : 2 N
	Justification	There are 6 main stocks: Atlantic cod, golden redfish, saithe, haddock, Greenland halibut, and deep-water redfish (see Table 6). Saithe, cod, golden redfish and haddock are currently in a good state and are at or above the MSY level (see Table 14) with a high degree of certainty. Specifically, based on the stock assessments for these stocks, there is a greater than 80% probability that the stock is above their MSY $B_{trigger}$. This meets the SG100 for these 4 elements. The stock size indicator of deep-water redfish (survey biomass index) declined from 2001 to 2003, and has been stable in the following years (ICES, MWWG 2017). The ICES framework for category 3 stocks was applied. Altought the absence of any indications of incoming cohorts raises concerns about the future productivity of the stock, the level of biomass seems stable for more than ten years and is highly likely that the stock is above the PRI. This meets SG 80 but SG 100 is not met. For the Greenland halibut element the assessment is indicative of stock trends and provides relative measures of stock status. The stock assessment estimates that the stock has been below the biomass that is associated with B_{MSY} since the early 1990s and is presently at 68% of B_{MSY}, but highly likely above the PRI (Blim=30% B_{MSY}). Since the 2004–2005 the stock has been slowly increasing and present fishing mortality is estimated to be around F_{MSY}. The stock has been increasing since 2004 and 2005 and is currently well above the MSY $B_{trigger}$ (50%B_{MSY}). This meets SG 80 but SG 100 is not met.		

<table>
<tr><td rowspan="3"></td><td colspan="4">Nephrops trawl</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>4 Y: 2 N</td></tr>
<tr><td>Justification</td><td colspan="3">There are 6 main stocks: Atlantic cod, Norway lobster, golden redfish, ling, saithe and witch (see Table 7).
The elements cod, golden redfish, ling and saithe are currently at or above MSY level (see Table 14) with a high degree of certainty. Specifically, based on the stock assessments for these stocks, there is a greater than 80% probability that the stock is above their MSY $B_{trigger}$. This meets the SG100 for these 4 elements.
Regarding the element witch, data available from the Icelandic Nephrops survey suggests that the fishable witch stock declined in 2005–2008, but has been steady since. Recruitment has been very poor in recent years, which will probably mean further decrease in the fishable stock in the coming years. Current biomass appears to be above any B_{lim} because biomass has been broadly stable through the recruitment decline. This meets SG 80 but SG 100 is not met.
With regards to the element Norway lobster, the Nephrops May biomass survey index has been decreasing since 2008 and was at an historical minimum in 2014. Based on a commercial CPUE index, MRI has indicated that this may at least in part be due to changes in survey catchability rather than just abundance. Effort has been reduced in the past, and management has achieved the target fishing mortality ($F_{0.1}$) or below it since 1995. The main concern appears to be overexploitation in some areas in some years, and overall biomass is declining rapidly due to low recruitment. Large Nephrops (proxy for SSB) has been declining, but is above the long term mean. MRI has not yet recommended a reduction in harvest rate, suggesting they believe SSB is still well above the PRI. This meets SG 80 but SG 100 is not met.</td></tr>
<tr><td rowspan="3"></td><td colspan="4">Danish seine</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>2 Y : 2 N</td></tr>
<tr><td>Justification</td><td colspan="3">There are 4 main stocks: Atlantic cod, haddock, plaice and Atlantic wolffish (see Table 8).
Haddock and cod are currently in a good state and are at or above the MSY level (see Table 14) with a high degree of certainty. Specifically, based on the stock assessments for these stocks, there is a greater than 80% probability that the stock is above their MSY $B_{trigger}$. This meets the SG100 for these 2 scoring elements.
Atlantic wolffish abundance is tracked in the spring groundfish survey. The survey also provides a recruitment index as it catches wolffish before they recruit to the fishery. The survey suggests that the fishable stock biomass decreased by more than half in 1985–1995 but has generally increased since then, and in 2015 the index is above average. Recruitment was high from 1991–1998, but has decreased since to the lowest level in 2015. Increases in fishable stock indices from 1995–2008 correspond to the high recruitment indices in earlier years. 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 FMSY. Therefore the stock is highly likely to be above its PRI, but because FMSY has only recently been applied, it is not clear whether it is at the MSY level yet. This meets SG80, but not SG100 for this element.
Based on age-catch analysis, the plaice stock has been estimated to have decreased by more than half in 1993–2000, reaching a minimum in 2000. Since 2000, fishing mortality has been reduced and the fishable biomass has been increasing despite low recruitment. The quota is set at F_{MSY}, assuming the low recruitment is ongoing, and a seasonal closed area is used to help protect the spawning stock. Given the stock assessment results, it is unlikely that the stock is below PRI and with the current increase in stock size, the fishery is not hindering any recovery to the MSY level. Therefore, SG 80 is met for this scoring element, but SG 100 is not met.</td></tr>
<tr><td></td><td colspan="4">Gillnet</td></tr>
</table>

	Met?	Y	Y	2 Y : 1 N
	Justification	There are three main stocks: Atlantic cod, saithe, and Greenland halibut (see Table 9). Saithe and cod are currently in a good state and are at or above the MSY level (see Table 14) with a high degree of certainty. Specifically, based on the stock assessments for these stocks, there is a greater than 80% probability that the stock is above their MSY $B_{trigger}$. This meets SG100 for these 2 elements. The assessment of Greenland halibut is indicative of stock trends and provides relative measures of stock status. The stock assessment estimates that the stock has been below the biomass that is associated with B_{MSY} since the early 1990s and is presently at 68% of B_{MSY}, but highly likely above the PRI (Blim=30% B_{MSY}). Since the 2004–2005 the stock has been slowly increasing and present fishing mortality is estimated to be around F_{MSY}. The stock has been increasing since 2004 and 2005 and is currently well above the MSY $B_{trigger}$ (50% B_{MSY}). This meets SG 80 but SG 100 is not met for this scoring element.		
	Anglerfish gillnet			
	Met?	Y	Y	1 Y
	Justification	There is one main stock: Atlantic cod (see Table 10). Cod is currently in a good state and is at or above the MSY level (see Table 14) with a high degree of certainty. Specifically, based on the stock assessments for these stocks, there is a greater than 80% probability that the stock is above their MSY $B_{trigger}$. This meets the SG100 for this element.		
	Lumpfish gillnet			
	Met?	Y	Y	1 Y : 1 N
	Justification	There are two main stocks: Atlantic cod and lumpfish (see Table 11). Cod is currently in a good state and is at or above the MSY level (see Table 14) with a high degree of certainty. Specifically, based on the stock assessments for these stocks, there is a greater than 80% probability that the stock is above their MSY $B_{trigger}$. This meets the SG100 for this element. Regarding lumpfish, the MFRI advice is based on a maximum harvest rate not exceeding the 1985–2011 average. The objective is to prevent the female lumpfish biomass not falling below the historical minimum. These imply reference points for the survey indices and an appropriate HCR. The female biomass is well above its historical low point, indicating that the stock is above its PRI. Note that male biomass shows a long term decline and is near its historical minimum in 2014 since 1985. Therefore, SG 80 is met for this scoring element but SG 100 is not met.		
	Longline			
	Met?	Y	Y	3 Y : 1 N
	Justification	There are 4 main stocks: Atlantic cod, ling, haddock and Atlantic wolffish (see Table 12). Cod, haddock and ling are currently at or above their MSY level (see Table 14) with a high degree of certainty. Specifically, based on the stock assessments for these stocks, there is a greater than 80% probability that the stock is above their MSY $B_{trigger}$. This meets the SG100 for these scoring elements. Atlantic wolffish abundance is tracked in the spring groundfish survey. The survey also provides a recruitment index as it catches wolffish before they recruit to the fishery. The survey suggests that the fishable stock biomass decreased by more than half in 1985–1995 but has generally increased since then, and in 2015 the index is above average. Recruitment was high from 1991–1998, but has decreased since to the lowest level in 2015. Increases in fishable stock indices from 1995–2008 correspond to the high recruitment indices in earlier years. 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 FMSY. Therefore the stock is highly likely to be above its PRI, but because		

		FMSY has only recently been applied, it is not clear whether it is at the MSY level yet. This meets SG80 for this element, but not SG100.		
b	Minor primary species stock status			
	Guidepost			Minor primary species are highly likely to be above the PRI OR If below the PRI, there is evidence that the UoA does not hinder the recovery and rebuilding of minor primary species
	Bottom trawl			
	Met?			19 Y : 1 N
	Justification	There are 20 minor primary species stocks that are impacted by the fishery (i.e. these species have been recorded in the landings) (see Table 6). Of these elements, blue ling, blue whiting, ling and mackerel have a stock status that is around the MSY level. The other relevant elements, Atlantic wolffish, bluefin tuna, greater silver smelt, herring, lemon sole, lumpfish female, northern shrimp (2 stocks), Norway lobster, Norway redfish, plaice, spotted wolffish, tusk and witch have been determined as highly likely to be above their PRI or recovering to the MSY level (see Table 14). SG100 is met for these elements For dab and long rough dab, the stock status is not certain. For these stocks, it cannot be determined that the stock is highly likely above their PRI, and there is no evidence of recovery. Bottom trawl landings are small for common dab (54 t in the years 2011-2016, which represents 1.7% of total common dab landings during this period). Even if there is some discarding, this is thus clear evidence that this UoA would not hinder the recovery for common dab, and SG100 is met. For long rough dab landings are more substantial (192 t in 2011-2016; which represents 24.7% of total common dab landings during this period) so there is insufficient evidence that the gear is not preventing any recovery of the stock. SG100 is not met for this element.		
	Nephrops trawl			
	Met?			12 Y
	Justification	There are 12 minor primary species stocks that are impacted by the fishery (see Table 7). Of these elements blue ling, lemon sole, haddock, Atlantic wolffish, plaice, tusk, spotted wolffish, greater silver smelt, mackerel and Norway redfish have stock status that is around the MSY level (see Table 14). For the elements long rough dab and common dab, the stock status are not certain. For these stocks, it cannot be determined that the stock is highly likely above their PRI, and there is no evidence of recovery. However, *Nephrops* trawl fishing accounts for a small percentage of the landings of long rough dab and common dab (3 t and 1 t in 2011-2016 respectively, which represents 0.39 and 0.03% of total Icelandic landings of these species in 2011-2016 respectively). Even if there is some discarding, this is clear evidence that this gear does not hinder recovery so SG100 is met.		
	Danish seine			
	Met?			10 Y : 2 N
	Justification	There are 12 minor primary species stocks that are impacted by the fishery (see Table 8). Of these elements lemon sole, sea cucumber, spotted wolffish, tusk, witch, lumpfish		

		female, blue ling, golden redfish, ling, mackerel and saithe have stock status that is around the MSY level (see Table 14). For the elements long rough dab and common dab, the stock status are not certain. For these stocks, it cannot be determined that the stock is highly likely above their PRI, and there is no evidence of recovery. Danish seine fishing accounts for a high volume of the landings of common dab (3147 t in 2011-2016, which represents 96.98% of Icelandic landings of this species in 2011-2016), and a significant amount of the landings of long rough dab (215 t in 2011-2016, which represents 27.67% of Icelandic landings of this species in 2011-2016). There is thus insufficient evidence to show that the gear is not hindering recovery of these two stocks and SG 100 is not met for both species.		

	Gillnet			
	Met?			18 Y
	Justification	There are 18 minor primary species stocks that are impacted by the fishery (see Table 9). Of these elements ling, herring, haddock, plaice, golden redfish, blue ling, tusk, lumpfish female, Atlantic wolffish, spotted wolffish, lemon sole, mackerel, witch and sea cucumber have stock status that is around the MSY level. While, deepwater redfish is higly likely to be above the PRI (see Table 14). For the elements long rough dab and common dab, the stock status is not certain. For these stocks, it cannot be determined that the stock is highly likely above their PRI, and there is no evidence of recovery. However, gillnet fishing accounts for a small percentage of the landings of long rough dab and common dab (7 t and 16 t in 2011-2016 respectively, which represents 0.9 and 0.49% of total Icelandic landings of these species in 2011-2016 respectively). Even if there is some discarding, this is clear evidence to show that this gear does not hinder recovery, so SG100 is met for both species .		

	Anglerfish gillnet			
	Met?			11 Y
	Justification	There are 11 minor primary species stocks that are impacted by the fishery (see Table 10). Of these elements saithe, ling, plaice, lumpfish female, Atlantic wolffish, haddock, golden redfish, herring, blue ling, tusk and lemon sole have stock status that is around the MSY level (see Table 14). This meets the SG100.		

	Lumpfish gillnet			
	Met?			8 Y
	Justification	There are 8 minor primary species stocks that are impacted by the fishery (see Table 11). Of these elements plaice, lumpfish female, saithe, Atlantic wolffish, haddock, spotted wolffish, lemon sole, and tusk have stock status that is around the MSY level (see Table 14). This meets the SG100.		

	Longline			
	Met?			15 Y
	Justification	There are 15 minor primary species stocks that are impacted by the fishery (see Table 12). Of these elements tusk, golden redfish, spotted wolffish, blue ling, saithe, Greenland halibut, plaice, bluefin tuna, mackerel, herring, Norway redfish, lumpfish female have stock status that is around the MSY level . While, deepwater redfish is higly likely to be above the PRI (see Table 14). For long rough dab and common dab, the stock status is not certain. For these stocks, it cannot be determined that the stock is highly likely above their PRI, and there is no evidence of recovery. However, longline fishing accounts for a small percentage of the landings of long rough dab and common dab (25 t and 26 t in 2011-2016 respectively, which represents 3.2 and 0.8% of total Icelandic landings of these species in 2011-2016		

		respectively). Even if there is some discarding, this is clear evidence that this gear would not hinder the recovery, so SG100 is met for both species .

References	MRI 2016. ICCAT stock advice: 2014 Atlantic Bluefin Tuna stock assessment. ICES stock advice: ICES 2015. 9.3.17 Herring (*Clupea harengus*); 9.3.25 Mackerel (*Scomber scombrus*); Stock Annex for Icelandic cod; 9.3.8 Blue whiting (*Micromesistius poutassou*). ICES 2016. 2.3.2 Cod (*Gadus morhua*); 2.3.6 Greenland halibut (Reinhardtius hippoglossoides); 2.3.7 Haddock (*Melanogrammus aeglefinus*); 2.3.8 Herring (*Clupea harengus*); 2.3.11 Beaked redfish (*Sebastes mentella*); 2.3.13 Beaked redfish (*Sebastes mentella*); 2.3.14 Golden redfish (*Sebastes norvegicus*); 2.3.15 Saithe (*Pollachius virens*); 9.3.3 Blue ling (*Molva dypterygia*); 9.3.23 Greater silver smelt (*Argentina silus*); 9.3.35 Ling (*Molva molva*); 9.3.47 Tusk (*Brosme brosme*). ICES 2017. reb.27.5a14 Beaked redfish (Sebastes mentella) in Subarea 14 and Division 5.a, Icelandic slope stock (East of Greenland, Iceland grounds). DOI: 10.17895/ices.pub.3213

OVERALL PERFORMANCE INDICATOR SCORE:	
Bottom trawl Main species: 4 reach 100, 2 reach 80 Minor species: 19 reach 100, 1 does not	**95**
Nephrops trawl Main species: 4 reach 100, 2 reach 80 Minor species: 12 reach 100	**95**
Danish seine Main species: 2 reach 100, 2 reach 80 Minor species: 10 reach 100, 2 reach 80	**95**
Gillnet Main species: 2 reach 100, 1 reaches 80 Minor species: 18 reach 100	**95**
Anglerfish Gillnet Main species: 1 reaches 100 Minor species: 11 reach 100	**100**
Lumpfish Gillnet Main species: 1 reaches 100, 1 reaches 80 Minor species: 8 reach 100	**95**
Longline Main species: 3 reach 100, 1 reaches 80 Minor species: 15 reach 100	**95**
CONDITION NUMBER (if relevant):	

PI 2.1.2 Evaluation Table for Primary species management strategy

PI 2.1.2		There is a strategy in place that is designed to maintain or to not hinder rebuilding of primary species, and the UoA regularly reviews and implements measures, as appropriate, to minimise the mortality of unwanted catch.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are measures in place for the UoA, if necessary, that are expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are likely to above the point where recruitment would be impaired.	There is a partial strategy in place for the UoA, if necessary, that is expected to maintain or to not hinder rebuilding of the main primary species at/to levels which are highly likely to be above the point where recruitment would be impaired.	There is a strategy in place for the UoA for managing main and minor primary species.
	Met?	Y	Y	Y
	Justification	**All gears** All main primary species are managed 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 and ICCAT, which provide the scientific advice, specifically the TAC. Stock assessments not reviewed through ICES and ICCAT are conducted by the same scientists and follow the same principles. The scientific advice has been followed for these stocks, limiting exploitation to sustainable levels. Additional controls are applied, such as seasonal closures of spawning areas. Generic controls, notably mesh size 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. All of the assessed UoAs also catch minor primary species, which are also managed through Iceland/ICES fisheries management system described above. The remaining species are managed by Iceland through advice from MFRI. However, these follow very similar procedures and similar objectives, which are analogous to the ICES system. The data are collected in the same way using the same system, the same type of stock assessments are conducted. The TAC is adjusted, and closed areas are implemented where appropriate. This constitutes a full management strategy for all minor primary species to maintain stocks at MSY (or equivalent reference with the same intent). Because all primary stocks have a harvest strategy with TACs set based on scientific monitoring, SG100 is met for all gears.		
b	Management strategy evaluation			
	Guidepost	The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species).	There is some objective basis for confidence that the measures/partial strategy will work, based on some information directly about the fishery and/or species involved.	Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the fishery and/or species involved.
	Met?	Y	Y	N

	Justification	**All gears** All primary species are monitored and all undergo an annual assessment of stock status. This tests whether the harvest strategy is working in each case. The assessments and scientific advice are published annually by MFRI and ICES, and regularly by ICCAT. This constitutes testing of the strategy. For many primary stocks subject to full stock assessment, testing supports high confidence that the harvest strategy will work. For several minor stocks (common dab, long rough dab, witch, Norway redfish, lemon sole) 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	**All gears** The evidence for successful implementation consists of landings, which can be compared to TAC, and assessments of abundance. Estimates of discarding are made for haddock and cod. Discards are estimated to be very low (essentially negligible for stock assessment purposes), although discards are not estimated for all stocks. Given the regulation prohibiting discarding, it is likely discards are equally low across all primary stocks. This meets SG80. Stock assessments and the abundance indices are being used to assess whether target fishing mortality is limited to sustainable levels for primary 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?	Y	Y	Y

	Justification	**All gears** As for the Principle 1 species (PI 1.2.1.f), because the low discards are likely partly the result of management initiatives, SI.e is scored. See PI 1.2.1.f for an interpretation of the scoring guideposts. There is no dedicated review of unwanted mortality. Unwanted mortality is addressed within the harvest strategy and therefore a review is conducted routinely alongside all other issues pertinent to controlling mortality. This on-going consideration is evident in the stock assessments; scientific advice and policy documents are treated as a review. This review occurs annually. There is clear evidence that alternative measures have been adopted to minimize discarding of all species. There is a prohibition on discarding commercial species, although reasonable exceptions are allowed. There is flexibility in TAC, so a limited 5% overshoot can be carried over between years without penalty, and quota can be exchanged among companies and vessels. Technical measures include increasing mesh size in trawls from 120 mm to 155 mm in 1977 (except redfish directed fisheries), an allowable gillnet mesh size range, and real time area closures to reduce catches of undersized fish. In addition, individual boats may be allowed the limited transfer of allowable catch quota of one species to another. The effect of these measures on the quota system is reviewed. Moreover, the fishing industry has a policy to make best possible use of all products, including bio-medical products, and new markets for new products such as developing markets for dried starry ray, dried cod heads, encouraging restaurants to use more unusual species (Clucas, 2014), and luxury items such as handbags and wallets made from fish skins (ISF, pers. communication). This converts otherwise unwanted to wanted catch, which is perhaps the most effective way of dealing with this issue. With at least an annual review of unwanted catch across main primary species, and implementation of an array of appropriate measures to reduce this and discarding of all species where appropriate and possible, SG60, SG80 and SG100 are met.
References		Clucas 2014; MRI 2016. <u>ICCAT stock advice:</u> 2014 Atlantic Bluefin Tuna stock assessment. <u>ICES stock advice:</u> ICES 2015. 9.3.17 Herring (*Clupea harengus*); 9.3.25 Mackerel (*Scomber scombrus*); Stock Annex for Icelandic cod; 9.3.8 Blue whiting (*Micromesistius poutassou*). ICES 2016. 2.3.2 Cod (*Gadus morhua*); 2.3.6 Greenland halibut (Reinhardtius hippoglossoides); 2.3.7 Haddock (*Melanogrammus aeglefinus*); 2.3.8 Herring (*Clupea harengus*); 2.3.11 Beaked redfish (*Sebastes mentella*); 2.3.13 Beaked redfish (*Sebastes mentella*); 2.3.14 Golden redfish (*Sebastes norvegicus*); 2.3.15 Saithe (*Pollachius virens*); 9.3.3 Blue ling (*Molva dypterygia*); 9.3.23 Greater silver smelt (*Argentina silus*); 9.3.35 Ling (*Molva molva*); 9.3.47 Tusk (*Brosme brosme*).

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

PI 2.1.3 Evaluation Table for Primary species information

PI 2.1.3		Information on the nature and extent of primary species is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage primary species		
Scoring Issue		SG 60	SG 80	SG 100
a	Information adequacy for assessment of impact on main primary species			
	Guidepost	Qualitative information is adequate to estimate the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Qualitative information is adequate to estimate productivity and susceptibility attributes for main primary species.	Some quantitative information is available and is adequate to assess the impact of the UoA on the main primary species with respect to status. OR If RBF is used to score PI 2.1.1 for the UoA: Some quantitative information is adequate to assess productivity and susceptibility attributes for main primary species.	Quantitative information is available and is adequate to assess with a high degree of certainty the impact of the UoA on main primary species with respect to status.
	Met?	Y	Y	Y
	Justification	**All gears** Full quantitative information, in the form of landings data, is available to measure the impact of each gear on each stock of main primary species identified. In addition, there are fisheries independent scientific demersal surveys (see ICES, 2010), and catch composition sampling (length, age) for both surveys and commercial catches is carried out, covering all main species. These data are suitable to quantitatively assess the impact of the UoAs being assessed on main primary species with a high degree of certainty. SG100 is met.		
b	Information adequacy for assessment of impact on minor primary species			
	Guidepost			Some quantitative information is adequate to estimate the impact of the UoA on minor primary species with respect to status.
	Met?			Y
	Justification	**All gears** All minor species, like the main species, have accurate landings recorded for all gears. These species are also assessed with respect to status. In all cases reference points are available and used to assess status, at least in the form of trends. These assessments are used to advise on adjustments in TAC for each species. This meets SG100 for all gears.		

c	Information adequacy for management strategy			
	Guidepost	Information is adequate to support measures to manage main primary species.	Information is adequate to support a partial strategy to manage main Primary species.	Information is adequate to support a strategy to manage all primary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	Y
	Justification	**All gears** Information available for main species in all gears is sufficient to support stock assessments, estimate biomass and adjust the TAC accordingly. A standard harvest strategy is implemented for each primary species. Because the stock status of all main and minor primary species is evaluated each year, the strategy for each species is under constant re-evaluation, determining whether objectives are being achieved in each case. Because all primary species have information sufficient to evaluate the harvest strategy, SG100 is met for all gears.		
References		ICES 2010; MRI 2016. ICCAT stock advice: 2014 Atlantic Bluefin Tuna stock assessment. ICES stock advice: ICES 2015. 9.3.17 Herring (*Clupea harengus*); 9.3.25 Mackerel (*Scomber scombrus*); Stock Annex for Icelandic cod; 9.3.8 Blue whiting (*Micromesistius poutassou*). ICES 2016. 2.3.2 Cod (*Gadus morhua*); 2.3.6 Greenland halibut (Reinhardtius hippoglossoides); 2.3.7 Haddock (*Melanogrammus aeglefinus*); 2.3.8 Herring (*Clupea harengus*); 2.3.11 Beaked redfish (*Sebastes mentella*); 2.3.13 Beaked redfish (*Sebastes mentella*); 2.3.14 Golden redfish (*Sebastes norvegicus*); 2.3.15 Saithe (*Pollachius virens*); 9.3.3 Blue ling (*Molva dypterygia*); 9.3.23 Greater silver smelt (*Argentina silus*); 9.3.35 Ling (*Molva molva*); 9.3.47 Tusk (*Brosme brosme*).		
OVERALL PERFORMANCE INDICATOR SCORE (All Gears):				**100**
CONDITION NUMBER (if relevant):				

PI 2.2.1 Evaluation Table for Secondary species outcome

PI 2.2.1		**The UoA aims to maintain secondary species above a biologically based limit and does not hinder recovery of secondary species if they are below a biological based limit.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Main secondary species stock status			
	Guide-post	Main Secondary species are likely to be within biologically based limits. OR If below biologically based limits, there are measures in place expected to ensure that	Main secondary species are highly likely to be above biologically based limits OR If below biologically based limits, there is either **evidence of recovery** or a **demonstrably effective**	There is a high degree of certainty that main secondary species are within biologically based limits.

		the UoA does not hinder recovery and rebuilding.	**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.	

Met?												
TB		AGN	Y	TB		AGN	N	TB		AGN	N
TN		LGN	Y	TN		LGN	N	TN		LGN	N
SD		LL	Y	SD		LL	Y	SD		LL	N
GN	Y			GN	N			GN	N		

Justification

Species	TB	TN	SD	GN	AGN	LGN	LL
Brünnich's guillemot						80	
Common guillemot				80	RBF score: 82	80	
European shag						60	80
Great black-backed gull							80
Great cormorant						60	80
Northern fulmar				80	RBF score: 82		80
Northern gannet				80			80
Razorbill				80			
Harbour porpoise				80	RBF score: 63	80	
Harbour seal				60	RBF score: 63	FAIL	
Harp seal				80		80	
Grey seal						60	
Ringed seal				80		80	

Data on catches of secondary finfish and shark species was available for all gears, and data on out of scope secondary seabird and marine mammal species from on-board observations was available for all UoAs except for anglerfish gillnets. For the latter gear a limited number of onboard observations were carried out by the MFRI 2016 (0.6% coverage of anglerfish gillnet fishing trips was achieved), but the final 2016 bycatch estimates were not available to the assessment team. Consequently, a Productivity Susceptibility Analysis (PSA) was carried out and used to score this UoA.

Anglerfish gillnets:

There are no secondary species of finfish or shark which are main species for this gear.

A Productivity Susceptibility Analysis (PSA) was carried out and was used to score this UoA since no data on the out-of-scope secondary species bycatch was available for this gear.The species list used for the PSA was compiled during the site visit. During meetings with the National Small Boat Owners Federation and with the bycatch expert of the MFRI the Northern fulmar and the common guillemot were identified to be likely seabird bycatch species. Harbour porpoise and harbour seals were recorded as marine mammal bycatch species during onboard observations carried out by the Icelandic Directorate of Fisheries (DF). The elements considered are thus: common guillemot, Northern fulmar, harbour porpoise, harbour seal.

The result of this RBF assessment is a score of 70 - pass with condition. Two of the elements (species) scored below SG 80: harbour seal and harbour porpoise. Full details are available in Appendix 1.2.

Gillnets and longlines

There are no secondary species of finfish or shark which are main species. The following out-of-scope species are main secondary species which may have interactions with the UoAs considered in this assessment. An overview of the interactions can be seen in the justification summary table above.

<u>Brünnich's guillemot</u>

Brünnich's guillemot, also known as 'thick-billed murre', is native to both Greenland and Iceland, where it breeds on coastal cliffs and islands in areas supporting rich planktonic biomass near cliffed coasts. The European population is estimated at 1,920,000-2,840,000 mature individuals; the Icelandic population has been estimated at 153,000-520,000 individuals (Table 19). No information is available on population trends (BirdLife International, 2015). Since the species has an extremely large population size it has an IUCN status of 'Least Concern' in Europe (see status on http://www.iucnredlist.org/).

Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 46 Brünnich's guillemot deaths per year, which accounts for 0.01-0.03% of the total estimated Icelandic population per year. Given the IUCN status of 'Least Concern' in Europe, the team considers that lumpfish gillnet impacts are not significant and that this species is highly likely to be within biologically based limits. SG 80 is met for lumpfish gillnets. SG 100 is not met since based on the available information it cannot be concluded that there is a high degree of certainty that this species is above biologically based limits.

<u>Common guillemot</u>

The common guillemot has a circumpolar distribution, occurring in the low-arctic and boreal waters of the north Atlantic. The European population is estimated at 2,350,000-3,060,000 mature individuals; the Icelandic population has been estimated at 368,000-1,060,000 individuals (Table 19). Since 2005 a sharp decline has been observed in Iceland (where nearly a quarter of the European population is found) (BirdLife International, 2015). As a result of the reported decline in Iceland, the estimated and projected rate of decline of the European population size over the period 2005-2050 (three generations) varies from 25% to more than 50%, and the species was recently given an IUCN status of just 'Near Threatened' in Europe (see status on http://www.iucnredlist.org/). However, since 2000 a number of populations have been increasing elsewhere, including in the UK (which holds nearly half the European population) (JNCC 2014; BirdLife International, 2015).

Based on the most recent MFRI data available, cod gillnets account for a maximum of 1127 common guillemot deaths per year, which accounts for only 0.11-0.31% of the total estimated Icelandic population per year. In addition a maximum of 216 common guillemots were caught annually by lumpfish gillnets in 2014 - 2015, which accounts for another 0.02-0.06% of the total Icelandic common guillemot population per year. Indeed, local experts do not consider that gillnet fisheries are a threat to the population status of this species (Dr. Erpur Snær Hansen,

		Náttúrustofa Suðurlands / South Iceland Nature Research, Vottunarstofan Tún pers. communication, 24 May 2016). Since the available data indicates that relative to the total population size very low numbers of common guillemot were caught by both gillnets and lumpfish gillnets in 2014-2015, the species has an IUCN status of just 'Near Threatened' (which is not part of the IUCN 'threatened' categories) in Europe, and local expert opinion does not consider fishing to be a threat, the team considers that gillnet and lumpfish gillnet impacts are not significant and that this species is highly likely to be within biologically based limits. SG 80 is met for gillnets and lumpfish gillnets. SG 100 is not met since based on the available information it cannot be concluded that there is a high degree of certainty that this species is above biologically based limits. <u>European Shag / Great cormorant</u> The great cormorant (*Phalacrocorax carbo*) inhabits both marine and freshwater areas, whilst the European Shag (*Phalacrocorax aristotelis*) is exclusively marine. Both shag and cormorant breed in the Breiðafjörður region of Iceland. During the winter, they can be found all along the Icelandic coast. 4100 pairs of great cormorant and 4900 pairs of European shag are estimated to breed in Iceland (BirdLife International, 2015), representing 1% and 6% respectively, of the overall North Atlantic population. The populations of the great cormorant are expected to increase both in the short and the long term, whilst the status of the European shag is less clear, with suspected decreasing short and long term population trends for unknown reasons. Nevertheless, both species were recently given a status of 'Least Concern' in Europe by IUCN (see http://www.iucnredlist.org/). Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 930 European shag / great cormorant deaths per year. Moreover, according to 2014-2015 bycatch estimates available from the MFRI, longlines account for a maximum of 113 cormorant / shag deaths a year. Since it is not known what percentage of the bycatch are cormorant and what percentage are shag (although breeding populations of the two species are similar in Iceland), the assessment team took the precautionary approach to assume all bycatch were one species and then the other. Based on these precautionary calculations, a maximum of 11.34% of the total estimated Icelandic population per year would be affected for great cormorant, and 9.49% per year for shag by lumpfish gillnets. For longlines the precautionary estimates are 1.38% for great cormorant and 1.15% for European shag. It is likely that the actual values are much lower for both species / gears. Indeed local experts do not consider that fisheries are a threat to the population status of this species (Dr. Erpur Snær Hansen, Náttúrustofa Suðurlands / South Iceland Nature Research, Vottunarstofan Tún pers. communication, 24 May 2016). Since the available data indicates that relative to the total population size low numbers of cormorants / European shags were caught by longlines in 2014-2015, the species have an IUCN status of 'Least Concern' in Europe, and local expert opinion does not consider longlines to be a threat, the team considers that longline impacts are not significant and that this species is highly likely to be within biologically based limits. SG 80 is met for both species for longlines. In the case of lumpfish gillnets the estimated population impacts are much higher, but given the limitations of the bycatch estimates (only combined numbers for both species available, lack of logbook data, low coverage of lumpfish trips by on board observers, high variation in estimates [487 in 2014; 930 in 2015]), and the fact that this species has an IUCN status of 'Least Concern' in Europe, overall the team considers that it is likely that both cormorants and European shags are above biologically based limits.. SG 60 is met for lumpfish gillnets. Due to the high bycatch numbers and the lack of a demonstrably effective partial strategy to manage the impacts of the UoA on these species, SG 80 is not met for both species for lumpfish gillnets. <u>Greater black-backed gull</u> This species has a wide distribution and can be found across the north Atlantic, including in Iceland and southern Greenland. The Icelandic population was estimated to number 15,000 to 20,000 breeding pairs by the Icelandic Institute of Natural History in 2000. The short-term trend of the Icelandic population is unknown, whilst the projected long term trend is decreasing (Birdlife International, 2015). This could possibly be due to the declining availability of discarded offal from ships and land-based waste (Dr. Erpur Snær Hansen, Náttúrustofa Suðurlands/South

		Iceland Nature Research, Vottunarstofan Tún pers. communication, 24 May 2016). However, this species was recently given a status of 'Least Concern' by IUCN (see http://www.iucnredlist.org/). According to the most recent bycatch estimates available from the MFRI, longlines account for a maximum of 207 black-backed gull deaths a year. Based on the lower estimated Icelandic population size of 30,000 individuals, this would account for only 0.69% of the total estimated Icelandic population per year. Since the available data indicates that relative to the total population size low numbers of black-backed gulls were caught in 2014-2015 and the species has an IUCN status of 'Least Concern' in Europe the team considers that longline impacts are not significant and that this species is highly likely to be within biologically based limits. SG 80 is met for longlines. SG 100 is not met since based on the available information it cannot be concluded that there is a high degree of certainty that this species is above biologically based limits. <u>Fulmar</u> The northern fulmar is found throughout the north Atlantic and North Sea, north of 45°N (Hagemeijer and Blair 1997). Based on the most recent estimates the European fulmar population is estimated at 3,380,000-3,500,000 pairs. Despite fluctuations in the fulmar population, it remains a common breeder in Iceland; in 1983-2009 the Icelandic population was estimated to number 1,150,000 breeding pairs. More recent estimates are not available, but both short and long term population trends for this species have been estimated to be decreasing in Iceland. Historically 3,300 and 10,500 fulmars were hunted annually in Iceland, but this practise is far less frequently nowadays. The species was recently given an IUCN status of 'Least Concern' in Europe (see http://www.iucnredlist.org/). Based on the most recent MFRI data available, cod gillnets account for a maximum of 2717 fulmar deaths per year , and longlines account for around 2490 fulmar deaths per year. This is the equivalent to 0.1% of the total estimated Icelandic population per year for each of these gears. Indeed, local experts do not consider that fisheries are a threat to the population status of this species (Dr. Erpur Snær Hansen, Náttúrustofa Suðurlands / South Iceland Nature Research, Vottunarstofan Tún pers. communication, 24 May 2016). Since the available data indicates that relative to the total population size low numbers of fulmar were caught in 2014-2015, the species has an IUCN status of 'Least Concern' in Europe, and local expert opinion does not consider fishing to be a threat, the team considers that longline as well as gillnet impacts are not significant and that this species is highly likely to be within biologically based limits. SG 80 is met for gillnets, and for longlines. SG 100 is not met since based on the available information it cannot be concluded that there is a high degree of certainty that this species is above biologically based limits. <u>Northern gannet</u> The northern gannet is found on both sides of the Atlantic Ocean; breeding sites include northern France, the United Kingdom, Ireland, Iceland, Norway and the eastern tip Quebec (Canada) (del Hoyo et al. 1992). The Icelandic population was estimated to number 31,500 breeding pairs in 2005-2008 (Arnthór Garðarsson. 2008a, cited in Birdlife International, 2015). Both short and long term population trends for this species have been estimated to be increasing in Iceland, and the species was recently given an IUCN status of 'Least Concern' in Europe (see status on http://www.iucnredlist.org/). According to the most recent bycatch estimates available from the MFRI, gillnets account for a maximum of 292 gannet deaths a year. Based on the estimated Icelandic population size of 63,000 individuals, an average annual catch of northern gannets caught as bycatch would account for only 0.46% of the total estimated Icelandic population per year. Moreover, according to the most recent bycatch estimates available from the MFRI, longlines account for around a maximum of 207 gannet deaths a year. Based on the estimated Icelandic population size of 63,000 individuals, an average annual catch of northern gannets caught as by-catch by longlines would account for 0.33% of the total estimated Icelandic population per year. Indeed, local experts consider that longline fisheries are not a threat to the population status of this

species (Dr. Erpur Snær Hansen, Náttúrustofa Suðurlands / South Iceland Nature Research, Vottunarstofan Tún pers. comm., 24 May 2016).

Since the available data indicates that relative to the total population size low numbers of Northern gannet were caught by longlines and gillnets in 2014-2015, Birdlife International considers the Icelandic populations to be increasing, the species has an IUCN status of 'Least Concern' in Europe, and local expert opinion does not consider longline fisheries to be a threat, the team considers that longline impacts are not significant and that this species is highly likely to be within biologically based limits. SG 80 is met is for both longlines and gillnets. SG 100 is not met since based on the available information it cannot be concluded that there is a high degree of certainty that this species is above biologically based limits.

Razorbill

The species breeds on northern Atlantic coasts, in Greenland and in Western Europe from north-western Russia to northern France. The Icelandic population has been estimated at 625,000 individuals (Table 19). This auk began declining in parts of its European breeding range during the 2000s, primarily in Iceland, which holds at least 60% of the European population, but where the population declined by 18% over the period 2005-2008 (BirdLife International, 2015). This overall decline is estimated to range between 20-29% over a three year generation period (41 years), resulting in an IUCN classification of 'Near Threatened' in Europe (see http://www.iucnredlist.org/).

Based on the most recent MFRI data available, gillnets account for a maximum of 83 razorbill deaths per year, which accounts for 0.01% of the total estimated Icelandic population per year. Since the available data indicates that relative to the total population size very low numbers of razorbill were caught by gillnets in 2014-2015, and the species has an IUCN status of just 'Near Threatened' (which is not part of the IUCN 'threatened' categories) in Europe, the team considers that gillnet impacts are not significant and that this species is highly likely to be within biologically based limits. SG 80 is met for gillnets. SG 100 is not met since based on the available information it cannot be concluded that there is a high degree of certainty that this species is above biologically based limits.

Harbour Porpoise

Harbour porpoise is common in shallow waters all around Iceland in spring to autumn, but less during the winter months (Ólafsdóttir et al., 2002). In 2007 an aerial survey was conducted which specifically was designed to get reliable estimates of harbour porpoise distribution and abundance in Icelandic waters (Gilles et al. 2011). Highest densities were estimated in Breiðafjörður and to the NW of the fjord as well as in inshore waters off East Iceland. The population size of harbour porpoise in Icelandic waters was estimated at 43,179 animals (95% confident interval: 31,755 – 161,899 animals) in 2007; the current population trend is unknown. This rough estimate most likely represents an underestimation of abundance, as the proportion of porpoise sightings missed during ship surveys can be quite high (Gilles et al. 2011).

The North Atlantic population of this species is large, and there is no evidence to suggest that any significant decline has occurred (although the population trend has not been quantified). This part of the European population should be considered 'Least Concern', based on the IUCN Cetacean Specialist Group (2007).

According to the most recent MFRI data available, gillnets account for a maximum of 553 harbour porpoise deaths per year; based on the most recent estimates of population size available (43,179 animals) an estimated 1.28 % of the total population per year is impacted. In addition a maximum of 215 harbour porpoises were caught annually in 2014 and 2015 by lumpfish gillnets, accounting for another 0.5% of the Icelandic population.

ASCOBANS have set a provisional 1.7% limit for total anthropogenic removals for this species (ASCOBANS 2000), with removals above this level constituting an 'unacceptable interaction'. Since the IUCN considers that this species should have a status of 'Least Concern' in the North Atlantic due to its abundance, and it is likely that less than 1.7% of the Icelandic harbour porpoise population is impacted by gillnet and lumpfish gillnet fisheries combined (the

		estimates above equate to 1.78%, but these are based on the <u>maximum</u> observed bycatch numbers) the team considers that this species is highly likely to be within biologically based limits. SG 80 is met for gillnets and lumpfish gillnets. SG 100 is not met since based on the available information it cannot be concluded that there is a high degree of certainty that this species is above biologically based limits. <u>Harbour seal</u> Harbour seals are one of the most widespread of the pinnipeds. They are found throughout coastal waters of the northern hemisphere, from temperate to polar regions. IUCN considers that the Icelandic population is part of the Eastern Atlantic harbour seal population, for which an updated population assessment was conducted by IUCN in 2016 (Bowen, 2016). The review concluded that the Eastern Atlantic harbour seal population does not meet any of the IUCN 'Threatened' criteria and the species was listed as 'Least Concern' since the population is relatively large and widespread. However, despite the species' potential for long-distance movements, harbour seals are known to be regionally philopatric on a scale of several hundred km, and studies of *Phoca vitulina* population structure have shown that there are infact a number of distinct population units in the North Atlantic, including a distinct population in Iceland (Stanley et al., 1996; Goodman, 1998; Andersen and Olsen, 2010; Andersen et al., 2011). A census of the Icelandic harbour seal population carried out in 2016 indicated continuing decline in the harbour seal population. The estimated population size (7652 individuals) was 77% smaller than when first estimated in 1980, and 32% smaller than in 2011, when the last complete population census was undertaken (Figure 3-11). In addition, the estimate was 36% lower than a government issued management objective for the minimum population size of harbour seals in Iceland. The study concluded that based on criteria used by the International Union for Conservation of Nature and Natural Resources (IUCN), the conservation status of the Icelandic population should be considered as 'Endangered'. The reasons for the observed population decline are poorly understood, but the most likely factors contributing to the alarming population trends are likely to be by-catch as well as direct hunting, which still takes place in Iceland (Þorbjörnsson, 2017). Based on this information it cannot be argued that this species is likely to be above biologically based limits in Iceland. Based on the most recent MFRI data available, gillnets account for a maximum of 46 harbour seal deaths per year, which would account for only 0.6% of the total estimated Icelandic population per year. The team considers that this is evidence that the measures in place are sufficient to ensure that this UoA does not hinder recovery and rebuilding of this species. SG60 is thus met for gillnets. Since there is no demonstrably effective partial strategy in place to manage seabird and marine mammal bycatch in Iceland SG80 is not met. Lumpfish gillnets were responsible for an estimated maximum of 1288 harbour seal deaths in 2014 - 2015, which would have impacted 16.83% of the estimated Icelandic population. Although this is a worst-case-scenario based on the available information and needs to be considered wtih caution given the limitations of the available bycatch data (lack of logbook data, low coverage of lumpfish trips by on board observers, high variation in estimates [232 in 2014; 1288 in 2015]), it cannot be argued that the measures currently in place are expected to ensure that the UoA does not hinder recovery and rebuilding. SG60 is not met for lumpfish gillnets. <u>Harp seal</u> Harp seals are widespread in the North Atlantic and the adjacent Arctic Ocean and shelf seas. The Harp Seal is the most abundant pinniped species in the northern hemisphere, and it is found in three separate populations, each of which uses a specific breeding site. The stock breeding on the "West Ice" off eastern Greenland contributes to Icelandic individuals. Globally this species numbers close to nine million animals with an annual pup production for all breeding sites combined of approximately 1.2 million (ICES 2013, Hammill et al. 2014). The Icelandic population has been estimated at 470,540-784,280 individuals

Table 21). Due to its large population size, and the increasing trend in two of the three major population groups, the harp seal is currently classified by IUCN as 'Least Concern' (Kovacs, 2015).

Based on the most recent MFRI data available, gillnets accounted for a maximum of 212 harp seal deaths per year in 2014 and 2015, which accounts for only 0.03-0.05% of the total estimated Icelandic population per year. Lumpfish gillnets were responsible for a maximum of 72 additional harp seal deaths during the same period, which impacted an additional 0.01-0.02% of the population. Since the available data indicates that relative to the total population size low numbers of harp seals were caught in 2014-2015, and the IUCN gives this species a status of 'Least Concern' due to its abundance, the team considers that gillnet impacts are not significant and that this species is highly likely to be within biologically based limits. SG 80 is met for both gillnets and lumpfish gillnets. SG 100 is not met since based on the available information it cannot be concluded that there is a high degree of certainty that this species is above biologically based limits.

Grey seal

Grey seals have a sub-Arctic to cold temperate distribution in over the continental shelf in North Atlantic waters (Hall 2002). The eastern Atlantic population is concentrated around the coast of the United Kingdom and Ireland but also includes breeding colonies in Iceland, the Faroe Islands and along the mainland coast of northern Europe as far south as Brittany. The Icelandic population has been estimated at 3,400-5,000 individuals (

Table 21). Grey seal numbers are known to have increased strongly in recent years as a result of increased measures to protect this species (Klimova et al., 2014). Based on the overall increasing population trends, this species is classified as 'Least Concern' by IUCN (European Mammal Assessment team, 2007).

Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 1216 grey seal deaths per year, which accounts for 24.32-35.76% of the total estimated annual number of grey seals which visit Icelandic waters to feed. Since the IUCN considers that this species should have a status of 'Least Concern' in the northeastern Atlantic (including in Iceland), and overall population numbers of the northeastern Atlantic population, which includes Iceland, are known to be increasing, the team considers that that this species is likely to be within biologically based limits. . However, given the high population level impact of lumpfish gillnets on grey seals and the lack of a demonstrably effective partial strategy to manage marine mammal bycatch in this fishery, SG 80 is not met.

Ringed seal

Ringed seals have a circumpolar distribution throughout the Arctic basin including near the North Pole (Rice 1998), and range widely into adjacent seas. The species is not native to Iceland and only found as a vagrant species since it uses seas ice exclusively as a breeding, molding and resting habitat, rarely coming onto land (Frost and Lowry 1981, Kelly 1988). The Icelandic population has been estimated at 2,000,000-5,000,000 individuals (

Table 21). The Arctic ringed seal population, which is found in Iceland, was given a status of 'Least Concern' by IUCN in 2016 due to its very large population size and broad distribution (Boveng, 2016).

Based on the most recent MFRI data available, gillnets accounted for a maximum of 38 ringed seal deaths per year in 2014 and 2015, which accounts for only 0.001-0.002% of the total population per year. Lumpfish gillnets were responsible for a maximum of 143 additional ringed seal deaths during the same period, which impacted an additional 0.003-0.01% of the population. Since the available data indicates that relative to the total population size low numbers of ringed seals were caught in 2014-2015, and the IUCN gives this species a status of 'Least Concern', the team considers that gillnet and lumpfish gillnet impacts are not significant and that this species is highly likely to be within biologically based limits. SG 80 is met for both gillnets and lumpfish gillnets.

		Other gears: there are no significant interactions recorded between bottom trawl, *Nephrops* trawl, and Danish Seine with out-of-scope species, and any such interactions are therefore considered negligible. All other secondary species are minor (see SI2.2.1b). Because there are no main secondary species for these gears, scoring issue (a) is not used. Each element (minor species) is assessed against scoring issue (b)..		
b	**Minor secondary species stock status**			
	Guide post			Minor secondary species are highly likely to be above biologically based limits. OR If below biologically based limits', there is evidence that the UoA does not hinder the recovery and rebuilding of secondary species
	Met?			N
		All gears The status of the minor secondary species is not certain (see Table 15 for list of secondary species). The only evidence is the low level of landings. This is not sufficient to demonstrate whether minor secondary species are above any biologically based limits. No ecological risk assessment has been undertaken. There is evidence that Atlantic halibut has been reduced below biologically based limits (its PRI), but that the stock has been recovering over the last few years. There is a prohibition on retaining viable halibut and landings have been very low. Because the abundance indices suggest that the stock has been increasing, the current fisheries are not preventing stock recovery. Each element (minor species) is assessed against scoring issue b. If it does not meet SG100, it is treated as though it still meets SG80 (which is blank), which is automatically met by virtue of being a minor species. Although there is evidence that Atlantic halibut meets SG100, the status of the other minor secondary species cannot be determined, so SG100 is not met for all gears.		
References		BirdLife International 2015; Boveng, 2016; del Hoyo et al. 1992; European Mammal Assessment team 2007; Gilles et al. 2011; Frost and Lowry 1981; Hagemeijer and Blair 1997; Hall 2002; Hammill et al. 2014; ICES 2013; Kelly 1988; Klimova et al. 2014; Kovacs, 2015; Ólafsdóttir et al. 2002; Sigurjónsson and Víkingsson 1997; Stenson 2003; Þorbjörnsson, 2017; Rice 1998.		

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**80**
	***Nephrops* trawl**	**80**
	Danish Seine	**80**
	Gillnet	**75**
	Anglerfish Gillnet	**75**
	Lumpfish Gillnet	**FAIL**
	Longline	**80**
CONDITION NUMBER (if relevant):		**2**
Outline Condition Number:		**1**

PI 2.2.2 Evaluation Table for Secondary species management strategy

<table>
<tr><td>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 rowspan="4">Met?</td><td>TB</td><td>Y</td><td>AGN</td><td>Y</td><td>TB</td><td>Y</td><td>AGN</td><td>N</td><td>TB</td><td>N</td><td>AGN</td><td>N</td></tr>
<tr><td></td><td>TN</td><td>Y</td><td>LGN</td><td>Y</td><td>TN</td><td>Y</td><td>LGN</td><td>N</td><td>TN</td><td>N</td><td>LGN</td><td>N</td></tr>
<tr><td></td><td>SD</td><td>Y</td><td>LL</td><td>Y</td><td>SD</td><td>Y</td><td>LL</td><td>N</td><td>SD</td><td>N</td><td>LL</td><td>N</td></tr>
<tr><td></td><td>GN</td><td>Y</td><td colspan="2"></td><td>GN</td><td>N</td><td colspan="2"></td><td>GN</td><td>N</td><td colspan="2"></td></tr>
<tr><td></td><td>Justification</td><td colspan="12">Gillnets, anglerfish gillnets, lumpfish gillnets, longlines
Various measures are taken to ensure the protection of juvenile fish, vulnerable and critical habitats. Such measures will serve to reduce bycatch of secondary out of scope seabird and marine mammal species; although not established to protect such species, area closures will also serve to maintain bycatch of marine mammals and seabirds at low levels since bycatch of many sensitive species is highest in inshore areas, which is where the closures are located (MFRI, pers. communication).

The measures includes regulations on the type of fishing gear allowed in different areas, rules on the minimum mesh size, use of sorting grids on trawls and both temporary closures of fishing grounds (Figure 3-12, Figure 3-1). Furthermore, various long-term area closures are in place, which may apply to specific fishing gear, fishing-vessel size or all fishing for certain periods of time. For instance, in order to protect the spawning stock of cod, extensive seasonal closures are in operation during the spawning season (Regulation nr. 30/2005); all cod fisheries are closed within 12 miles along the south and west coast and within 6 miles along the north and east coast in April each year.

Additional measures in place to manage bycatch of marine mammals and seabirds in Icelandic fisheries include:
Marine mammal and seabird bycatch is monitored by mandatory eLog system, through the cod gillnet surveys (conducted in April each year), and onboard observers from the DF and the MFRI, although to date returns from the eLog system have been poor. The association of Small Boat Owners has taken steps to improve logbook reporting of marine mammal bycatch. In the effort to step up monitoring of such bycatch, the DF issued in 2014 a new simplified logbook form that is believed to improve reporting of bycatch[11]. This will allow a strategy to manage fishing impacts to be implemented in the future. Observers monitored ca. 1% of all</td></tr>
</table>

[11] http://www.hafro.is/undir.php?ID=242&REF=3.

		fishing trips by the gillnet and longline fleets in both 2014 and 2015, and overall the quality of the data has improved in the last 5 years (MFRI pers. communication). • Icelandic longline fisheries use mitigation measures in order to reduce bycatch of seabirds (pers. comm. Gunnlaugur Eiriksson, ISF; Vottunarstofan Tún 2011). The longliners use either bird-scaring buoy lines or a gas alarm which is sounded when the line is shot. During the winter time, the lines are often shot in the dark, which reduces the possible bycatch of seabirds. • It is an offence in Iceland to catch a seabird with hooks (Reg. 456, 1994). • Fishers are not allowed to offer for sale, give away, nor accept as a gift, any bird that has been killed in fishing nets. • Any birds or mammal caught alive must be released. A project to evaluate and mitigate bycatch in the lumpfish fishery is currently underway; project partners are BirdLife International, BioPol ehf. (a marine biotechnology company based in Skagaströnd), and the Icelandic National Association of Small Boat Owners (NASBO). The project has increased observer coverage on lumpfish fishing vessels, focussing in particular on areas which are known bycatch hotspots, and areas with high fishing effort. Twelve fishing trips with observers on board took place in 2015, and thirty-one in 2016. The project is in addition testing practical bycatch mitigation measures such as black and white scarer panels sown into lumpfish gillnets, and the potential use of flashing lights to scare away seabirds and marine mammals. Efforts are underway to identify sustainable sources of funding for ongoing monitoring and to extend the project to other fisheries. The project is ongoing, but once results are available it is expected that additional measures to further minimise the impacts of the lumpfish gillnet fishery will be implemented. Although the focus is on lumpfish gillnets, the mitigation measures being tested will be transferrable to other types of gillnets such as (cod) gillnets and anglerfish gillnets. Moreover, in 2017 research trials using the 'banana' pinger (from Fishtek Marine) were carried out to try to reduce porpoise bycatch in the cod gillnet fishery. Three commercial vessels were used for the experiment, one in Breidafjordur in west Iceland, one in Hunafloi in North Iceland and one off the south east coast. Analysis of the data collected during this initiative conducted in April 2017 is still ongoing, and will be presented at the ICES 2018 WGBYC meeting (ICES, 2017). There are thus measures in place, which are expected to maintain / not hinder rebuilding of main secondary species at / to levels which are highly likely to be within biologically based limits, or to ensure that the UoA does not hinder their recovery. SG 60 is met. These measures however do not represent a partial strategy specifically implemented to manage by-catch of out-of-scope secondary species like birds and mammals. Harbour seal (gillnet, lumpfish gillnet, anglerfish gillnet), , European shag (lumpfish gillnet), great cormorant (lumpfish gillnet), grey seal (lumpfish gillnet), and harbour porpoise (anglerfish gillnet) failed to reach SG 80 for PI 2.2.1, and several bird species caught as bycatch in Icelandic longlines are known to have decreasing population trends (European shag, greater black-backed gull, fulmar). SG 80 is not met and a condition is imposed. This condition is harmonised with that for ISF Iceland cod and halibut fisheries. **Bottom trawl, *Nephrops* trawl, Danish seine** There are no main secondary species caught by these gears and as such SG 80 is met. There is no strategy in place to specifically manage catches of all minor secondary species. Such species benefit from some management measures in place to protect juvenile fish, as well as vulnerable and critical habitats (closed areas, technical measures on mesh size, limits on fishing effort and catches of target species). Moreover, measures are in place to allow Atlantic halibut to recover. However such measures do not constitute a strategy , so SG 100 is not met.
b	Management strategy evaluation	

<table>
<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>AGN</td><td>Y</td><td>TB</td><td>Y</td><td>AGN</td><td>N</td><td>TB</td><td>N</td><td>AGN</td><td>N</td></tr>
<tr><td></td><td></td><td>TN</td><td>Y</td><td>LGN</td><td>Y</td><td>TN</td><td>Y</td><td>LGN</td><td>N</td><td>TN</td><td>N</td><td>LGN</td><td>N</td></tr>
<tr><td></td><td></td><td>SD</td><td>Y</td><td>LL</td><td>Y</td><td>SD</td><td>Y</td><td>LL</td><td>N</td><td>SD</td><td>N</td><td>LL</td><td>N</td></tr>
<tr><td></td><td></td><td>GN</td><td>Y</td><td></td><td></td><td>GN</td><td>N</td><td></td><td></td><td>GN</td><td>N</td><td></td><td></td></tr>
<tr><td></td><td>Justification</td><td colspan="12">Gillnets, anglerfish gillnets, lumpfish gillnets, longlines
The measures which are currently in place (see scoring issue 'a' for a description) although not specifically established to reduce catches of secondary species, can be expected to protect such species and to maintain bycatch of marine mammals and seabirds at low levels. Furthermore, bycatch of many sensitive species is highest in inshore areas, which is where the closures are located (MFRI, pers. communication). SG 60 is thus met.
There are a number of measures that aim to ensure compliance with the law, including monitoring and surveillance which are conducted by the DF and the coast guard to ensure compliance of regulations. Annual assessment of discarding by MFRI indicates that discarding is very limited, and control and surveillance information indicates that temporal and permanent fishing ground closures are respected. However, information available on the fishery / species involved indicates that the partial strategy currently in place is not sufficient. It may not work to ensure the fishery does not pose a risk for bycatch populations as evidenced by the outcome score of SG 60 for several elements: European shag, great cormorant, harbour seal, and grey seal.
The measures in place for managing bycatch of vulnerable species such as seabirds and mammals are generally not designed to manage impact on that component specifically (e.g. temporal and seasonal closures are not designed to reduce bycatch of vulnerable species), and other measures require improvements to be appropriate for the fishery (e.g. more logbook returns / more observer trips are required to gather bycatch data). SG 80 is not met.

Bottom trawl, Nephrops trawl, Danish seine
The fact that there are no main secondary species caught as bycatch by these gears provides an objective basis for confidence that the measures currently in place (closed areas, technical measures on mesh size, limits on fishing effort and catches of target species etc.) are sufficient. SG 80 is met. Since there is no direct strategy to manage catches of minor species (with the exception of Atlantic halibut), and the effect of the current harvest strategy on minor secondary species has not been tested, SG100 is not met.</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>Met?</td><td colspan="4"></td><td>TB</td><td>Y</td><td>AGN</td><td>Y</td><td>TB</td><td>Y</td><td>AGN</td><td>N</td></tr>
<tr><td></td><td></td><td colspan="4"></td><td>TN</td><td>Y</td><td>LGN</td><td>Y</td><td>TN</td><td>Y</td><td>LGN</td><td>N</td></tr>
<tr><td></td><td></td><td colspan="4"></td><td>SD</td><td>Y</td><td>LL</td><td>Y</td><td>SD</td><td>Y</td><td>LL</td><td>N</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td>GN</td><td>Y</td><td></td><td>GN</td><td>N</td><td></td></tr>
<tr><td></td><td>Justification</td><td colspan="7">Gillnets, anglerfish gillnets, lumpfish gillnets, longlines

Control and surveillance information indicates that temporal and permanent fishing ground closures are respected, and restrictions on coastal fishing are likely to have reduced fishing mortality rates of bycatch species. There is thus <u>some</u> evidence that management measures are being implemented successfully; SG 80 is met.

Low returns of electronic logbook data on bycatch rates of vulnerable species, and the fact that observer coverage to adequately monitor bycatch rates of vulnerable species remains low (MFRI, pers. communication) means that there is no clear evidence that all management measures are being implemented successfully. Moreover there is no evidence that these actions are achieving the objective of maintaining out-of-scope secondary species above biologically based limits. More monitoring of seabird and marine populations would be required to assess this. In addition, the status of most minor finfish is effectively unknown. Therefore, evidence is lacking to be sure that they are achieving the objectives of maintaining stocks above biologically based limits. SG 100 is not met.

Bottom trawl, Nephrops trawl, Danish seine

For these gears interactions with both main and minor secondary species are considered negligible. This is due to the successful implementation of management measures (closed areas, technical measures on mesh size, limits on fishing effort and catches of target species), and therefore SG100 is met.</td></tr>
<tr><td>d</td><td colspan="8">Shark finning</td></tr>
<tr><td></td><td>Guidepost</td><td colspan="2">It is likely that shark finning is not taking place.</td><td colspan="3">It is highly likely that shark finning is not taking place.</td><td colspan="2">There is a high degree of certainty that shark finning is not taking place.</td></tr>
<tr><td></td><td>Met?</td><td colspan="2">Y</td><td colspan="3">Y</td><td colspan="2">Y</td></tr>
<tr><td></td><td>Justification</td><td colspan="7">All gears

There are several species of shark caught by the UoAs under assessment (Greenland shark, spiny dogfish, Portuguese dogfish, porbeagle shark, black dogfish). The discard prohibition in effect in Iceland effectively makes shark finning illegal. There is no local market for fins alone, but a limited market for whole sharks does exist. With very low quantities caught, there is no incentive to land fins separate from sharks themselves. As a result, there is a high degree of certainty shark finning is not taking place; SG100 is met.</td></tr>
<tr><td>e</td><td colspan="8">Review of alternative measures to minimise mortality of unwanted catch</td></tr>
<tr><td></td><td>Justification</td><td colspan="2">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="3">There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of main secondary species and they are implemented as appropriate.</td><td colspan="2">There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of unwanted catch of all secondary species, and they are implemented, as appropriate.</td></tr>
</table>

<table>
<tr><td></td><td>Met?</td><td>TB</td><td>Y</td><td>AGN</td><td>Y</td><td>TB</td><td>Y</td><td>AGN</td><td>N</td><td>TB</td><td>Y</td><td>AGN</td><td>N</td></tr>
<tr><td></td><td></td><td>TN</td><td>Y</td><td>LGN</td><td>Y</td><td>TN</td><td>Y</td><td>LGN</td><td>N</td><td>TN</td><td>Y</td><td>LGN</td><td>N</td></tr>
<tr><td></td><td></td><td>SD</td><td>Y</td><td>LL</td><td>Y</td><td>SD</td><td>Y</td><td>LL</td><td>Y</td><td>SD</td><td>Y</td><td>LL</td><td>N</td></tr>
<tr><td></td><td></td><td>GN</td><td>Y</td><td></td><td></td><td>GN</td><td>N</td><td></td><td></td><td>GN</td><td>N</td><td></td><td></td></tr>
</table>

	Guidepost	**Gillnets, lumpfish gillnets, anglerfish gillnets** There are no main in-scope secondary species caught by (cod) gillnets, anglerfish gillnets, and lumpfish gillnets. With regards to out-of-scope seabird and marine mammal species, review of the MFRI observer data represents an ongoing review of the effectiveness of UoA-related mortality of main secondary species. Research on measures to minimise unwanted catches of seabirds and marine mammals in lumpfish gillnets is ongoing as a collaborative effort involving NGOs, the fishing industry and scientists; the results will also be applicable to (cod) gillnets and anglerfish gillnets. However, the fact that several species do not achieve SG80 under PI 2.2.1 (European shag, great cormorant, harbour seal, grey seal) indicates that the measures may not have been implemented as appropriate in all cases for (cod) gillnets and lumpfish gillnets. In the case of anglerfish gillnets insufficient information is available to ascertain that measures are being implemented as appropriate. Moreover, there are further measures used in other fisheries which could be appropriate for gillnets in this case (e.g. limits to area, season or times, pingers or weak lines to allow escape from entanglement), and no evidence was found to indicate why they should not be used. Therefore gillnets, anglerfish gillnets and lumpfish gillnets do not meet SG 80. **Longlines** There are no main in-scope secondary species caught by longlines. With regards to out-of-scope seabird and marine mammal species, review of the MFRI observer data represents an ongoing review of the effectiveness of UoA-related mortality of main secondary species. Icelandic longline fisheries use mitigation measures in order to reduce bycatch of seabirds (pers. comm. Gunnlaugur Eiriksson, ISF; Vottunarstofan Tún 2011): the longliners use either bird-scaring buoy lines or a gas alarm which is sounded when the line is shot. During the winter time, the lines are often shot in the dark, which reduces the possible bycatch of seabirds. Since all species achieve SG80 under PI 2.2.1 the implementation of alternative measures appears to be appropriately minimising mortality of unwanted catches in longline fisheries. SG80 is met. There is no biennial review of the potential effectiveness of such measures, so SG100 is not met. **Bottom trawl, *Nephrops* trawl, Danish seine** No catches of main secondary species have been reported for these gears. With regards to unwanted catches of minor in-scope species, the review of alternative measures to minimise mortality is addressed within the harvest strategy for all species and therefore a review is conducted routinely by the MFRI alongside all other issues pertinent to controlling fishing mortality. This on-going consideration is evident in stock assessments, scientific advice and policy documents. Such work is ongoing throughout the year. There is evidence that the strategy to avoid unwanted catch is successful. Landings of in-scope secondary species that have market value are very low. This is at least partly due to improvements in technology that allow better targeting of fish to fill quotas. This will also increase avoidance of unwanted species. The fishing industry have a policy to make best possible use of all products, including bio-medical products and new markets for new products (such as developing markets for dried starry ray, dried cod heads, and encouraging restaurants to use more unusual species, see Clucas, 2014). This converts otherwise unwanted to wanted catch, which is perhaps the most effective way of dealing with this issue. SG 100 is thus met.
References		Clucas, 2014.

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**95**
	***Nephrops* trawl**	**95**
	Danish Seine	**95**

	Gillnet	**65**
	Anglerfish Gillnet	**65**
	Lumpfish Gillnet	**65**
	Longline	**75**
CONDITION NUMBER(S)		**3**
Outline Condition Number:		**2**

PI 2.2.3 Evaluation Table for Secondary species information

<table>
<tr><td colspan="2">PI 2.2.3</td><td colspan="12">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.</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">Information adequacy for assessment of impacts on main secondary species</td></tr>
<tr><td rowspan="7"></td><td>Guidepost</td><td colspan="4">Qualitative information is adequate to estimate the impact of the UoA on the main secondary species with respect to status.

<u>Anglerfish gillnet UoA (RBF)</u>
Qualitative information is adequate to assess productivity and susceptibility attributes for main secondary species.</td><td colspan="4">Some quantitative information is available and adequate to assess the impact of the UoA on main secondary species with respect to status.

<u>Anglerfish gillnet UoA (RBF)</u>
Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species.</td><td colspan="4">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.</td></tr>
<tr><td rowspan="4">Met?</td><td>TB</td><td>Y</td><td>AGN</td><td>Y</td><td>TB</td><td>Y</td><td>AGN</td><td>N</td><td>TB</td><td>Y</td><td>AGN</td><td>N</td></tr>
<tr><td>TN</td><td>Y</td><td>LGN</td><td>Y</td><td>TN</td><td>Y</td><td>LGN</td><td>N</td><td>TN</td><td>Y</td><td>LGN</td><td>N</td></tr>
<tr><td>SD</td><td>Y</td><td>LL</td><td>Y</td><td>SD</td><td>Y</td><td>LL</td><td>N</td><td>SD</td><td>Y</td><td>LL</td><td>N</td></tr>
<tr><td>GN</td><td>Y</td><td colspan="2"></td><td>GN</td><td>N</td><td colspan="2"></td><td>GN</td><td>N</td><td colspan="2"></td></tr>
<tr><td>Justification</td><td colspan="12">Gillnets, lumpfish gillnets, longlines
Icelandic regulations require that all bycatch is recorded. The registration of bird and mammal bycatch in commercial cod gillnets (other than lumpfish) started in 2002. Bycatch registration was received from 5% of the cod gillnet vessels until 2009, although no birds were registered. In 2009 fishers were required to switch to electronic logbooks and after that no information on marine mammals or bird bycatch has been returned. More recently discussions have taken place between the competent authorities (MII, MRI and DF) and the National Association of Small Boat Owners in order to improve logbook reporting of marine mammals and seabirds bycatch. In an effort to step up monitoring of such bycatch DF has issued a new simplified logbook form that is believed to improve reporting of bycatch. In order to further improve the available data, the DF observers have stepped up efforts to monitor bycatch rates of cod gillnets, lumpfish gillnets nets and longlines (coverage at present is ca. 1% of fishing trips annually). All data recorded by onboard observers is routinely made available to the MFRI for analysis. In addition to such fisheries dependent data, the registration of marine mammals caught in the MRI spring gillnet survey was initiated in 1997, and for birds in 2009. The MRI spring gillnet survey is equivalent to 2% of the total cod gillnet fishing effort in April. The first year's gillnet survey was only conducted in the south and west of the country but since 2002 it is also done in the north.
Routine scientific surveys are supplemented by targeted research projects and population counts in Iceland, including for out-of-scope marine mammals and seabirds. For example during June-August 2015, the MRI participated in a large scale cetacean sightings survey (NASS-2015) conducted in cooperation with the Faroes, Greenland and Norway under coordination of the NAMMCO Scientific Committee. The Icelandic part of the survey was conducted from two research vessels and one aircraft (NAMMCO, 2016). More recently, in July - September 2017 the Icelandic Seal Centre, the Vör Marine Research Centre and the MFRI joined forces to carry out an aerial census of the Icelandic harbour seal in order to update the available information on population estimates, trends and current status (Þorbjörnsson, 2017). Seabird surveys are carried out by the Icelandic Institute of Natural History, as well as through ad hoc scientific studies (e.g. Gardarsson and Jónsson (2014)</td></tr>
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<table>
<tr><td></td><td></td><td colspan="3">carried out a study on the status of the breeding population of great cormorants in Iceland in 2012).

Some quantitative information on bycatch rates of main secondary species (out-of-scope marine mammal and seabird species in the present assessment) is thus available, as is information on the status of marine mammals and seabird species. SG 60 is thus met.

However logbook returns have been poor, and variations in estimated numbers of bycatch species evident in the most recent data provided by the MFRI indicate that the available information may not be accurate and verifiable for all bycatch species, including for the main secondary species being considered in the present assessment. The low number of trips monitored by observers in the smaller fisheries, including gillnets, continues to make extrapolation of bycatch estimates difficult (MFRI, pers. communication). The quality of the data has improved in the last 5 years. The quantitative information available is thus not adequate to assess impacts of the UoA on main secondary species with respect to status. SG 80 is not met and a condition is imposed, which is harmonised with that for ISF Iceland cod and halibut fisheries.

Anglerfish gillnets
In the case of anglerfish gillnets the RBF was used to score PI 2.2.1. The information was adequate to estimate productivity and susceptibility attributes for the main secondary species, so SG 60 is met. The available information did not suffice to meet SG 80.

Bottom trawl, Nephrops trawl, Danish seine
No catches of main secondary species have been reported by these gears. As such SG 80 is met.

Although the assessment team found no evidence that marine mammals or seabirds are caught as bycatch by these gears, a recommendation (Recommendation 1) has been added to ensure that electronic logbook records of out-of-scope secondary species are correctly filled and submitted by fishers in future (if any), and that such records are adequately monitored by the MFRI through ad hoc onboard observations.</td></tr>
<tr><td>b</td><td colspan="4">Information adequacy for assessment of impacts on minor secondary species</td></tr>
<tr><td></td><td>Guidepost</td><td></td><td></td><td>Some quantitative information is adequate to estimate the impact of the UoA on minor secondary species with respect to status.</td></tr>
<tr><td></td><td>Met?</td><td></td><td></td><td>Y</td></tr>
<tr><td></td><td>Justification</td><td colspan="3">All gears
Information on fishing impacts on minor in-scope secondary species is available from the same data sources as for primary species (including both fisheries dependent and fisheries independent data), except that they may be somewhat less well studied since such species are not the focus of scientific sampling programmes and research projects. The Icelandic Fisheries Management Act requires that all catches shall be landed. Discarding is thus illegal, and landings of all in-scope species, are routinely recorded. All catches landed in Iceland must be weighed using specially authorized scales and the landing data is instantly transmitted to the database of Directorate of Fisheries (DF). There are strict requirements for the keeping of log books on-board all fishing vessels, containing information on fishing practices such as location, dates, gear and catch quantity. Log books must be made available to inspectors from the DF and to MRI for scientific purposes. A team of inspectors from DF monitors landing and weighing practices and inspectors may board fishing vessels to monitor catch composition, handling methods and fishing equipment. Following a random investigation, inspectors can join the vessel crew to the same fishing ground the vessel visited during the previous fishing trip, in order to examine their fishing practices. Also, the</td></tr>
</table>

		system of instant recordings of landings allows for the use of DF database to trace the origin and date of catch and to compare catches by an individual vessel to other vessels fishing at the same location and date. Discrepancies in catch proportion can lead to further inspections (see section 3.4.4.3 for further details). Species are also monitored through the scientific surveys, even if this information is not used. The closer monitoring of Atlantic halibut has been initiated because management has intervened to reduce mortality, and information is sufficient to evaluate the effect of this intervention (see section 3.4.6.1). Therefore, SG100 is met.		
c	Information adequacy for management strategy			
	Guidepost	Information is adequate to support measures to manage main secondary species.	Information is adequate to support a partial strategy to manage main secondary species.	Information is adequate to support a strategy to manage all secondary species, and evaluate with a high degree of certainty whether the strategy is achieving its objective.
	Met?	Y	Y	N
	Justification	**All gears** Information is collected on spatial and temporal fishing patterns through the use of Vessel Monitoring System, and the presence / absence of bycatch of vulnerable species on the fishing grounds is evaluated through the use of onboard observers, scientific research at sea, and sampling of landed catches. There is thus a recurrent monitoring and scientific survey system in place to estimate the trend and relative quantities of secondary species, which is necessary prerequisite to the implementation of bycatch management measures. In the case of anglerfish gillnets the RBF was used to score PI 2.2.1, but the main secondary species being impacted by the gear are nevertheless known, and onboard observations to monitor this gear commenced in 2016. The team considers that the information is adequate to support a partial strategy to manage main secondary species. SG 80 is met. The information available at present would however not be adequate to evaluate with a high degree of certainty whether the strategy is achieving its objective. SG 100 is not met.		
References		Gardarsson and Jónsson 2014; NAMMCO 2016; Þorbjörnsson 2017.		

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**90**
	***Nephrops* trawl**	**90**
	Danish Seine	**90**
	Gillnet	**75**
	Anglerfish Gillnet	**75**
	Lumpfish Gillnet	**75**
	Longline	**75**
CONDITION NUMBER		**4**
Outline Condition Number:		**3**

PI 2.3.1 Evaluation Table for ETP species outcome

PI 2.3.1		The UoA meets national and international requirements for the protection of ETP species The UoA does not hinder recovery of ETP species		
Scoring Issue		SG 60	SG 80	SG 100
a	Effects of the UoA on population/stock within national or international limits, where applicable			
	Guidepost	Where national and/or international requirements set limits for ETP species, the effects of the UoA on the population/stock are known and likely to be within these limits.	Where national and/or international requirements set limits for ETP species, the combined effects of the MSC UoAs on the population/stock are known and highly likely to be within these limits.	Where national and/or international requirements set limits for ETP species, there is a high degree of certainty that the combined effects of the MSC UoAs are within these limits.
	Met?	Not relevant	Not relevant	Not relevant
	Justification	This SI is not scored as there are no national or international requirements that set limits for ETP species for Icelandic fisheries.		
b	Direct effects			
	Guidepost	Known direct effects of the UoA are likely to not hinder recovery of ETP species.	Known direct effects of the UoA are highly likely to not hinder recovery of ETP species.	There is a high degree of confidence that there are no significant detrimental direct effects of the UoA on ETP species.

Met?

SG 60				SG 80				SG 100			
TB	Y	AGN	Y	TB	Y	AGN	Y	TB	Y	AGN	Y
TN	Y	LGN	Y	TN	Y	LGN	N	TN	Y	LGN	N
SD	Y	LL	Y	SD	Y	LL	Y	SD	Y	LL	N
GN	Y			GN	Y			GN	N		

Justification

Species	**TB**	**TN**	**SD**	**GN**	**AGN**	**LGN**	**LL**
Atlantic puffin				80		80	
Black guillemot						60	80
Black-legged kittiwake						80	
Common eider						80	
Common loon						60	
Hooded seal				80			
Long-tailed duck						80	

Gillnets, lumpfish gillnets, longlines

Atlantic puffin

The species can be found throughout the North Atlantic Ocean. The Icelandic population has been estimated at 4,000,000-6,000,000, however this estimate dates back to 1992 and is thus outdated (

Table 25). The population in Iceland and Norway, which together account for 80% of the European population, decreased markedly since the early 2000s and, although the population size was estimated to be increasing in the UK during 1969-2000, evidence suggests that it has undergone declines or probable declines since 2000 (Harris and Wanless 2011). As a result, the population size in Europe is estimated and projected to decrease by 50-79% between 2000-2065 (three generations) (BirdLife International, 2015). These declines resulted in an IUCN classification of 'Endangered' in Europe (see status on http://www.iucnredlist.org/).

Based on the most recent MFRI data available, gillnets accounted for a maximum of 42 Atlantic puffin deaths per year in 2014 and 2015. Only outdated Icelandic population data (Umhverfisráðuneytið, 1992 cited in BirdLife International, 2015) exists, based on which an estimated 0.0007-0.001% of the Icelandic Atlantic puffin population would have been impacted. An additional maximum of 72 Atlantic puffins were caught as annual bycatch by lumpfish gillnets during the same period, which impacted a further 0.001-0.002% of the Icelandic population.

Given the low numbers of Atlantic puffin caught as bycatch in both gillnets and lumpfish gillnets, the team considers that the direct effects of these fisheries are highly likely not to hinder the recovery of this species. SG 80 is met.

Due to the remaining uncertainties with data on marine mammals and seabird bycatch, there is no high degree of confidence that there are no significant detrimental effects of the UoA on this species, SG 100 is not met.

Black guillemot

According to IUCN (BirdLife International 2012), Iceland has about 3% of the North Atlantic breeding population with about two thirds breeding in Greenland or Norway (see 'supplementary material' to BirdLife International 2012). Due to its very large population size in Europe, and only moderate decreases in the overall population size (less than 25% in 32.7 years, i.e. three generations), this species was given an IUCN status of 'Least Concern' in Europe in a recent review of the species population status (BirdLife International, 2015).

The Icelandic population was estimated to number between 10,000 to 15,000 individuals by the Icelandic Institute of Natural History in 2000. More recent estimates are not available, but both short and long term population trends for this species in Iceland have been estimated to be decreasing at a moderate rate. Black guillemots are nearshore feeders, and several studies (at the Bay of Fundy, Finland, Denmark and Iceland) found that black guillemots foraged between 0.5 and 4 km from nest sites, and occasionally beyond 7 km away (Birdlife International, 2000). As such they are more susceptible to inshore gillnets, such as those targeting lumpfish, rather than cod gillnets that are usually operated further offshore.

Recent estimates of bycatch made available by the MFRI show that bycatch rates are low in longlines, although these estimates are based on observer reports which cover ca. 1% of fishing trips and there were considerable differences between estimated bycatch levels in 2014 and 2015 (2014: 0 / 2015: 311 black guillemots caught as bycatch). Using the lower estimated Icelandic population size of 10,000 individuals, and the maximum annual recorded bycatch of 311 black guillemots caught as by catch, the longline fishery would have impacted 3.11% of the total estimated Icelandic population per year.

Since the available data indicates that relative to the total population size low numbers of black guillemot were caught in 2014 and 2015 and the species has an IUCN status of 'Least Concern' in Europe the team considers that the direct effects of the longline fishery are highly likely to not hinder recovery of this species. SG 80 is met for longlines. Due to the remaining uncertainties with data on marine mammals and seabird bycatch, there is no high degree of confidence that there are no significant detrimental effects of the UoA on this species, SG 100 is not met.

Estimated bycatch levels for lumpfish gillnets, where a maximum of 1019 black guillemots bycatch was recorded during the same period, accounts for an estimated 6.79-10.19% of

		the total Icelandic population . However, these bycatch estimates refer to a worst-case-scenario based on the available information and need to be considered with caution given the limitations of the available bycatch data (lack of logbook data, low coverage of lumpfish gillnet trips by onboard observers), and the outdated population estimates. Although bycatch rates appear to be high in the case of lumpfish gillnets, the team considers that this information needs to be considered with caution, and that the fishery is likely not to hinder recovery of this species due to the species' high abundance and its IUCN status of 'Least Concern' in Europe. SG 60 is met for lumpfish gillnets. It cannot be argued that the direct effects of the UoA are highly likely to not hinder recovery of this species so SG 80 is not met. A condition has been set to improve the available information. <u>Black-legged kittiwake</u> This small gull is found along most Atlantic coastlines, including those of Iceland and Greenland. The European population is estimated at 3,460,000-4,410,000 mature individuals; the Icelandic population has been estimated at 1,160,000 individuals (Table 19). The European population size is estimated and projected to decrease by 30-49% over the period from 1983, the start year of the reported trend for Iceland, which accounts for more than 30% of the European population) to 2020 (three generations) (BirdLife International, 2015). As a result common eider was recently given an IUCN status of 'Vulnerable' in Europe (see status on http://www.iucnredlist.org/). Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 23 black-legged kittiwake deaths per year, which accounts for 0.002% of the total estimated Icelandic population per year. Given the very low numbers caught as bycatch in lumpfish gillnets (23 individuals in 2014 and none in 2015), the team considers that the known direct effects of the UoA are highly likely to not hinder recovery of this ETP species. SG 80 is met for lumpfish gillnets. SG 100 is not met since based on the available information it cannot be concluded that there is a high degree of confidence that there are no significant detrimental effects. <u>Common eider</u> The common eider is a widespread sea duck, which is distributed over the northern coasts of Europe, Iceland and southern Greenland. The European population is estimated at 1,580,000-1,910,000 mature individuals, but the species underwent rapid declines across the majority of its European breeding range during the 2000s. The Icelandic population has been estimated at 600,000 individuals (Table 19). The European population size is estimated and projected to decrease by 30-49% over the period 2000 - 2027 (three generations) (BirdLife International, 2015). As a result common eider was recently given an IUCN status of 'Vulnerable' in Europe (see status on http://www.iucnredlist.org/). Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 6580 common eider deaths per year, which accounts for 1.1% of the total estimated Icelandic population per year. It is however important to note that it is likely that annual bycatch rates are in fact lower since there is a very high variability between 2014 and 2015 estimates (2014 - 950 common eider deaths / 2015 - 6580 common eider deaths), and a number of management measures are already in place to protect this species form the impacts of lumpfish fishing, in part due to pressure from the Icelandic eider duck farmers. Given the very low percentage of the Icelandic population impacted by lumpfish gillnets the team considers that the known direct effects of the UoA are highly likely to not hinder recovery of this ETP species, as demonstrated by the low impact on the total population numbers despite the likely overestimation of maximum bycatch rates in 2014 and 2015. SG 80 is met. SG 100 is not met since based on the available information it cannot be concluded that there is a high degree of confidence that there are no significant detrimental effects. <u>Common loon</u> The common loon, also known as the great northern diver, breeds in southern parts of Greenland and throughout Iceland. The European wintering population is estimated at 5,100-6,300 individuals, of which ca. 3,400-4,200 are mature individuals. The Icelandic

population has been estimated at just 400-600 individuals (Table 19). The European population is estimated and projected to be decreasing by 30-49% between 2000 and 2029 (three generations) (BirdLife International, 2015). As a result the common loon has an IUCN status of 'Vulnerable' (see status on http://www.iucnredlist.org/).

Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 46 common loon deaths per year, which accounts for a 7.67-11.5% of the total estimated Icelandic population per year. With an IUCN status of 'Vulnerable' in Europe and decreasing population numbers, it cannot be argued that the common loon is likely to be above biologically based limits. However, although population level impacts of the lumpfish gillnet fishery on common loons at first glance appear high, these estimates should be interpreted with caution since they are based on a worst-case scenario and there are limitations with both the bycatch estimates (low coverage of lumpfish trips by on board observers, variation in estimates [46 individuals caught in 2014; none in 2015]) and with population estimates (last common loon population estimate was carried out in 2000 and data quality is 'medium' according to BirdLife, 2015). Draft 2016 bycatch data made available to the assessment team by the towards the end of the present assessment process also did not record any common loon individuals in lumpfish gillnets as bycatch (MFRI, pers. communication). Moreover, there are measures in place which can be expected to ensure that the UoA does not hinder recovery and rebuilding of this species (see PI 2.2.2). SG 60 is met for lumpfish gillnets. Since it is not highly likely that the UoA does not hinder recovery of this ETP species, SG 80 is not met and a condition has been imposed.

<u>Hooded seal</u>

Hooded seals are found at high latitudes in the North Atlantic, and seasonally they extend their range north into the Arctic Ocean. The most recent estimate of the total size of this population is 82,830 (SE=8,028) and models suggest a continued decline of approximately 7% per year in the coming decade (Øigård *et al*. 2014). Overall, this stock is less than 10% of its abundance observed some 60 years ago (ICES, 2013). Overhunting was clearly involved in the collapse of this stock as quotas were being set for a population size much larger than it actually was. However, the cause of the significant, on-going decline in this population is thought to be related to climate change induced alternation of its sea ice breeding habitat and increased predation by polar bears and killer whales in the pupping areas (Øigard *et al*., 2014); prey availability might also be an issue. As a result of these population declines this species is currently classified by IUCN as 'Vulnerable' (Kovacs, 2016).

Based on the most recent MFRI data available, gillnets account for a maximum of 46 hooded seal deaths per year in 2014 and 2015, which accounts for only 0.05-0.07% of the total estimated annual number of hooded seals which visit Icelandic waters to feed. Although this species is considered 'Vulnerable' by IUCN, the team considers that the direct effects of gillnet fishing are highly likely to not hinder recovery of this species since the overall bycatch numbers are low, and the estimated proportion of the Icelandic population which is impacted is less than 0.1%. SG 80 is met for gillnets. SG 100 is not met because based on the available information it cannot be concluded that there is a high degree of confidence that there are no significant detrimental direct effects of the UoA on this ETP species.

<u>Long-tailed duck</u>

This seaduck is circumpolar, and breeds on the coasts of Greenland, Iceland and Norway. Besides coastal sites, this species nests on small lakes, pools, bogs and rivers; it is for example known to breed at Lake Mývatn in the north-east of Iceland (Bengtson, 1972). In Europe the breeding population is estimated at 676,000-890,000 mature individuals, which increases to 954,000-2,350,000 mature individuals in winter. The Icelandic population has been estimated at 4,000-6,000 (

Table 25). The winter population size is estimated to be decreasing by 30-49% in 27 years (projected decrease over three generations); due to the rapid wintering population size

		decreases across Europe this species has an IUCN classification of 'Vulnerable' (BirdLife International, 2015; see http://www.iucnredlist.org/). Based on the most recent MFRI data available, lumpfish gillnets account for a maximum of 23 long-tailed duck deaths per year in 2014 and 2015, which accounts for 0.38-0.58% of the total estimated Icelandic population of this species. Although this species is considered 'Vulnerable' by IUCN, the team considers that the direct effects of lumpfish gillnet fishing are highly likely to not hinder recovery of this species since the overall bycatch numbers are low, and the estimated proportion of the Icelandic population which is impacted is less than 0.6%. SG 80 is met for lumpfish gillnets. SG 100 is not met because based on the available information it cannot be concluded that there is a high degree of confidence that there are no significant detrimental direct effects of the UoA on this ETP species. Anglerfish gillnets In the case of anglerfish gillnets the assessment team did not find any evidence that any ETP species are being impacted. Given the lack of data available for this gear and the fact that the RBF had to be used to score PI 2.2.1 the team consders that a precautionary score at SG80 level is appropriate for this gear. **Bottom trawl, *Nephrops* trawl, Danish seine** There are no significant interactions recorded between bottom trawl, *Nephrops* trawl, Danish seine fisheries and ETP species. As such, there is a high degree of confidence that there are no significant detrimental direct effects of these UoAs on ETP species, and SG100 is met.

c	Indirect effects												
	Guidepost					Indirect effects have been considered and are thought to be highly likely to not create unacceptable impacts.				There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.			
	Met?	TB	Y	AGN	Y	TB	Y	AGN	Y	TB	N	AGN	N
		TN	Y	LGN	Y	TN	Y	LGN	Y	TN	N	LGN	N
		SD	Y	LL	Y	SD	Y	LL	Y	SD	N	LL	N
		GN	Y			GN	Y			GN	N		
	Justification	**All gears** It is known that some seabird species accompany fishing vessels, forming large aggregations to take advantage of fish waste (e.g. del Hoyo, et al., 1992; Hatch and Nettleship, 1998), and that lost fishing gears are a threat to marine megafauna including seals (e.g. Stelfox et al., 2016). The team however considers that such indirect effects are highly likely not to create unacceptable impacts since there are no apparent indirect effects of any of the UoAs on Atlantic puffin, black guillemot, hooded seal and long-tailed duck populations known to the team. SG 80 is thus met for all gears. There is however insufficient information to concluded that there is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species; SG 100 is not met.											

References	Bengtson, 1972; Birdlife International 2000, 2012, 2015; del Hoyo, et al., 1992; Harris and Wanless 2011; Hatch and Nettleship, 1998; ICES 2013; Kovacs 2016; Øigård *et al*. 2014; Stelfox et al., 2016.

OVERALL PERFORMANCE INDICATOR SCORE:	

	Bottom trawl	**90**
	***Nephrops* trawl**	**90**
	Danish Seine	**90**
	Gillnet	**80**
	Anglerfish Gillnet	**80**
	Lumpfish Gillnet	**70**
	Longline	**80**
CONDITION NUMBER (if relevant):		
Outline Condition Number:		**4**

PI 2.3.2 Evaluation Table for ETP species management strategy

<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 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 (national and international requirements)</td></tr>
<tr><td>Guidepost</td><td>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>There is a strategy in place for managing the UoAs impact on ETP species, including measures to minimise mortality, which is designed to be highly likely to achieve national and international requirements for the protection of ETP species.</td><td>There is a comprehensive strategy in place for managing the UoAs impact on ETP species, including measures to minimise mortality, which is designed to achieve above national and international requirements for the protection of ETP species.</td></tr>
<tr><td>Met?</td><td>Not relevant</td><td>Not relevant</td><td>Not relevant</td></tr>
<tr><td>Justification</td><td colspan="3">This scoring issues is not scored because there are no requirements for protection or rebuilding provided through national Icelandic ETP legislation or international agreements (see Section 3.4.7).</td></tr>
<tr><td rowspan="4">b</td><td colspan="4">Management strategy in place (alternative)</td></tr>
<tr><td>Guidepost</td><td>There are measures in place that are expected to ensure the UoA does not hinder the recovery of ETP species.</td><td>There is a strategy in place that is expected to ensure the UoA does not hinder the recovery of ETP species.</td><td>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>Met?</td><td>TB Y | AGN Y
TN Y | LGN Y
SD Y | LL Y
GN Y</td><td>TB Y | AGN N
TN Y | LGN N
SD Y | LL N
GN N</td><td>TB Y | AGN N
TN Y | LGN N
SD Y | LL N
GN N</td></tr>
<tr><td>Justification</td><td colspan="3">Gillnets, lumpfish gillnets, longlines
Various measures are taken to ensure the protection of juvenile fish, vulnerable and critical habitats and such measures will serve to reduce bycatch of ETP seabird and marine mammal species. Although not specifically established to protect such species, area closures in particular will also serve to maintain bycatch of marine mammals and seabirds at low levels since bycatch of many sensitive species is highest in inshore areas, which is where the closures are located (MFRI, pers. communication).

The measures include regulations on the type of fishing gear allowed in different areas, rules on the minimum mesh size, use of sorting grids on trawls and both temporary closures of fishing grounds (Figure 3-12, Figure 3-1). Furthermore, various long-term area closures are in place, which may apply to specific fishing gear, fishing-vessel size or all fishing for certain periods of time. For instance, in order to protect the spawning stock of cod, extensive seasonal closures are in operation during the spawning season (Regulation nr. 30/2005); all cod fisheries are closed within 12 miles along the south and west coast and within 6 miles along the north and east coast in April each year.</td></tr>
</table>

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

- Marine mammal and seabird bycatch is monitored by mandatory eLog system, through the cod gillnet surveys (conducted in April each year), and onboard observers from the DF and the MFRI, although to date returns from the eLog system have been poor. The association of Small Boat Owners has taken steps to improve logbook reporting of marine mammal bycatch. In the effort to step up monitoring of such bycatch, the DF issued in 2014 a new simplified logbook form that is believed to improve reporting of bycatch. This will allow a strategy to manage fishing impacts be implemented in the future. Observers monitored ca. 1% of all fishing trips by the gillnet and longline fleets in 2014 and 2015, and overall the quality of the data has improved in the last 5 years (MFRI pers. communication).
- Icelandic longline fisheries use mitigation measures in order to reduce bycatch of seabirds (pers. comm. Gunnlaugur Eiriksson, ISF; Vottunarstofan Tún 2011). The longliners use either bird-scaring buoy lines or a gas alarm which is sounded when the line is shot. During the winter time, the lines are often shot in the dark, which reduces the possible bycatch of seabirds.
- It is an offence in Iceland to catch a seabird with hooks (Reg. 456, 1994).
- Fishers are not allowed to offer for sale, give away, nor accept as a gift, any bird that has been killed in fishing nets.
- Any birds or mammals caught alive must be released.

A project to evaluate and mitigate bycatch in the lumpfish fishery is currently underway; project partners are BirdLife International, BioPol ehf. (a marine biotechnology company based in Skagaströnd), and the Icelandic National Association of Small Boat Owners (NASBO). The project has increased observer coverage on lumpfish fishing vessels, focussing in particular on areas which are known bycatch hotspots, and areas with high fishing effort. Twelve fishing trips with observers on board took place in 2015, and thirty-one in 2016. The project is in addition testing practical bycatch mitigation measures such as black and white scarer panels sown into lumpfish gillnets, and the potential use of flashing lights to scare away seabirds and marine mammals. Efforts are underway to identify sustainable sources of funding for ongoing monitoring and to extend the project to other fisheries. The project is ongoing, but once results are available it is expected that additional measures to further minimise the impacts of the lumpfish gillnet fishery will be implemented. Although the focus is on lumpfish gillnets, the mitigation measures being tested will be transferrable (cod) gillnets. Moreoever, in 2017 research trials using the 'banana' pinger (from Fishtek Marine) were carried out to try to reduce porpoise bycatch in the cod gillnet fishery. Three commercial vessels were used for the experiment, one in Breidafjordur in west Iceland, one in Hunafloi in North Iceland and one off the south east coast. Analysis of the data collected during this initiative conducted in April 2017 is still ongoing, and will be presented at the ICES 2018 WGBYC meeting (ICES, 2017).

There are thus measures in place, which are expected to ensure the UoAs do not hinder the recovery of ETP species, and efforts are ongoing to implement further measures in the near future; SG 60 is met.

The measures in place cannot be considered a full management strategy which has been designed to manage impacts on marine mammal and seabird species, and as such SG 80 is not met. A condition has been set.

This condition is new, and has not been harmonised with previous MSc assessments such as the ISF Icelandic cod and haddock assessments. The difference is due to the fact that the previous assessment teams did not have access to the updated MFRI bycatch estimates which were considered in the present assessment, and argued that there is a strategy in place to monitor interactions of ETP species with the fishery and other sources of mortality, and that appropriate interventions are being implemented. In light of the updated bycatch information the team considers that this rationale is no longer appropriate.

		Anglerfish nets In the case of anglerfish gillnets the assessment team did not find any evidence that any ETP species are being impacted. Given the lack of data available for this gear and the fact that the RBF had to be used to score PI 2.2.1 the team consders that a precautionary score in line with the other gillnets being assessed is appropriate until more data is available to confirm that no ETP species are being impacted by this gear. **Bottom trawl, *Nephrops* trawl, Danish seine** There are no ETP species caught by these gears and as such SG 100 is 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, AGN Y TN Y, LGN Y SD Y, LL Y GN Y	TB Y, AGN N TN Y, LGN N SD Y, LL N GN N	TB Y, AGN N TN Y, LGN N SD Y, LL N GN N
	Justification	**Gillnets, lumpfish gillnets, longlines** The measures which are currently in place (see scoring issue 'a' for a description) although not established to reduce catches of secondary species, can be expected to protect ETP species and to maintain bycatch of marine mammals and seabirds at low levels since bycatch of many sensitive species is highest in inshore areas, which is where the closures are located (MFRI, pers. communication). SG 60 is thus met. There are a number of measures that aim to ensure compliance with the law, including monitoring and surveillance which are conducted by the DF and the coast guard to ensure compliance of regulations. However, information available on the fishery / species involved indicates that the measures currently in place is not sufficient and may not work to ensure the fishery does not pose a risk for ETP populations as evidenced by the outcome score of SG 60 for black guillemot in the case of lumpfish gillnets. The measures in place for managing bycatch of vulnerable species such as seabirds and mammals are generally not designed to manage impact on that component specifically (e.g. temporal and seasonal closures are not designed to reduce bycatch of vulnerable species), and other measures require improvements to be appropriate for the fishery (e.g. more logbook returns / more observer trips are required to gather bycatch data). SG 80 is not met. **Anglerfish nets** In the case of anglerfish gillnets the assessment team did not find any evidence that any ETP species are being impacted. Given the lack of data available for this gear and the fact that the RBF had to be used to score PI 2.2.1 the team consders that a precautionary score in line with the other gillnets being assessed is appropriate until more data is available to confirm that no ETP species are being impacted by this gear. **Bottom trawl, *Nephrops* trawl, Danish seine** There are no ETP species caught by these gears and as such SG 100 is met.		
d	Management strategy implementation			

		SG 60	SG 80	SG 100
	Guidepost		There is some evidence that the measures/strategy is being implemented successfully.	There is clear evidence that the strategy / comprehensive strategy is being implemented successfully and is achieving its objective as set out in scoring issue (a) or (b).
	Met?		TB Y, AGN Y TN Y, LGN Y SD Y, LL Y GN Y	TB Y, AGN N TN Y, LGN N SD Y, LL N GN N
	Justification	**Gillnets, lumpfish gillnets, longlines** Control and surveillance information indicates that temporal and permanent fishing ground closures are respected, and restrictions on coastal fishing are likely to have reduced fishing mortality rates of ETP marine mammal and seabird species. There is thus <u>some</u> evidence that management measures are being implemented successfully; SG 80 is met. Clear evidence that the strategy is being implemented successfully and is achieving its objective of ensuring the UoA does not hinder recovery of ETP species is lacking, so SG100 is not met. **Anglerfish nets** In the case of anglerfish gillnets the assessment team did not find any evidence that any ETP species are being impacted. Given the lack of data available for this gear and the fact that the RBF had to be used to score PI 2.2.1 the team consders that a precautionary score in line with the other gillnets being assessed is appropriate until more data is available to confirm that no ETP species are being impacted by this gear. **Bottom trawl, *Nephrops* trawl, Danish seine** There are no ETP species caught by these gears and as such SG 100 is met.		
e	Review of alternative measures to minimize mortality of ETP species			
	Guidepost	There is a review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species.	There is a regular review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality of ETP species and they are implemented as appropriate.	There is a biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species, and they are implemented, as appropriate.
	Met?	TB Y, AGN Y TN Y, LGN Y SD Y, LL Y GN Y	TB Y, AGN N TN Y, LGN N SD Y, LL Y GN N	TB Y, AGN Y TN Y, LGN N SD Y, LL N GN N
	Justification	**Gillnets, lumpfish gillnets** The review of the onboard observer data by MFRI scientists represents an ongoing review of the effectiveness of current measures to minimise unwanted ETP interactions. The evaluation of the performance of the current measures occurs annually, and as such is regular. Research on measures to minimise unwanted catches of seabirds and marine mammals in lumpfish gillnets is ongoing as a collaborative effort involving NGOs, the fishing		

		industry and scientists; the results will also be applicable to (cod) gillnets. SG 60 is met for gillnets and lumpfish gillnets. However, the fact that black guillemot and common loon did not achieve SG80 under PI 2.3.1 indicates that measures may not have been implemented as appropriate for lumpfish gillnets. Moreover, there are further measures used in other fisheries which could be appropriate for gillnets in this case (e.g. further limits to area, season or times specifically to avoid areas / seasons when marine mammals or seabirds are common, pingers or weak lines to allow escape from entanglement), and no evidence was found to indicate that they should not be used. Therefore gillnets and lumpfish gillnets do not achieve SG 80. **Anglerfish nets** In the case of anglerfish gillnets the assessment team did not find any evidence that any ETP species are being impacted. Given the lack of data available for this gear and the fact that the RBF had to be used to score PI 2.2.1 the team consders that a precautionary score in line with the other gillnets being assessed is appropriate until more data is available to confirm that no ETP species are being impacted by this gear. **Longlines** The review of the onboard observer data by MFRI scientists represents an ongoing review of the effectiveness of current measures to minimise unwanted ETP interactions. The evaluation of the performance of the current measures occurs annually, and as such is regular. Icelandic longline fisheries use mitigation measures in order to reduce bycatch of seabirds (pers. comm. Gunnlaugur Eiriksson, ISF; Vottunarstofan Tún 2011): the longliners use either bird-scaring buoy lines or a gas alarm which is sounded when the line is shot. During the winter time, the lines are often shot in the dark, which reduces the possible bycatch of seabirds. Since all species achieve SG80 under PI 2.3.1 the implementation of alternative measures appears to be appropriately minimising mortality of unwanted catches of ETP species in longline fisheries. SG80 is met. There is no biennial review of the potential effectiveness of such measures, so SG100 is not met. **Bottom trawl, *Nephrops* trawl, Danish seine** There are no ETP species caught by these gears and as such SG 100 is met.
References		ICES, 2017

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**100**
	***Nephrops* trawl**	**100**
	Danish Seine	**100**
	Gillnet	**65**
	Anglerfish Gillnet	**65**
	Lumpfish Gillnet	**65**
	Longline	**70**
CONDITION NUMBER (if relevant):		**5**
Outline Condition Number:		**5**

PI 2.3.3 Evaluation Table for ETP species information

<table>
<tr><td colspan="2">PI 2.3.3</td><td colspan="12">Relevant information is collected to support the management of UoA impacts on ETP species, including:
• Information for the development of the management strategy;
• Information to assess the effectiveness of the management strategy; and
• Information to determine the outcome status of ETP species.</td></tr>
<tr><td colspan="2">Scoring Issue</td><td colspan="4">SG 60</td><td colspan="4">SG 80</td><td colspan="4">SG 100</td></tr>
<tr><td rowspan="7">a</td><td colspan="13">Information adequacy for assessment of impacts</td></tr>
<tr><td>Guidepost</td><td colspan="4">Qualitative information is adequate to estimate the UoA related mortality on ETP species.

OR

If RBF is used to score PI 2.3.1 for the UoA:
Qualitative information is adequate to estimate productivity and susceptibility attributes for ETP species.</td><td colspan="4">Some quantitative information is adequate to assess the UoA related mortality and impact and to determine whether the UoA may be a threat to protection and recovery of the ETP species.

OR

If RBF is used to score PI 2.3.1 for the UoA:
Some quantitative information is adequate to assess productivity and susceptibility attributes for ETP species.</td><td colspan="4">Quantitative information is available to assess with a high degree of certainty the magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status of ETP species.</td></tr>
<tr><td rowspan="4">Met?</td><td>TB</td><td>Y</td><td>AGN</td><td>Y</td><td>TB</td><td>Y</td><td>AGN</td><td>N</td><td>TB</td><td>Y</td><td>AGN</td><td>N</td></tr>
<tr><td>TN</td><td>Y</td><td>LGN</td><td>Y</td><td>TN</td><td>Y</td><td>LGN</td><td>N</td><td>TN</td><td>Y</td><td>LGN</td><td>N</td></tr>
<tr><td>SD</td><td>Y</td><td>LL</td><td>Y</td><td>SD</td><td>Y</td><td>LL</td><td>N</td><td>SD</td><td>Y</td><td>LL</td><td>N</td></tr>
<tr><td>GN</td><td>Y</td><td colspan="2"></td><td>GN</td><td>N</td><td colspan="2"></td><td>GN</td><td>N</td><td colspan="2"></td></tr>
<tr><td>Justification</td><td colspan="12">Gillnets, lumpfish gillnets and longlines
Icelandic regulations require that all bycatch is recorded. The registration of bird and mammal bycatch in commercial cod gillnets (other than lumpfish) started in 2002. Bycatch registration was received from 5% of the cod gillnet vessels until 2009, although no birds were registered. In 2009 fishers were required to switch to electronic logbooks and after that no information on marine mammals or bird bycatch has been returned. More recently discussions have taken place between the competent authorities (MII, MRI and DF) and the National Association of Small Boat Owners in order to improve logbook reporting of marine mammals and seabirds bycatch. In the effort to step up monitoring of such bycatch DF has issued a new simplified logbook form that is believed to improve reporting of bycatch. In order to further improve the available data, the DF observers have stepped up efforts to monitor bycatch rates of cod gillnets, lumpfish gillnets nets and longlines (coverage at present is ca. 1% of fishing trips). All data recorded by onboard observers is routinely made available to the MFRI for analysis. In addition, to such fisheries dependent data, the registration of marine mammals caught in the MRI spring gillnet survey was initiated in 1997, and for birds in 2009. The MRI spring gillnet survey is equivalent to 2% of the total cod gillnet fishing effort in April. The first year's the gillnet survey was only conducted in the south and west of the country but since 2002 it is also done in the north.
Routine scientific surveys are supplemented by targeted research projects and population counts in Iceland, including for ETP marine mammal and seabirds. For example during June-August 2015, the MRI participated in a large scale cetacean sightings survey (NASS-2015)</td></tr>
</table>

		conducted in cooperation with the Faroes, Greenland and Norway under coordination of the NAMMCO Scientific Committee. The Icelandic part of the survey was conducted from two research vessels and one aircraft (NAMMCO, 2016). Seabird surveys are carried out by the Icelandic Institute of Natural History, as well as through *ad hoc* scientific studies (e.g. Gardarsson and Jónsson (2014). Some quantitative information on bycatch rates of ETP marine mammal and seabird species is thus available. SG 60 is thus met. However logbook returns have been poor, and variations in estimated numbers of bycatch species evident in the most recent data provided by the MFRI indicate that the available information may not be accurate and verifiable for all bycatch species, including for the ETP species being considered in the present assessment. The low number of trips monitored by observers in the smaller fisheries, including gillnets, continues to make extrapolation of bycatch estimates difficult (MFRI, pers. communication); although the quality of the data has improved in the last 5 years. The quantitative information available is thus not 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. SG 80 is not met and a condition is imposed. **Anglerfish nets** In the case of anglerfish gillnets the assessment team did not find any evidence that any ETP species are being impacted. Given the lack of data available for this gear and the fact that the RBF had to be used to score PI 2.2.1 the team consders that a precautionary score in line with the other gillnets being assessed is appropriate until more data is available to confirm that no ETP species are being impacted by this gear. **Bottom trawl, *Nephrops* trawl, Danish seine** Information is collected on spatial and temporal fishing patterns through the use of Vessel Monitoring System, and the presence / absence of bycatch of ETP species on the fishing grounds is evaluated through the use of onboard observers, logbooks, scientific research at sea, and sampling of landed catches. Based on this information there are no indications that these gears are catching ETP species. Since it is not necessary to assess the magnitude of UoA-related impacts, mortalities and injuries and the consequences for the status of ETP species for these UoAs, SG 100 is met.

b	Information adequacy for management strategy												
	Guidepost	Information is adequate to support measures to manage the impacts on ETP species.				Information is adequate to measure trends and support a strategy to manage impacts on ETP species.				Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives.			
	Met?	TB	Y	AGN	Y	TB	Y	AGN	Y	TB	Y	AGN	N
		TN	Y	LGN	Y	TN	Y	LGN	Y	TN	Y	LGN	N
		SD	Y	LL	Y	SD	Y	LL	Y	SD	Y	LL	N
		GN	Y			GN	Y			GN	N		
	Justification	**Gillnets, lumpfish gillnets and longlines** Information is collected on spatial and temporal fishing patterns through the use of Vessel Monitoring System, and the presence / absence of bycatch of ETP species on the fishing											

		grounds is evaluated through the use of onboard observers, logbooks, scientific research at sea, and sampling of landed catches. There is thus a recurrent monitoring and scientific survey system in place to estimate the trend and relative quantities of ETP species, which is a necessary prerequisite to the implementation of bycatch management measures and manage fishing impacts on such species. The team considers that the information is adequate to measure trends and support a strategy to manage impacts on ETP species. SG 80 is met. The information available at present would however not be adequate to evaluate with a high degree of certainty whether the strategy is achieving its objective. SG 100 is not met. **Anglerfish nets** In the case of anglerfish gillnets the assessment team did not find any evidence that any ETP species are being impacted. Given the lack of data available for this gear and the fact that the RBF had to be used to score PI 2.2.1 the team consders that a precautionary score in line with the other gillnets being assessed is appropriate until more data is available to confirm that no ETP species are being impacted by this gear. **Bottom trawl, *Nephrops* trawl, Danish seine, anglerfish gillnets** Information is collected on spatial and temporal fishing patterns through the use of Vessel Monitoring System, and the presence / absence of bycatch of ETP species on the fishing grounds is evaluated through the use of onboard observers, logbooks, scientific research at sea, and sampling of landed catches. Based on this information there are no indications that these gears are catching ETP species. A strategy to manage impacts on ETP species is thus not required, and SG 100 is met for these gears.
References		Gardarsson and Jónsson 2014; NAMMCO 2016; Þorbjörnsson 2017.

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**100**
	***Nephrops* trawl**	**100**
	Danish Seine	**100**
	Gillnet	**70**
	Anglerfish Gillnet	**70**
	Lumpfish Gillnet	**70**
	Longline	**70**
CONDITION NUMBER (if relevant):		**6**
Outline Condition Number:		**6**

PI 2.4.1 Evaluation Table for Habitats outcome

PI 2.4.1	**The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.**		
Scoring Issue	SG 60	SG 80	SG 100
a	Commonly encountered habitat status		
Guidepost	The UoA is unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	The UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.	There is evidence that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm.

Met?												
	TB	Y	AGN	Y	TB	Y	AGN	Y	TB	N	AGN	Y
	TN	Y	LGN	Y	TN	Y	LGN	Y	TN	N	LGN	Y
	SD	Y	LL	Y	SD	Y	LL	Y	SD	Y	LL	Y
	GN	Y			GN	Y			GN	Y		

Justification

	Commonly encountered habitats					
Gear	Coarse sediments	Fine mud	Mixed sediment	Rock / hard substrata	Sand	Sandy mud - muddy sand
TB	80		80		80	
TN		80	80		80	80
SD	100	100	100		100	100
GN	100			100		
AGN	100					
LGN	100			100		
LL	100			100		

Bottom trawl

Trawl fishing effort In Icelandic waters is primarily concentrated in areas characterised by coarse sediments, mixed sediments and sands. High bottom trawling effort has been ongoing for decades in these habitats, and they are still productive fishing grounds. The current effort by the bottom trawl fishery is considerably less intensive than it used to be. Significant reductions in fishing effort in recent years (compared to early 1990s fishing effort, see ICES 2017) means that any impacts bottom trawl gear may be having in such habitats will have decreased concurrently.

Scientific research has shown that compared to hard bottom sites, species diversity is low in Icelandic deep-water sedimentary habitats (Santos et al., 2008). Moreover, there is evidence in the scientific literature that the effects of otter trawling on less stable sedimentary habitats (including coarse sediments and sandy bottoms) are relatively minor, and that such habitats recover quickly from the effects of fishing activities (Collie et al. 2000; Dernie et al. 2003; Kaiser et al. 2006). Indeed, research on the short- and long-term effects of otter trawling on a macrobenthic infaunal community in subtidal Icelandic waters that had never been trawled before found that no significant treatment effects could be detected on total abundance or on multivariate structure; tests for individual species revealed only a single short-term effect for a bivalve. Trawling did however cause significant short-term reduction in species richness and persistent effects on the Shannon-Wiener diversity index (Ragnarsson and Lindegarth 2009). Based on these studies the team considers that the habitat structure, biological diversity, abundance and function of coarse sediment, mixed sediment and sand habitats would be unable 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 this bottom trawling will reduce the structure and function of such habitats to the point where there would be serious irreversible harm and that SG 80 is met for this scoring element. Ragnarsson and Lindegarth (2009) carried out their research in shallow waters where storm induced disturbance will be higher than in the trawl fishing grounds being assessed. The team therefore considers that this study does not constitute sufficient evidence that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm. SG 100 is not met. ***Nephrops* trawl** The habitat of *Nephrops norvegicus* is characterized by fine sand and mud, where sea-pen (e.g. *Virgularia mirabilis*, *Pennatula phosphorea*, and *Funiculina quadrangularis*) and burrowing megafauna communities can be found (OSPAR 2010d). Seapens are sensitive to mechanical damage by *Nephrops* trawling. Studies on the impact of *Nephrops* trawling indicate that fishing intensity is the major factor controlling long-term negative trends in the benthos (Ball et al. 2000). However, compared to early 1970s fishing effort had decreased by some 60–70% by the year 2000 (Garcia et.al. 2006), and during the period 2001-2013 the number of boats in the *Nephrops* fishery had reduced by around 50% (*Figure 3-19*). Based on an assessment against the Texel-Faial criteria (selection criteria for habitats are: global importance, regional importance, rarity, sensitivity, ecological significance, status of decline) carried out by OSPAR such communities are ecologically significant, but not classified as rare or regionally important. Seapen- and burrowing megafauna communities are on the OSPAR List of threatened and/or declining species and habitats for region II (Greater North Sea) and III (Celtic Seas), but not for region I, which includes Icelandic waters (OSPAR 2010d). Pennatulacea corals (seapens) are known to be relatively common in Icelandic waters, and there are known areas which are not affected by *Nephrops* trawling since they lie outside trawl fishing grounds (see Table 30). Despite the fact that high bottom trawling effort has been ongoing for decades, including trawling for *Nephrops*, fishing grounds have remained productive. The *Nephrops* trawl used in Icelandic waters has a ground rope but is not fitted with bobbins or tickler chain (www.fisheries.is), which therefore reduces environmental impacts. Since seapen- and burrowing megafauna communities are common in Icelandic waters and unimpacted communities remain, the team considers that in the long term (within 20 years), the habitat structure, biological diversity, abundance and function of such habitats would be able to recover to at least 80% of its unimpacted structure. Overall, the team considered that the UoA is highly unlikely to reduce structure and function of the seapen and burrowing megafauna communities to a point where there would be serious or irreversible harm. SG80 is met. There is no evidence that this is highly unlikely, so SG100 is not met. **Danish seine** The Danish seine cannot be used to fish on rough grounds and is instead used on relatively flat sandy or muddy seabeds lacking significant obstructions which could damage the gear. Since Danish seines encircle the target species rather than being towed across large areas of substrate this gear has a relatively limited spatial footprint, reducing seabed disturbance. Due to the characteristics of Danish seine fishing the team considers that this UoA is highly unlikely to reduce structure and function of the commonly encountered habitats to a point where there would be serious or irreversible harm. SG 80 is 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 found no differences in species composition between the two treatments, although abundance tended to be higher in the closed area (significant difference for two out of nine benthic taxa from grab sampling). On this basis, the team considered that there is evidence that the UoA is highly unlikely to reduce structure and function of the commonly encountered habitats, although such habitats may suffer some reversible changes. SG 100 is met. **Gillnet**

		Static fishing gear, such as set nets, do not affect large areas of seabed and are 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, (cod) gillnet fishing efforts in Iceland are concentrated in areas characterised by hard bottoms and coarse sediments where sensitive or vulnerable species do not occur. 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. SG 80 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 habitats, although such habitats may suffer some reversible changes. SG 100 is met. **Anglerfish gillnet** 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). Anglerfish gillnets differ from the more common cod gillnets (UoA 'gillnet') by having a larger mesh size, and having a less buoyant headrope so that a bulge is present in the middle of the net. The gear targets anglerfish, which are found on muddy to gravelly, occasionally rocky bottoms depending on the life-cyle stage (Thangstad et al., 2002); stakeholders interviewed during the site visit indicated that fishing generally takes place in areas characterised by coarse sediments. 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 anglerfish 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. SG 80 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 description above under ‘seine net’)). The team considered that habitat impacts of anglerfish 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 habitats, although such habitats may suffer some reversible changes. SG 100 is met. **Lumpfish gillnet** Static fishing gear, such as set nets, does not affect large areas of seabed and are not thought to cause serious or irreversible harm to habitat structures (Jennings et al. 2001). The lumpfish gillnet fishery is operating close to the shore during the spawning season of the species in spring and early summer (Thorsteinsson 1996). The lumpfish typically spawns on rocky bottoms where kelp beds occur along an open coastline with highly turbulent water; the species is not likely to spawn in more sheltered areas with loose benthic sediments. Considering that set nets are considered to have insignificant impact on benthic habitats and lumpfish spawns on rocky bottoms in highly turbulent water, where sensitive or vulnerable habitats do not occur, the UoA is highly unlikely to reduce habitat structure and function 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 under ‘seine net’ above). The team considered that habitat impacts of lumpfish 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 habitats, although such habitats may suffer some reversible changes. SG 100 is met.

Longline

Static fishing gear, such as 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). 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 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. Based on a number of scenarios 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). 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 coral species, and the fact that longline fishing efforts are concentrated in areas characterised by hard bottoms and coarse sediments where sensitive or vulnerable species do not occur (compare Figure 3-14 with map of fishing intensity distribution in Table 26), 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. SG 80 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 combined with the lack of geographic overlap suggested a risk level well below 20%, as required for SG100. SG100 is therefore 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	AGN	Y	TB	N	AGN	Y	TB	N	AGN	N
	TN	Y	LGN	Y	TN	Y	LGN	Y	TN	N	LGN	N
	SD	Y	LL	Y	SD	Y	LL	Y	SD	N	LL	Y
	GN	Y			GN	Y			GN	N		

Justification

Gear	**VMEs**					
	Maerl beds	*Modiolus* reefs	*Lophelia* reefs	Coral gardens	Sponges	Hydrothermal vents
TB			60	60	60	80
TN				80	80	80
SD	80	80				
GN	100	100	80			100
AGN	100	100	80			100

LGN	100	100	80			
LL	100	100	100	100	100	100

Bottom trawl

Maerl beds

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

Modiolus reefs

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

Lophelia reefs

In Icelandic waters, most fishing with otter trawls (around 70%) takes place at depths between 100 and 500 m; anglerfish are common at depths of ca. 20 -500 m (Thangstad et al., 2002); *Lophelia* reefs are found at depths of 200-1,400 m, but are concentrated 400 – 800 m. There is thus overlap between the UoA and *Lophelia* reefs between 200 and 500 m, with the highest potential for overlap at 400 - 500 m.

The slope areas off the south coast of Iceland are very steep, with depths descending from around 400 m to more than 1500 m within few nautical miles, and parts of the slope areas are considered difficult for trawling. Therefore, vulnerable habitats have some depth refuge from fisheries impacts in Icelandic waters. Nevertheless, in the past the bottom trawl fishery has reduced coral habitat structure and the present fishing patterns of the UoA overlap with vulnerable habitats of corals.

There is explicit protection of several *Lophelia* areas where no fishing gears with bottom contact are allowed, including bottom trawling. Permanent area closures for bottom trawling are in operation along the shelf break off W Iceland including the seabed on the shallow part of the Reykjanes Ridge where *Lophelia* reefs occur (Figure 3-20; Figure 3-21).

Detailed habitat mapping has so far concentrated on the areas most at risk from trawling or other threats. Ongoing habitat mapping may identify further areas and the intention is to protect these. In particular since 2015, the bycatch of invertebrates is being monitored during the annual autumn ground fish survey in deep water carried out by MFRI. All invertebrates in the trawl catches observed are identified by benthologists (about half of the trawls carried out). This data will give considerable amount of information on benthos, including corals, as well as other species vulnerable to fishing in the near future (MFRI, pers. communication). However, no recording of benthic bycatch by commercial fishing vessels is in place.

A single contact by the bottom trawl gear has a significant impact on corals, which have slow recovery rates. Therefore, adverse impacts by bottom trawling is significant. It cannot be concluded that the assessed bottom trawl fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. Therefore SG 80 is not metfor bottom trawl.

This has been harmonised with the ISF Iceland haddock, ISF Iceland redfish, ISF Ling and saithe, ISF cod and halibut fisheries, where there is a condition for this PI.

Coral gardens

In Icelandic waters, most fishing with otter trawls (around 70%) takes place at depths between 100 and 500 m / anglerfish are common at depths of ca. 20 -500 m (Thangstad et al., 2002), and coral gardens are primarily found in the depth range of ca. 500-1700 m (see *Figure 3-18*). However, anglerfish can be found at deeper depths, so there may be some limited overlap between the UoA and coral gardens.

The slope areas off the south coast of Iceland are very steep, with depths descending from around 400 m to more than 1500 m within few nautical miles, and parts of the slope areas are considered difficult for trawling. Therefore, vulnerable habitats have some depth refuge from fisheries impacts in Icelandic waters. Nevertheless, in the past the bottom trawl fishery has reduced coral habitat structure.

There is explicit protection of several *Lophelia* areas where no fishing gear with bottom contact are allowed, including bottom trawling since permanent area closures for bottom trawling are in operation along the shelf break off W Iceland including seabed on the shallow part of the Reykjanes Ridge where *Lophelia* reefs occur (Figure 3-20; Figure 3-21). However, no such closures are in place to protect coral gardens characterised by aggregations of colonies or individuals of one or more coral species of leather corals (Alcyonacea), (Gorgonacea), sea pens (Pennatulacea), black corals (Antipatharia), and hard corals (Scleractinia) other than *Lophelia*.

Detailed habitat mapping has so far concentrated on the areas most at risk from trawling or other threats. Ongoing habitat mapping may identify further areas and the intention is to protect these. In particular since 2015, the bycatch of invertebrates is being monitored during the annual autumn ground fish survey in deep water carried out by MFRI. All invertebrates in the trawl catches observed are identified by benthologists (about half of the trawls carried out). This data will give a considerable amount of information on benthos, including coral garden species, as well as other species vulnerable to fishing in the near future (MFRI, pers. communication). However, no recording of benthic bycatch by commercial fishing vessels is in place.

A single contact by the bottom trawl has a significant impact on coral gardens, which have slow recovery rates. Therefore, adverse impacts by bottom trawling is significant. It cannot be concluded that the assessed bottom trawl fishery is highly unlikely to reduce habitat structure and function of coral gardens to a point where there would be serious or irreversible harm. Therefore SG 80 is not metfor bottom trawl. This has been harmonised with the ISF Iceland haddock, ISF Iceland redfish, ISF Ling and saithe, ISF cod and halibut fisheries, where there is a condition for this PI.

Sponges

In Icelandic waters, most fishing with otter trawls (around 70%) takes place at depths between 100 and 500 m; anglerfish are common at depths of ca. 20 -500 m (Thangstad et al., 2002). Deep-sea sponge aggregations are found primarily in the depth range of ca. 250 - 1300 m, and habitat forming sponge communities are common at depths of up to 500 m (Ospar, 2010d). There is thus overlap between the UoA and sponge communities between 300 and 500 m, although a comparison of the known distribution of sponges in Icelandic waters (Table 31) with known fishing grounds of anglerfish (Figure 3-15) shows that the areal overlap is limited to a few locations off the northwest of Iceland.

There is no explicit protection of areas which are rich in sponge communities where no fishing gear with bottom contact are allowed, although a number of seasonal or annual closures to bottom trawling exist which might have beneficial effects on the sponge habitats occurring there.

Detailed habitat mapping has so far concentrated on the areas most at risk from trawling or other threats. Ongoing habitat mapping may identify further areas and the intention is to protect these . In particular since 2015, the bycatch of invertebrates is being monitored during the annual autumn ground fish survey in deep water carried out by MFRI. All invertebrates in the trawl catch observed are identified by benthologists (about half of the trawls carried out). This data will give a considerable amount of information on benthos,

		including sponges, as well as other species vulnerable to fishing in the near future (MFRI, pers. communication). However, no recording of benthic bycatch by commercial fishing vessels is in place. A single contact by the bottom trawl has a significant impact on sponges, which have slow recovery rates (Ospar 2010d). Therefore, adverse impacts by bottom trawling is significant. It cannot be concluded that the assessed bottom trawl fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. Therefore SG80 is not metfor bottom trawl. This has been harmonised with the ISF Iceland haddock, ISF Iceland redfish, ISF Ling and saithe, ISF cod and halibut fisheries, where there is a condition for this PI. <u>Hydrothermal vents</u> The depth distributions of trawl fishing, anglerfish habitats and hydrothermal vent fields overlap, and trawling is known to take place close to hydrothermal vent fields (see map of trawling effort superimposed on vent field distribution in Table 32). However, comparing the location of areas of hydrothermal activity in Icelandic waters with maps of anglerfish catches around Iceland in recent years (Figure 3-15) shows that there is practically no overlap between the UoA and hydrothermal vent areas. Moreover, the hydrothermal vents at Steinahóll are situated inside a closed area for otter trawling which has been in operation since 1994. As such the UoA is highly unlikely to reduce structure and function of the hydrothermal vent habitats to a point where there would be serious or irreversible harm. SG 80 is met. Mapping of hydrothermal vent areas is however ongoing, with surveys planned to survey several potential vent sites on the Reykjanes Ridge for 2017 (MFRI, pers. communication). As such it cannot be argued that there is evidence that the fishery is highly unlikely to impact hydrothermal vent habitats. SG 100 is not met. ***Nephrops* trawl** <u>Maerl beds</u> Since coralline algae require light for photosynthesis maerl beds are generally only found at depths to about 40 m; Icelandic maerl beds have rarely been reported below 20 m depth. *Nephrops* trawling does not take place below 100 m depth and is not allowed within a certain distance from land (generally around 12 nm) in Iceland (MFRI, pers. communication). There is thus no potential overlap between this UoA and the distribution of maerl beds in Icelandic waters. <u>*Modiolus* reefs</u> *Modiolus* reefs have been reported at depths ranging from 5 - 50m in Icelandic waters. *Nephrops* trawling does not take place in waters shallower than 100 m depth and is not allowed within certain distance from land (generally around 12 nm) in Iceland (MFRI, pers. communication). There is thus no potential overlap between this UoA and the distribution of horse mussel beds in Icelandic waters. <u>*Lophelia* reefs</u> *Nephrops* trawling does not take place on hard substrata where *Lophelia* reefs are found. <u>Coral gardens</u> Soft corals occur on the softer muddy habitats favoured by *Nephrops*. However fishing with Nephrops trawls in Icelandic waters primarily takes place in shallower waters at depths above 500 m; in Icelandic waters Nephrops is found in the warmer waters off the south, southeast and southwest coast, mostly at depths of 110-270 m (see www.fisheries.is). Also anglerfish are common at depths of ca. 20 -500 m (Thangstad et al., 2002). Coral gardens on

		the other hand are found primarily in the depth range of ca. 500-1700 m (see *Figure 3-18*). Overlap between the UoA and coral gardens is thus extremely limited. Consequently the team considers that the UoA is highly unlikely to reduce structure and function of coral garden habitats to a point where there would be serious or irreversible harm, and SG80 is met. There is no evidence that this is high unlikely, so SG100 is not met. <u>Sponges</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*. However fishing with *Nephrops* trawls in Icelandic waters primarily takes place in shallower waters at depths above 500 m; in Icelandic waters *Nephrops* is found in the warmer waters off the south, southeast and southwest coast, mostly at depths of 110-270 m (see www.fisheries.is). Also anglerfish are common at depths of ca. 20 -500 m (Thangstad et al., 2002). Deep-sea sponge aggregations on the other hand are found primarily in the depth range of ca. 300-750 m, and a comparison of the known distribution of sponges in Icelandic waters (Table 31) with known fishing grounds of anglerfish (Figure 3-15) shows that the areal overlap is limited to a few locations off the northwest of Iceland where *Nephrops* trawling does not take place (Table 26). Overlap between the UoA and sponges is thus very limited and consequently the team considers that the UoA is highly unlikely to reduce structure and function of deep-sea sponge habitats to a point where there would be serious or irreversible harm, and SG80 is met. There is no evidence that this is highly unlikely, so SG100 is not met. <u>Hydrothermal vents</u> The depth distributions of *Nephrops* trawl fishing, anglerfish habitats 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 in Table 26 with map of vent field distribution in Table 32). However, 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), and comparing the location of areas of hydrothermal activity in Icelandic waters with maps of anglerfish catches around Iceland in recent years (Figure 3-15) shows that there is practically no overlap between the UoA and hydrothermal vent areas. Moreover, the hydrothermal vents at Steinahóll are situated inside a closed area for otter trawling which has been in operation since 1994. As such the UoA is highly unlikely to reduce structure and function of the hydrothermal vent habitats to a point where there would be serious or irreversible harm. SG 80 is met. Mapping of hydrothermal vent areas is however ongoing, with surveys planned to survey several potential vent sites for 2017 (MFRI, pers. communication). As such it cannot be argued that there is evidence that the fishery is highly unlikely to impact hydrothermal vent habitats. SG 100 is not met. **Danish seine** <u>Maerl beds</u> The distribution of Danish seine fishing effort (see Table 26) overlaps with areas where maerl habitats are found (see Table 27), in particular inside fjords along the northern coast of Iceland. However, maerl beds are generally only found at depths to about 40 m, Icelandic maerl beds have rarely been reported below 20 m depth, and Danish seine fishing generally takes place at depths of 40-60 m. Moreoever, 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. Although scientific evidence indicates that it is highly unlikely that the Danish seine would reduce

habitat structure and function to a point where there would be serious or irreversible harm, this has not been proven. SG 100 is not met.

Modiolus reefs

The distribution of Danish seine fishing effort (see Table 26) and location of anglerfish fishing grounds (see Figure 3-15) overlap with areas where *Modiolus* reefs have been recorded (see Table 28), in particular off the south-western coast of Iceland. Moreover, horse mussel beds have been reported at depths of 5-50 m in Icelandic waters, which overlaps with the depth range where Danish seines are used.

It is however unlikely that there would be fishing by Danish seine over horse mussel beds, as it would lead to fishing gear damage, such as the footrope being damaged after getting hooked in the mussel bed matrix. Danish seines are instead used on smooth bottoms, and it is likely that fishermen avoid fishing on grounds where there are beds with horse mussel (MFRI pers. communication). As such the UoA is highly unlikely to reduce structure and function of the maerl habitats to a point where there would be serious or irreversible harm. SG 80 is met.

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

Lophelia reefs

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

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

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

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.

Gillnets

Maerl beds

The distribution of gillnet fishing effort (see Table 26) and areas where anglerfish are caught with (cod) gillnets (see Figure 3-16) overlap with areas where maerl habitats are found (see Table 27) 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. SG 100 is met. *Modiolus* reefs The distribution of gillnet fishing effort (see Table 26) areas where anglerfish are caught with (cod) gillnets (see Figure 3-16) overlap with a few areas where *Modiolus* reefs have been recorded (see Table 28), 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. SG 100 is met. *Lophelia* reefs 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. However, it is possible that lost gillnets could have some indirect impacts by smothering or breaking fragile hard corals in certain current conditions. SG 100 is not met. Coral gardens 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 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 Based on the known distribution of gillnet fishing effort (see Table 26), this gear is deployed in Eyjafjörður, where a hydrothermal vent field is located (see Table 32). However, this area is not an anglerfish fishing ground where gillnets in general and (cod) gillnets in particular operate (see Figure 3-15, Figure 3-16). Moreover, 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. SG 100 is met. **Anglerfish gillnets** Maerl beds The distribution of gillnet fishing effort (see Table 26) and areas where anglerfish are caught with anglerfish gillnets (see Figure 3-16) overlap with areas where maerl habitats are found (see Table 27) 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 anglerfish 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. SG 100 is met.

Modiolus reefs

The distribution of gillnet fishing effort (see Table 26) areas where anglerfish are caught with anglerfish gillnets (see Figure 3-16) and locations where *Modiolus* reefs have been recorded (see Table 28), only appear to overlap in a single location 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 extremely limited overlap of the UoA with this VME and the characteristics of anglerfish 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. SG 100 is met.

Lophelia reefs

Fishing with anglerfish gillnets takes place at average depths of 60-80 m and on occasions at depths of up to 130 m (pers. communication MFRI; pers. communication anglerfish gillnet fisherman), and therefore in waters which are too shallow for *Lophelia* reefs to be encountered. However, it is possible that lost gillnets could have some impact by smothering or breaking fragile hard corals in certain current conditions. SG 100 is not met.

Coral gardens

Fishing with anglerfish gillnets takes place at average depths of 60-80 m and on occasions at depths of up to 130 m (pers. communication MFRI; pers. communication anglerfish gillnet fisherman), and therefore in waters which are too shallow for coral gardens to be encountered.

Sponges

Fishing with anglerfish gillnets takes place at average depths of 60-80 m and on occasions at depths of up to 130 m (pers. communication MFRI; pers. communication anglerfish gillnet fisherman), and therefore in waters which are too shallow for deep-sea sponge communities to be encountered.

Hydrothermal vents

Based on the known distribution of gillnet fishing effort (see Table 26), this gear is deployed in Eyjafjörður, where a hydrothermal vent field is located (see Table 32). However, this area is not an anglerfish fishing ground where gillnets in general and anglerfish gillnets in particular operate (see Figure 3-15, Figure 3-16). Moreover, 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 anglerfish 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. SG 100 is met.

Lumpfish gillnets

Maerl beds

The distribution of gillnet fishing effort (see Table 26) and areas where anglerfish are caught with lumpfish gillnets (see Figure 3-16) may be overlapping at a single location off the north-western coast of Iceland where maerl habitats are found (see Table 27). 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 lumpfish 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. SG 100 is met.

Modiolus reefs

The distribution of gillnet fishing effort (see Table 26) areas where anglerfish are caught with lumpfish gillnets (see Figure 3-16) and locations where *Modiolus* reefs have been recorded (see Table 28), only appear to overlap to a very limited extent off the south-western coast of Iceland and possibly in Breiðafjörður. 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 extremely limited overlap of the UoA with this VME and the characteristics of lumpfish 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. SG 100 is met.

Lophelia reefs

The lumpfish fishery is operating close to the shore and down to approximately 40 m depth during the spawning season of the species in spring and early summer (Thorsteinsson 1996), and therefore in waters which are too shallow for *Lophelia* reefs to be encountered. However, it is possible that lost gillnets could have some impact by smothering or breaking fragile hard corals in certain current conditions. SG 100 is not met.

		<u>Coral gardens</u> The lumpfish fishery is operating close to the shore and down to approximately 40 m depth during the spawning season of the species in spring and early summer (Thorsteinsson 1996), and therefore in waters which are too shallow for coral gardens to be encountered. <u>Sponges</u> The lumpfish fishery is operating close to the shore and down to approximately 40 m depth during the spawning season of the species in spring and early summer (Thorsteinsson 1996), and therefore in waters which are too shallow for deep-sea sponge communities to be encountered. <u>Hydrothermal vents</u> The lumpfish fishery is operating close to the shore and down to approximately 40 m depth during the spawning season of the species in spring and early summer (Thorsteinsson 1996), and therefore in waters which are too shallow for hydrothermal vents to be encountered. **Longline** <u>Maerl beds</u> The distribution of longline fishing effort (see Table 26) and areas where anglerfish are caught (see Figure 3-15) appear to overlap off the north-western coast of Iceland where maerl habitats are found (see Table 27). However, although longline fishing from small vessels may occasionally take place close to the shore, this gear is generally used at depths below 50 m and maerl beds are found at depths of less than 20 m 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 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. SG 100 is met. <u>*Modiolus* reefs</u> The distribution of longline fishing effort (see Table 26) and areas where anglerfish are caught (see Figure 3-15) appear to overlap off the south-eastern coast of Iceland where *Modiolus* reefs are found (see Table 28). However, although longline fishing from small vessels may occasionally take place close to the shore, this gear is generally used at depths below 50 m and *Modiolus* reefs have been recorded at depths of up to 50 m 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. Due to the characteristics of longline fishing, the overall limited potential for overlap between the UoA and *Modiolus* reefs, the team considers 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. <u>*Lophelia* reefs</u>

Longlines are primarily used at depths of 50 - 300 m in Icelandic fisheries, and therefore generally in waters which are shallower than *Lophelia* reef habitats. However, the distribution of longline fishing effort and areas where anglerfish are caught (see Figure 3-15) overlaps on the slope areas off the southern and western coast of Iceland where *Lophelia* reefs occur (see Table 29).

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 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 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. Based on a number of scenarios 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). 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 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.

<u>Coral gardens</u>

Longlines are primarily used at depths of 50 - 300 m in Icelandic fisheries, and therefore generally in waters which are shallower than coral garden habitats (see Figure 3-18). However, the distribution of longline fishing effort and areas where anglerfish are caught (see Figure 3-15) overlaps with some sites where coral gardens are known to occur (see Table 30).

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 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 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. Based on a number of scenarios 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). 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 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.

<u>Sponges</u>

Longlines are primarily used at depths of 50 - 300 m in Icelandic fisheries, and therefore generally in waters which are shallower than deep-water sponge habitats (see Table 31).

		However, the distribution of longline fishing effort and areas where anglerfish are caught (see Figure 3-15) overlaps with some areas where deep water sponges are known to occur. Static fishing gears, such as 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). 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 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 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. Based on a number of scenarios 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). 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 corals, and the fact that there is only limited overlap between the UoA and deep-water sponge habitats, 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. <u>Hydrothermal vents</u> 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 waters (see Table 32, Table 31). Moreover, the distribution of longline fishing effort and areas where anglerfish are caught (see Figure 3-15) overlaps with areas where hydrothermal vent communities are known to occur. Static fishing gears, such as 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). 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 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 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. Based on a number of scenarios 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). 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 corals, the team concluded that there is evidence that it is highly unlikely that longlines reduce habitat structure and function of hydrothermal vent communities to a point where there would be serious or irreversible harm. SG 100 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.

				N

Justification

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

All Gears

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

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

References	Ball et al. 2000; Barbera et al., 2017; Chuenpagdee et al. 2003; Collie et al. 2000; Dernie et al. 2003; Garcia et.al. 2006; Grieve et al., 2014; ICES 2017; Jennings et al. 2001; Kaiser et al. 2006; OSPAR 2010d; Ragnarsson and Lindegarth 2009; OSPAR, 2010e; Santos et al. 2008; Sharp et al. 2009; Thangstad et al., 2002; Thorarinsdóttir et al. 2010; Thorsteinsson 1996.

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**75**
	***Nephrops* trawl**	**80**
	Danish Seine	**95**
	Gillnet	**90**
	Anglerfish Gillnet	**85**
	Lumpfish Gillnet	**85**
	Longline	**95**
CONDITION NUMBER (if relevant):		**7**

PI 2.4.2 Evaluation Table for Habitats management strategy

PI 2.4.2		**There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance.	There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above.	There is a strategy in place for managing the impact of all MSC UoAs/non-MSC fisheries on habitats.

Met?	SG 60				SG 80				SG 100			
	TB	Y	AGN	Y	TB	N	AGN	Y	TB	N	AGN	N
	TN	Y	LGN	Y	TN	N	LGN	Y	TN	N	LGN	N
	SD	Y	LL	Y	SD	Y	LL	Y	SD	N	LL	N
	GN	Y			GN	Y			GN	N		

Justification

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

All gears

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

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

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

Bottom and *Nephrops* Trawls

The Icelandic management strategy for marine habitats in general, and VMEs in particular, is mainly implemented through a system of closed areas which effectively prevent both bottom trawls and *Nephrops* trawls from being used in known areas of cold-water coral

		concentrations along the edge of the continental shelf. A known hydrothermal vent area is also closed to trawling. This represents a partial strategy for cold water corals and hydrothermal vents, but is not yet in place for coral gardens or sponge concentrations, and does not meet SG80 for these two VME types. Vessels abide by commonly accepted move-on rules when encountering VMEs in these areas, but these are informal. As a consequence a condition has been imposed, which is harmonised with the ISF Icelandic cod and halibut assessments. Danish seine, gillnet, anglerfish gillnet, lumpfish gillnet, longline 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, 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. Consequenctly SG 100 is not met. Scoring has been harmonised with previous MSc assessments of these gears, including most recently the ISF cod and haddock (Icelandic UoAs) fishery assessments.

b	Management strategy evaluation												
	Guidepost	The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar UoAs/habitats).				There is some objective basis for confidence that the measures/partial strategy will work, based on information directly about the UoA and/or habitats involved.				Testing supports high confidence that the partial strategy/strategy will work, based on information directly about the UoA and/or habitats involved.			
	Met?	TB	Y	AGN	Y	TB	Y	AGN	Y	TB	N	AGN	N
		TN	Y	LGN	Y	TN	Y	LGN	Y	TN	N	LGN	N
		SD	Y	LL	Y	SD	Y	LL	Y	SD	N	LL	N
		GN	Y			GN	Y			GN	N		
	Justification	Bottom and *Nephrops* trawls The measures in place for cold water corals e.g. closed areas for bottom gears are well proven to be effective, providing objective evidence that the partial strategy will work. Whilst it is acknowledged that this partial strategy is currently inadequate for soft corals and sponges (see 2.4.1a above), it is being expanded and a condition has been put in place to ensure this happens (again, see 4.2.1a). Therefore it is considered that this meets SG80. However, there is no comprehensive management plan supported by an impact assessment and testing based on information directly about the UoAs and habitats involved, so SG 100 is not met. Danish seine, gillnet, anglerfish gillnet, lumpfish gillnet, longline Large areas of Icelandic waters are closed for fishing, some of them temporarily (hours per day, days in total or seasonal) and others permanently (years). Areas are usually closed for fishing with different gear types due to the presence of juvenile fish over extended periods of time or in order to protect spawning grounds. Although area closures are aimed at protecting juvenile fish, the measures have a secondary effect, i.e. protecting seabed habitats from being damaged by fishing activities. Closed areas are widely adopted as fisheries management measures to protect benthic habitats. Combined with the known											

		limited impacts of these UoAs on benthic habitats, the team considers that there is some objective basis for confidence that the measures will work, based on information directly about the UoA and habitats involved. This meets SG80. However, there is no comprehensive management plan supported by an impact assessment and testing based on information directly about the UoAs and habitats involved, so SG 100 is not met. Scoring has been harmonised with previous MSc assessments of these gears, including most recently the ISF cod and haddock (Icelandic UoAs) fishery assessments.

c	Management strategy implementation			
	Guidepost		There is some quantitative evidence that the measures/partial strategy is being implemented successfully.	There is clear quantitative evidence that the partial strategy/strategy is being implemented successfully and is achieving its objective, as outlined in scoring issue (a).

Met?	SG80				SG100			
	TB	Y	AGN	Y	TB	N	AGN	N
	TN	Y	LGN	Y	TN	N	LGN	N
	SD	Y	LL	Y	SD	N	LL	N
	GN	Y			GN	N		

Justification	All gears Operation of all Icelandic fishing vessels is monitored by VMS and AIS and the Marine and Freshwater Research Institute (MFRI) has access to electronic logbooks for scientific purposes (high resolution data). During site visits the Icelandic Directorate of Fisheries (DF) has confirmed that vessels respect area closures, both with regards to areas closed to protected sensitive habitats such as *Lophelia* reefs and areas closed to protect juvenile fish / spawning grounds (which have the additional benefit of protecting bethic habitats). Whilst it is acknowledged that this partial strategy is currently inadequate for soft corals and sponges (see 2.4.1a above), it is being expanded and a condition has been put in place to ensure this happens (again, see 2.4.1a), the team considers that there is thus some quantitative information that the partial strategy is being implemented successfully, especially for Lophelia reefs. SG 80 is met. However, as yet there is no clear quantitative evidence that the partial strategy is being implemented successfully for all habitat types and VMEs; SG 100 is not met. Scoring has been harmonised with previous MSc assessments of these gears, including most recently the ISF cod and haddock (Icelandic UoAs) fishery assessments.

d	**Compliance with management requirements and other MSC UoAs'/non-MSC fisheries' measures to protect VMEs**			
	Guidepost	There is qualitative evidence that the UoA complies with its management requirements to protect VMEs.	There is **some quantitative evidence** that the UoA complies with both its management requirements and with protection 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?	SG60				SG80				SG100			
	TB	Y	AGN	Y	TB	Y	AGN	Y	TB	N	AGN	N
	TN	Y	LGN	Y	TN	Y	LGN	Y	TN	N	LGN	N
	SD	Y	LL	Y	SD	Y	LL	Y	SD	N	LL	N

		GN	Y		GN	Y		GN	N

	Justification	Bottom and *Nephrops* trawls VMS, AIS and other effort distribution information confirms that fishing vessels avoid closed areas and thus these are not subject to disturbance. Whilst it is acknowledged that this partial strategy is currently inadequate for soft corals and sponges (see 2.4.1a above), it is being expanded and a condition would be put in place to ensure this happens (again, see 4.2.1a). 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 cod, halibut, golden redfish, saithe, ling), fully comply with both their management requirements and with protection measures afforded to coral garden and deep-sea sponge VMEs. As a result SG 100 is not met. Danish seine, gillnet, anglerfish gillnet, lumpfish gillnet, longline Given the known levels of effort, and the low levels of observed impact on habitats, this achieved SG 80. However, there is no clear quantitative evidence that the UoAs considered in the present assessment, or other similar MSC UoAs (e.g. Icelandic cod, halibut, golden redfish, saithe, ling), fully comply with both their management requirements and with protection measures for all habitats. As a result SG 100 is not met. Scoring has been harmonised with previous MSc assessments of these gears, including most recently the ISF cod and haddock (Icelandic UoAs) fishery assessments.
References		Ministry of Environment 2010; OSPAR 2008a; OSPAR 2008b; OSPAR 2013.

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**75**
	***Nephrops* trawl**	**75**
	Danish Seine	**80**
	Gillnet	**80**
	Anglerfish Gillnet	**80**
	Lumpfish Gillnet	**80**
	Longline	**80**
CONDITION NUMBER (if relevant):		**8**

PI 2.4.3 Evaluation Table for Habitats information

<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 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">Information quality</td></tr>
<tr><td>Guidepost</td><td>The types and distribution of the main habitats are broadly understood.</td><td>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.</td><td>The distribution of all habitats is known over their range, with particular attention to the occurrence of vulnerable habitats.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td>Justification</td><td colspan="3">Since the Icelandic system for collecting data on the distribution of habitats and fishing effort does not vary in its general form according to habitat type or fishery, the team concluded that it did not make sense to break down the scoring by habitat elements in this case. The rationale therefore considers the information available in general, covering all types of habitat.

All gears

The BIOICE (Benthic Invertebrates of Icelandic waters) program was in operation in 1992-2004, and had the aim of producing a basic inventory of benthic fauna within Icelandic territorial waters. The objectives were to map the distribution of benthic invertebrates within the Icelandic EEZ, and to evaluate the species composition and biodiversity. Extensive sampling took place within Icelandic waters to achieve the project's objectives; in total, 1050 samples at 579 stations (Figure 3-22) were collected during 19 cruises at depths between 20 - 3000 m (Omarsdottir et al., 2013). Benthic samples have been collected from a variety of habitats, characterised by a range of temperature conditions (12° to -0.9°C) using a variety of sampling gear including benthic sleds, trawling, sediment sampling and deep-sea photographs. The BIOICE project has provided information on the benthic invertebrates in Icelandic waters, from which the nature, distribution and vulnerability of habitats can be inferred.

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

Independent of these projects, ROVs have also been used for habitat mapping, and the MFRI has identified areas of vulnerable benthic habitats in Icelandic waters (cold water corals, areas with aggregations of large sponge, distribution of soft coral and coral gardens, distribution of maerl beds) in relation to bottom trawl fishing activities (Steingrímsson and Einarsson 2004, Garcia et al. 2006). The MFRI is currently carrying out a number of research activities in order to continue mapping benthic habitats in Icelandic waters (biology and geology, using multibeam echo sounder), and studying the interaction between fish and cold water coral habitats:

• The CoralFISHproject (http://eu-fp7-coralfish.net/) was recently completed and a report detailing the CoralFISH project is in progress. Two manuscripts from the CoralFISH project will be submitted soon, one comparing fish communities inside and outside cold-water coral habitats based on longline catches, and another examining bottom fishing activities. A manuscript on coral habitat classification observed during this project has furthermore been submitted (MFRI pers. communication).</td></tr>
</table>

<table>
<tr><td colspan="2">PI 2.4.3</td><td colspan="3">Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.</td></tr>
<tr><td></td><td></td><td colspan="3">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. communication).
In 2016, MFRI conducted a specific survey with the primary objective to map, and explore possible different habitat areas in several locations north and south of Iceland. This survey was a part of general mapping of habitats within Icelandic waters where previous surveys targeted areas where high abundance of vulnerable species, particularly coral, were reported (MFRI, pers. communication).
In 2017, several potential vent sites on the Reykjanes Ridge will be surveyed (MFRI, pers. communication).
To date ca. 11% of the entire Iceland EEZ habitats has been mapped in detail using multi-beam echo-sounders (Burgos et al., 2014; Figure 3-23), and the intention is to map the entire EEZ by 2026. 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 nature, distribution and vulnerability of the main habitats are known at a level of detail relevant to the scale and intensity of the UoA, so SG 80 is met. Detailed habitat maps are not yet available for the entire Icelandic EEZ, so SG 100 is not met.</td></tr>
<tr><td>b</td><td colspan="4">Information adequacy for assessment of impacts</td></tr>
<tr><td></td><td>Guidepost</td><td>Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear.</td><td>Information is adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear.</td><td>The physical impacts of the gear on all habitats have been quantified fully.</td></tr>
<tr><td></td><td>Met?</td><td>Y</td><td>Y</td><td>N</td></tr>
<tr><td></td><td>Justification</td><td colspan="3">All gears

Information is available on the distribution of benthic habitats in Icelandic waters (see Figure 3-14; Figure 3-17; Table 27; Table 28; Table 29; Table 30; Table 31 in section 3.4.8). Through VMS and AIS there is detailed information on the distribution of fishing effort of the UoAs under assessment around Iceland (see Table 26 in section 3.4.8, and Figure 3-16), and the VMS / AIS data is available for scientific purposes. Detailed maps showing the distribution of fishing grounds for important target species are available (see Figure 3-15; Figure 3-16 in section 3.4.8). The UoA's footprints can thus be identified. Catches of VME indicator organisms are monitored in scientific surveys carried out annually by the MFRI (MFRI, pers. communication), and closed areas have been established to protect certain VMEs (see Figure 3-20; Figure 3-21). Information is thus adequate to allow for identification of the main impacts of the UoA on the main habitats, and there is reliable information on the spatial extent of interaction and on the timing and location of use of the fishing gear. SG 80 is met.

Although the physical impacts of fishing gears have in some cases been investigated in detail (e.g. Thorarinsdóttir et al. 2010), it cannot be said that the physical impacts of the gear on all habitats they encounter have been quantified fully. SG100 is not met.</td></tr>
</table>

PI 2.4.3		Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.		
c	Monitoring			
	Guidepost		Adequate information continues to be collected to detect any increase in risk to the main habitats.	Changes in habitat distributions over time are measured.
	Met?		Y	Y
	Justification	All gears The area coverage of the assessed fisheries is monitored through logbooks, VMS, and AIS thus their spatial distribution is known in relation to the main habitats. The habitat mapping by MFRI is ongoing as described above, together with studies on the ecological function of vulnerable habitats (e.g. CoralFISH project). Recently a project was established that collects data on benthic bycatch in the MFRI autumn survey. This data will provide information on the temporal trends in the state of benthic communities and habitats and thus can be used for monitoring purposes and to assess changes in habitat distributions over time. SG 100 is thus met.		
References		Burgos et al, 2014; Garcia et al. 2006; Steingrímsson and Einarsson 2004; Thorarinsdóttir et al. 2010.		
OVERALL PERFORMANCE INDICATOR SCORE: ALL GEARS				**85**
CONDITION NUMBER (if relevant):				

PI 2.5.1 Evaluation Table for Ecosystem outcome

PI 2.5.1		The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.		
Scoring Issue		SG 60	SG 80	SG 100
a	Ecosystem status			
	Guidepost	The UoA is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	The UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.	There is evidence that the UoA is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm.
	Met?	Y	Y	Y
	Justification	All gears Over the past 30 years the anglerfish fishery has ranged from less than 0.5 kt (1986) to 4 kt (2009) and more recently 0.9 kt (2016). Over the same time period the estimated biomass index has fluctuated substantially; biomass is currently at average levels (MRI, 2016). Despite this variation in both stock size and catch levels, there is no indication that the Icelandic marine ecosystem *per se* has been affected by the anglerfish fishery, which is restricted to a limited part of the Icelandic coastline. Extensive studies on the feeding ecology of a large number of fish species, marine mammals and seabirds have in fact shown that capelin (*Mallotus villosus*) is a key prey species, and cod (Gadus morhua) is a major fish predator in the marine ecosystem around Iceland (MRI, 1997). Anglerfish are lie-and-wait predators, usually lying partially-buried on muddy to gravely bottoms, using their specialised first dorsal fin ray as a 'fishing rod' to lure unsuspecting prey. Research on anglerfish diet composition has found that this species feeds		

<table>
<tr><td colspan="2">PI 2.5.1</td><td>The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.</td></tr>
<tr><td></td><td></td><td>on a variety of prey, including gadoid fish, sandeels, flatfish, and cephalopods (Thangstad et al., 2002). Whilst it is likely that pelagic anglerfish larvae as well as anglerfish juveniles are heavily preyed upon by other species (Thangstad et al., 2002), there are only few reports of predators specifically targeting anglerfish. According to Choisy and Jones (1983), cormorants (Phalacrocorax sp.) may prey on L. piscatorius, and Best (1999) report that male sperm whales (Physeter macrocephalus) may sometimes move into continental slope waters off Namibia to feed on benthic species including the anglerfish Lophius upsicephalus. Overall, anglerfish are not thought to be a key prey species for any particular piscivorous fish, mammal or bird, although they may be taken opportunistically by a range of predators.

The anglerfish fishery has little effect on capelin or cod population (see also PI 2.1.1 Retained species). None of the other retained species are considered as key prey items and anglerfish are not caught in vulnerable habitats. Instead there is evidence that the key driving factor for ecosystem change in Iceland is abiotic (Valdimarsson et al. 2012), driven by climatic variation e.g. North Atlantic Oscillation (NAO) and an overall trend towards warmer waters around Iceland.

Therefore the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure with evidence available based on information about anglerfish ecology and the Icelandic marine ecosystem, as is exaplained above. SG100 is met for all gears.</td></tr>
<tr><td colspan="2">References</td><td>Best 1999; Choisy and Jones 1983; MRI 1997; MRI 2016; Thangstad et al. 2002; Valdimarsson et al. 2012.</td></tr>
<tr><td colspan="3">OVERALL PERFORMANCE INDICATOR SCORE: ALL GEARS</td><td>100</td></tr>
<tr><td colspan="3">CONDITION NUMBER (if relevant):</td><td>N/A</td></tr>
</table>

PI 2.5.2 Evaluation Table for Ecosystem management strategy

PI 2.5.2		There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.		
Scoring Issue		SG 60	SG 80	SG 100
a	Management strategy in place			
	Guidepost	There are measures in place, if necessary which take into account the potential impacts of the fishery on key elements of the ecosystem.	There is a partial strategy in place, if necessary, which takes into account available information and is expected to restrain impacts of the UoA on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance.	There is a strategy that consists of a plan, in place which contains measures to address all main impacts of the UoA on the ecosystem, and at least some of these measures are in place.
	Met?	Y	Y	Y
	Justification	All gears The Icelandic authorities have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which impact less on marine ecosystems, and which aim to protect vulnerable benthic ecosystems (Ministry of the Environment 2010).This strategic plan gives managers a framework within which to take action if evidence suggested that anglerfish fishery might pose a risk or harm to ecosystem structure and function (Ministry of the Environment 2010). Moreover, the Icelandic Fisheries Management Act constitutes a strategy with measures to address all main impacts of the UoA on the ecosystem. The objective of the Act is to promote conservation and efficient utilization of marine stocks. The Icelandic strategy is composed of three main elements: (1) closed areas: closed areas have been long-established for both bottom trawl and longlines fishing fleets, which has provided protection for VMEs in particular; (2) multi-species stock management: trophic relationships between key predatory commercial species such as cod with commercial prey species such as capelin are known and integrated into fisheries management planning; and (3) key target species management: considerations include discard and other mortality, environmental changes on target stocks, multi-species considerations in mixed fisheries, physical environmental issues related to area and gear; and the understanding of ecosystem components by species / stock complexes. In order to provide the required scientific information the MFRI carries out wide ranging and extensive research on the status and productivity of commercial stocks, and long-term research on the marine environment and the ecosystem around Iceland. The results of this research are the foundations of the advice on sustainable catch levels of fish stocks (e.g. MRI, 2016), and the designation of closed areas to protect critical as well as sensitive habitats such as VMEs. There is evidence that at least some of these measures are in place since the Icelandic Coast Guard monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing and inspection of mesh sizes and other gear related practices. Inspectors may accompany fishing vessels during fishing trips or board the vessels to check their cargo and fishing gear; masters must provide them with assistance. Violation against the provisions of the Fisheries Management Act is liable to fines, regardless of whether committed deliberately or through negligence. The quota system itself has been demonstrated to work, and the Directorate of Fisheries catch database would provide evidence if the assessed fisheries were to catch significant amount of key ecosystem species. SG 100 is met for all gears.		
b	Management strategy evaluation			

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

		high compliance levels. There is thus some evidence that the strategy is being implemented successfully. SG 80 is met. Clear evidence that the strategy is being implemented successfully and is achieving its objectives is somewhat lacking. The strategy is focussed mainly on managing commercial species (including the ecosystem structures and functions required by such commercial species), but less emphasis is placed on managing impacts on vulnerable species and habitats. In particular uncertainties remain over the effectiveness in protecting certain benthic communities from bottom / *Nephrops* trawling, and there are concerns regarding the effectiveness of bycatch management strategies for seabird and marine mammals accidentally caught by longlines, gillnets, anglerfish nets and lumpfish nets. SG 100 is not met.
References		Ministry of the Environment 2010; MRI 2016.

OVERALL PERFORMANCE INDICATOR SCORE:		
	Bottom trawl	**85**
	***Nephrops* trawl**	**85**
	Danish Seine	**85**
	Gillnet	**85**
	Anglerfish Gillnet	**85**
	Lumpfish Gillnet	**85**
	Longline	**85**
CONDITION NUMBER (if relevant):		

PI 2.5.3 Evaluation Table for Ecosystem information

PI 2.5.3		**There is adequate knowledge of the impacts of the UoA on the ecosystem.**		
Scoring Issue		SG 60	SG 80	SG 100
a	Information quality			
	Guidepost	Information is adequate to identify the key elements of the ecosystem.	Information is adequate to broadly understand the key elements of the ecosystem.	
	Met?	Y	Y	
	Justification	All gears Extensive studies have been conducted on the marine ecosystems of Icelandic waters (e.g. Astthorsson et.al., 2007; Valdimarsson & Jónsson, 2007; ICES, 2017). Studies on the feeding ecology of a large number of fish species, marine mammals and seabirds have provided information on the ecological function of most of the species caught by the assessed fisheries. These studies have shown that capelin is a key prey species in the Icelandic waters ecosystems. Biomass estimates for stocks of fish, whales and seabirds in Icelandic waters and production estimates of *Calanus* spp. and other zooplankton species have been used to calculate the biomass of individual components in the Icelandic marine ecosystem (Astthorsson et al. 2007). As a result, there is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters, and this information is used in multi-species modelling (e.g. GADGET models; see MRI 2016 for an overview of stocks recently modelled by multi-species models) in MRI assessments. The models have been used to evaluate interactions between fisheries and key ecosystem elements. Information about these interactions have been taken into account for management purposes. This meets SG80.		
b	Investigation of UoA impacts			

	Guidepost	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, but have not been investigated in detail.	Main impacts of the UoA on these key ecosystem elements can be inferred from existing information, and some have been investigated in detail.	Main interactions between the UoA and these ecosystem elements can be inferred from existing information, and have been investigated in detail.
	Met?	TB Y, AGN Y TN Y, LGN Y SD Y, LL Y GN Y	TB Y, AGN Y TN Y, LGN Y SD Y, LL Y GN Y	TB N, AGN N TN N, LGN N SD N, LL N GN N
	Justification	All gears The Directorate of Fisheries database provides detailed information on catches of target and retained species. This provides information about the impact of the assessed fishery on the populations of non-target species involved, and would provide evidence of impact if any key ecosystem species were affected. The main impacts of the UoAs on bottom habitats and trophic structures can also be inferred from the existing information. Many interactions between fisheries and key ecosystem elements have been investigated in detail, especially trophic interactions with key predator - prey relationships, and with bottom substrates. In particular, there is a high level of spatial and temporal information on most forms of fishing and captures. SG80 is met. Based on the available information it can be inferred that anglerfish is not a key ecosystem species and the UoAs are not impacting key ecosystem elements. However, the main interactions between the UoA and ecosystem elements have not all been investigated in detail. SG 100 is not met.		
c	Understanding of component functions			
	Guidepost		The main functions of the components (i.e., P1 target species, primary, secondary and ETP species and Habitats) in the ecosystem are known.	The impacts of the UoA on P1 target species, primary, secondary and ETP species and Habitats are identified and the main functions of these components in the ecosystem are understood.
	Met?		TB Y, AGN Y TN Y, LGN Y SD Y, LL Y GN Y	TB N, AGN N TN N, LGN Y SD Y, LL Y GN Y
	Justification	All gears There is a comprehensive understanding of the key elements of the ecosystems of Icelandic waters, and the relationships between predators, prey and habitats are known (e.g. Astthorsson et al., 2007; MRI, 1997; Valdimarsson & Jónsson 2007; ICES 2017). Although anglerfish is not a key ecosystem element in Icelandic waters, it's biology and ecology is well known (Thangstad et al., 2002; Rajudeen, 2013). The main functions of the relevant primary, secondary, and ETP species caught by the UoAs as well as the habitats where fishing is taking place are also known SG80 is thus met for all gears. Bottom trawl and *Nephrops* trawl The impacts of bottom trawlers and Nephrops trawlers on P1 target species, primary, secondary and ETP species and habitats are generally known, in particularly when it comes		

		to impacts on *Lophlia* reefs. However impacts of these gears on soft corals and deep-water sponges have yet to be studied in detail, so SG 100 is not met. Danish seine, gillnet, lumpfish gillnet, longline The Directorate of Fisheries database provides quantitative information on retained species taken by the assessed fishery, logbook monitoring of marine mammal and seabird bycatch is mandatory and supplemented with information from onboard observations, and detailed information is available on habitats impacted by fishing activities. The distribution of fishing effort and landings in particular are recorded accurately and analysed on an annual basis. Based on the available information the impacts of the UoA on relevant ecosystem components can be identified. There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters, and this information is used in multi-species modelling (BORMICON and GADGET models) for MRI assessments. The models have been used to evaluate interactions between fisheries and key ecosystem elements and information about these interactions have been taken into account for management purposes (e.g. Pálsson 1997, Stefánsson and Pálsson 1998, Stefánsson 2003, Barbaro et al. 2008). SG 100 is met. Anglerfish gillnet Only very limited information on bycatch is available for anglerfish gillnets; the impacts of the UoA on out-of-scope secondary and potential ETP species (although there was no evidence of any ETP species being caught by the UoA during the site visit) are not well known. SG 100 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?		TB Y, AGN Y TN Y, LGN Y SD Y, LL Y GN Y	TB Y, AGN N TN Y, LGN Y SD Y, LL Y GN Y
	Justification	All gears Adequate information on the impacts - in terms of severity, duration and spatial location - of all the UoAs on the components is recorded through the use of logbooks, VMS / AIS tracking, monitoring of landings, and onboard observations. Information on by-catch of secondary and ETP species has improved conseriderably in recent years and is expected to improve further. The role of non-target catches and habitats in the wider Icelandic ecosystem is known through scientific studies, which are routinely carried out in Iceland. Based on this information some of the main consequences for the ecosystem can be inferred. In the case of anglerfish gillnets it is acknowledged that insufficient relevant data is available with regards to catches of out-of-scope secondary species and potential ETP species caught by the gear (although there was no evidence of any ETP species being caught by the UoA during the site visit). However, a condition has been imposed to address this issue and there is evidence that the MFRI has recently stepped up efforts to collect information on the impact of this gear through on-board observations (0.6% coverage of anglerfish gillnet fishing trips were monitored through onboard observations in 2016 for the first time). SG80 is met.		

		All gears except anglerfish gillnets A considerable number of studies have been carried out to elucidate the main ecosystem drivers within the Icelandic marine ecosystem, including studies of trophic interactions, the impact of climatic and other abiotic factors and ecosystem modelling (see main report, sections 3.4.1 and 3.4.9 for details). As a result there is a comprehensive understanding of the key elements of Icelandic marine ecosystems. UoA impacts on the components (non-target catches including ETP species and habitats) are known, and the resulting main consequences for the Icelandic ecosystem can be inferred. SG100 is met. Anglerfish gillnet Only very limited information on bycatch is available for anglerfish gillnets; the impacts of the UoA on out-of-scope secondary and potential ETP species (although there was no evidence of any ETP species being caught by the UoA during the site visit) are not sufficiently well known to to allow the main consequences for the ecosystem to be inferred. SG 100 is not 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?		TB	Y	AGN	Y	TB	N	AGN	N
			TN	Y	LGN	Y	TN	N	LGN	N
			SD	Y	LL	Y	SD	N	LL	N
			GN	Y			GN	N		
	Justification	All gears except anglerfish gillnets Iceland has a comprehensive set of on-going scientific research programmes, and fisheries are monitored through a variety of means. Regular estimates of primary productivity are undertaken, and research on environmental forcing pressures such as climate change is ongoing. Stock assessments of key commercial species are undertaken on a regular basis, and the stock status of species with key ecosystem importance such as capelin and cod is well known. Data on landed catch is instantly entered in the Directorate of Fisheries database. Surveillance by the Directorate of Fisheries and Coast Guard is constantly monitoring catch levels of juvenile fish, and such information is utilised to implement real-time area closures to protect juvenile fish. Efforts to improve information on bycatch of marine mammals and seabirds have been stepped up in recent years by introducing a revised electronic logbook (now specifically requesting information on such bycatch), and by increasing coverage through onboard observations. The MFRI has recently started recording benthic bycatch in scientific surveys on an annual basis, and there is a commitment to map the entire EEZ seabed in the next 10 years. Coupled with monitoring of fishing effort distributions based on VMS / AIS data such information will allow for the detection of any increase in risk level to habitats. In the case of anglerfish gillnets it is acknowledged that in the past insufficient data was collected to monitor the impacts of the UoA on the ecosystem, but a condition has been imposed to address this issue. Moreover, there is evidence that the MFRI has recently stepped up efforts to monitor this gear through on-board observations (0.6% coverage of anglerfish gillnet fishing trips were monitored through onboard observations in 2016 for the first time). This will allow any increases in risk levels to be detected in future. Adequate data thus continue to be collected to detect any increase in risk level, and SG80 is met for all gears. The strategy is provided by the Fisheries Management Act as well as a strategic plan to preserve biodiversity in Icelandic waters (Ministry of the Environment 2010). The main drivers of the Icelandic marine ecosystem are well understood, and sufficient data is collected to allow the consequences of fishing on the ecosystem to be inferred. However the information is incomplete, and as such SG 100 is not met.							
References		Astthorsson et.al. 2007; Barbaro et al. 2008; ICES 2017; MRI 1997; Ministry of the Environment 2010; MRI 2016; Pálsson 1997; Stefánsson and Pálsson 1998; Stefánsson 2003; Thangstad et al. 2002; Rajudeen 2013; Valdimarsson & Jónsson 2007.							

OVERALL PERFORMANCE INDICATOR SCORE:	
Bottom trawl	**85**
***Nephrops* trawl**	**85**
Danish Seine	**90**
Gillnet	**90**
Anglerfish Gillnet	**80**

	Lumpfish Gillnet	**90**
	Longline	**90**
CONDITION NUMBER (if relevant):		

PI 3.1.1 Evaluation Table for 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">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 (Art. 3) and allocation of harvest rights, including permits and catch quotas (Art. 4–14). It also lays out the system for individual transferable quotas in some detail (Art. 15), as well as procedures for monitoring, control and surveillance (Art. 16–18) and the application of sanctions (Art. 24–27). Further provisions are provided in a number of other acts, such as the 1997 Act on Fishing in Iceland’s Exclusive Fishing Zone and the 1996 Act concerning the Treatment of Commercial Marine Stocks, as well as in regulations at lower levels of the legal hierarchy, issued by the relevant management authorities. Iceland is also signatory to, and has ratified, the major international agreements pertaining to fisheries management, such as the 1982 Law of the Sea Convention and the 1995 Fish Stocks Agreement.

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 between the different governmental agencies involved are in place, able to provide management outcomes that are consistent with MSC Principles 1 and 2.</td></tr>
</table>

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 objectives of MSC Principles 1 and 2.	The management system has a mechanism to observe the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.	The management system has a mechanism to formally commit to the legal rights created explicitly or established by custom of people dependent on fishing for food and livelihood in a manner consistent with the objectives of MSC Principles 1 and 2.
	Met?	Y	Y	Y
	Justification	Iceland is highly dependent on fisheries, and the rights of traditional users were in the main secured when individual transferable quotas were introduced on the basis of historical fishing. One of the main objectives of Icelandic fisheries management, in addition to conservation and efficient utilization of marine living resources (see 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. Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industry and Innovation during the site visit. UN Fish Stocks Agreement, 1995. UN Law of the Sea Convention, 1982.	
OVERALL PERFORMANCE INDICATOR SCORE:		**100**
CONDITION NUMBER (if relevant):		

PI 3.1.2 Evaluation Table for Consultation, roles and responsibilities

<table>
<tr><td colspan="2">PI 3.1.2</td><td colspan="3">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</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">Roles and responsibilities</td></tr>
<tr><td>Guidepost</td><td>Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood.</td><td>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.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>Justification</td><td colspan="3">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.</td></tr>
<tr><td rowspan="4">b</td><td colspan="4">Consultation processes</td></tr>
<tr><td>Guidepost</td><td>The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system.</td><td>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.</td><td>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.</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 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</td></tr>
</table>

<table>
<tr><td></td><td></td><td colspan="3">Seamen's Federation and others). Also local authorities are actively engaged in fisheries management and have easy access to the management 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 commitment 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.</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 Evaluation Table for Long term objectives

PI 3.1.3		The management policy has clear long-term objectives to guide decision-making that are consistent with MSC fisheries standard, and incorporates the precautionary approach.		
Scoring Issue		SG 60	SG 80	SG 100
a	Objectives			
	Guidepost	Long-term objectives to guide decision-making, consistent with the MSC fisheries standard and the precautionary approach, are implicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach are explicit within management policy.	Clear long-term objectives that guide decision-making, consistent with MSC fisheries standard and the precautionary approach, are explicit within and required by management policy.
	Met?	Y	Y	Y
	Justification	The 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. Since these principles are codified in formal law, their application is required by management policy. Iceland is also signatory to, and has ratified, the 1995 Fish Stocks Agreement, which requires the use of the precautionary approach.		
References		Act on Fisheries Management No. 38/1999, amended as Act No. 116/2006. FAO Code of Conduct for Responsible Fisheries, 1995. UN Fish Stocks Agreement, 1995.		
OVERALL PERFORMANCE INDICATOR SCORE:				**100**
CONDITION NUMBER (if relevant):				

PI 3.2.1 Evaluation Table for Fishery-specific objectives

<table>
<tr><td colspan="2">PI 3.2.1</td><td colspan="3">The fishery-specific management system has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2.</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">Objectives</td></tr>
<tr><td>Guidepost</td><td>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.</td><td>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.</td><td>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.</td></tr>
<tr><td>Met?</td><td>Y</td><td>Y</td><td>Partial</td></tr>
<tr><td>Justification</td><td colspan="3">Well defined and measurable short and long-term objectives consistent with achieving the outcomes of MSC Principle 1 are explicit in the Fisheries Management Act and supporting legislation relating to the Icelandic anglerfish fishery, 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.

These fishery-specific objectives are supported by specific Anglerfish netter regualtions in place (such as capacity management through technical measures on net size and location).

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). There are also seasonal closures imposed on vessels using anglerfish nets to reduce eider by-catch, but overall P2 aspects are less well defined and measurable, resulting in a partial score for this PI.</td></tr>
<tr><td colspan="2">References</td><td colspan="3">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.

Regulation for the fishing of anglerfish in nets. Nr. 923, 1. December 2010</td></tr>
<tr><td colspan="4">OVERALL PERFORMANCE INDICATOR SCORE:</td><td>90</td></tr>
<tr><td colspan="4">CONDITION NUMBER (if relevant):</td><td></td></tr>
</table>

PI 3.2.2 Evaluation Table for Decision-making processes

PI 3.2.2		The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery.		
Scoring Issue		SG 60	SG 80	SG 100
a	Decision-making processes			
	Guidepost	There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives.	There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives.	
	Met?	Y	Y	
	Justification	Established decision-making procedures in the Icelandic fisheries management system – evolved over several decades and now codified in the Fisheries Management Act and supporting legislation – ensure that strategies are produced and measures taken to achieve the fishery-specific objectives. This applies to the anglerfish fishery as it does to Icelandic fisheries in general; 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.		
b	Responsiveness of decision-making processes			
	Guidepost	Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions.	Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.	Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions.
	Met?	Y	Y	N
	Justification	According to our interviews during the site visit, the established decision-making procedures 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). Therefore the necessary response to all issues is not evident for SG100 to be met.		

c	Use of precautionary approach			
	Guidepost		Decision-making processes use the precautionary approach and are based on best available information.	
	Met?		Y	
	Justification	Decision-making processes are based on relevant scientific research by the Marine Research Institute, as well as ICES assessments. National legislation requires the use of the precautionary approach (see 3.1.3), and the approach to assessment of category 3 species (including Anglerfish) has been suggested by ICES to be consistent with the precautionary principle.		
d	Accountability and transparency of management system and decision-making process			
	Guidepost	Some information on the fishery's performance and management action is generally available on request to stakeholders.	Information on the fishery's performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.	Formal reporting to all interested stakeholders provides comprehensive information on the fishery's performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity.
	Met?	Y	Y	N
	Justification	The Directorate of Fisheries and the Marine Research Institute produce annual reports that are available to the public on request and via their 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 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. Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industry and Innovation during the site visit.
OVERALL PERFORMANCE INDICATOR SCORE:		**85**
CONDITION NUMBER (if relevant):		

PI 3.2.3 Evaluation Table for 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	Y
	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 MCS system with a recently implemented e-logbook system, can be considered comprehensive and even prior to this development the system has demonstrated an ability to enforce relevant measures. SG100 is 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	Y
	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, sanctions are thought to be consistently applied. The reporting against the comprehensive enforcement regime combined with the high level of compliance demonstrates effective deterrence and therefore SG100 is 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">According to the Directorate of Fisheries control department, there is no evidence of systematic non-compliance in the fishery. The assessment team has not received any information indicating that this is not the case. 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>95</td></tr>
<tr><td colspan="4">CONDITION NUMBER (if relevant):</td><td></td></tr>
</table>

PI 3.2.4 Evaluation Table for 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. 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 (including Anglerfish) follows the ICES approach, which has been evaluated by ICES, while the financial side of the system is reviewed by the Icelandic National Audit Office. Therefore key parts of the management system are subject to review by the Fisheries Committee 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, the fishery-specific management system is subject to regular internal review. Assessment and advice relating to Anglerfish is regularly reviewed internally by the MFRI's TAC committee, but not externally by ICES. However, the approach adopted 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. Therefore, with the Icelandic Government's internal review of all its activity and some external review of fishery specific management performance by the Fisheries Committee, SG80 is met. However, it is difficult to conclude that there is a regular external evaluation of the Icelandic system for management of anglerfish specifically. Therefore, SG100 is not met.		
References		Interviews with representatives of the Directorate of Fisheries, Icelandic Sustainable Fisheries and the Ministry of Industry and Innovation during the site visit.		
OVERALL PERFORMANCE INDICATOR SCORE:				**80**
CONDITION NUMBER (if relevant):				

Appendix 1.2: Risk Based Framework (RBF) Outputs

The Risk Based Framework was used to assess PI 2.2.1 - Secondary Species Outcome for the anglerfish gillnet UoA.

A limited number of onboard observations were carried out by the MFRI 2016 (0.6% coverage of anglerfish gillnet fishing trips was achieved), but the final 2016 bycatch estimates were not available at the time of writing. Consequently, a PSA analysis had to be conducted to assess the outcome status of out-of-scope secondary species for this UoA. The species list used for the PSA was compiled during the site visit. During meetings with the National Small Boat Owners Federation and with the bycatch expert of the MFRI the Northern fulmar and the common guillemot were identified to be likely seabird bycatch species. Harbour porpoise and harbour seals were recorded as marine mammal bycatch species during onboard observations carried out by the Icelandic Directorate of Fisheries (DF).

The scores awarded below are used to determine an MSC score for Performance Indicator 2.2.1 using a spreadsheet provided by the MSC. This spreadsheet uses an algorithm that has been developed by the MSC to determine a "Productivity" and a "Susceptibility" score for the fishery, and then to allocate a corresponding MSC score. A copy of the spreadsheet that is used to perform this calculation is can be downloaded from the MSC website using the below link:

https://www.msc.org/documents/scheme-documents/forms-and-templates/msc-productivity-susceptibility-analysis-worksheet-v1-1/view

The completed PSA sheet for the out of scope secondary species is presented below.

Only main species scored?			Yes					
Scoring element	First of each scoring element	Species Grouping only ID 'At Risk' species by selecting associated species group	Species Grouping only Number of species in species group which this species	Family name	Scientific name	Common name	Species type	Fishery descriptor
1	First			Procellariidae	Fulmarus glacialis	Northern fulmar	Non-invertebrate	Anglerfish gillnet
2	First			Alcidae	Uria aalge	Common guillemot	Non-invertebrate	Anglerfish gillnet
3	First			Phocoenidae	Phocoena phocoena	Harbour porpoise	Non-invertebrate	Anglerfish gillnet
4	First			Phocidae	Phoca vitulina	Harbour seal	Non-invertebrate	Anglerfish gillnet

Scoring element	Productivity Scores [1-3]								Susceptibility Scores [1-3]					Cumulative only							
	Average age at maturity	Average max age	Fecundity	Average max size	Average size at Maturity	Reproductive strategy	Trophic level	Total Productivity (average)	Availability	Encounterability	Selectivity	Post-capture mortality	Total (multiplicative)	PSA Score	Catch (tons)	Weighting	Weighted Total	Weighted PSA Score	MSC PSA-derived score	Risk Category Name	MSC scoring guidepost
1	2	3	3	1	2	2	3	2.29	2	1	3	3	1.43	2.69					82	Low	≥80
2	2	3	3	1	2	2	3	2.29	2	1	3	3	1.43	2.69					82	Low	≥80
3	2	2	3	2	2	3	3	2.43	2	3	3	3	2.33	3.36					63	Med	60-79
4	1	3	3	2	2	3	3	2.43	2	3	3	3	2.33	3.36					63	Med	60-79
																		MSC score	75		
																		Status	ass with condition		

When scoring susceptibility, the impacts of fisheries other than the UoA were not included in the PSA since species were considered as 'main' due to the fact that they are out-of-scope secondary species, not due to high catch volumes. Moreover, during the site visit stakeholders indicated that the UoA for which the RBF was conducted (anglerfish gillnets) is unlikely to catch significant amounts of bycatch. The team considers that bycatch of out-of-scope marine mammals and seabirds will not be more than 10% or more of the total catch by weight of the UoA, and thus elected to conduct the PSA on the UoA only as per clause PF4.4.3.3.

PI 2.2.1	Northern fulmar	
Productivity	**Rationale**	**Score**
Average age at maturity	Sexual maturity is reached when individuals are 5 to 20 years old. The average age of maturity is 8 years in males, and 12 years in females (del Hoyo et al., 1992; Hatch and Nettleship, 1998).	2
Average maximum age	Northern fulmars have very long lifespans; average adult life expectancy has been estimated at 32 years, but birds have been reported breeding at over 50 years old (del Hoyo et al., 1992; Hatch and Nettleship, 1998).	3
Fecundity	Northern fulmars breed in April and lay their eggs in late May to early June in large colonies on ledges and among rocks. Females lay a single egg per year, which is incubated for about 50 days (del Hoyo et al., 1992; Hatch and Nettleship, 1998).	3
Average maximum size	Northern fulmars grow to a length of 45 - 50 cm, with wingspans of 102 - 112 cm, and average mass of 700 to 835 g (del Hoyo et al., 1992; Hatch and Nettleship, 1998; Huettmann and Diamond, 2000).	1
Average size at maturity	The average age of maturity is 8 years in males, and 12 years in females. The average size of an adult Northern fulmar ranges from 45 - 50 cm (del Hoyo et al., 1992; Hatch and Nettleship, 1998).	2
Reproductive strategy	Northern fulmars reproduce by laying eggs (del Hoyo et al., 1992; Hatch and Nettleship, 1998).	2
Trophic level	Fulmars are generalist, opportunistic predators and scavengers, eating zooplankton, squid, fish, fisheries discards, and whatever carcasses they can find in the marine environment (Hatch and Nettleship, 1998). They occupy upper positions in marine trophic webs, as indicated by stable isotope analyses, at a trophic level of 4.0–4.2 (Mallory, 2006 and references cited therein).	3
Fishery	**Anglerfish gillnet**	
Susceptibility	**Rationale**	**Score**
Availability	Northern fulmars are found throughout Iceland, but the species is most common in the west, south, and north-west of the island (listed in order of decreasing abundance) (Lilliendahl and Solmudsson, 1997). The species prefers shelf-break habitats (i.e. the area where the continental shelf begins to descend towards the sea floor), or areas over the continental slope, and is rarely seen more than 100 km from shore. Northern fulmars often accompany fishing vessels, forming large aggregations to take advantage of fish waste (del Hoyo, et al., 1992; Hatch and Nettleship, 1998). Anglerfish nets are set close to the shore, and in recent years the main anglerfish fishing grounds were concentrated in a few locations located in the west and north-west of Iceland (Figure 3-16). Northern fulmars are generally found in shelf-break habitats / over the continental slope	2

	which are located further out to sea than anglerfish fishing grounds. However, a medium susceptibility score was nevertheless given since this species is known to be attracted to fishing vessels, and the general location of fishing grounds in the west and north-west of Iceland overlaps with areas where this species is common.	
Encounterability	Northern fulmars capture prey mainly at the surface, and will only dive occasionally (del Hoyo, et al., 1992; Hatch and Nettleship, 1998). Seabirds which do not dive routinely are at a lower risk of encountering bottom-set nets (Benjamins et al., 2008 and references cited therein). Since Northern fulmars do not dive routinely and anglerfish nets are set close to the bottom (anglerfish nets have a floating line characterised by low buoyancy; MFRI, pers. communication), there is low overlap with the fishing gear.	1
Selectivity	The minimum mesh size of an anglerfish gillnet is 30 cm (MFRI pers. communication, October 2016) and size at maturity for northern fulmars is 45-50 cm. However, the since the bird will use its wings when diving, the wing-span of this species also needs to be considered. It is consequently likely that individuals < half the size at maturity are retained by gear.	3
Post capture mortality	Default score for retained species (P2)	3

Northern Fulmar PSA - References

Benjamins, S., Kulka, D. W., & Lawson, J. (2008). Incidental catch of seabirds in Newfoundland and Labrador gillnet fisheries, 2001–2003. Endangered Species Research, 5(2-3), 149-160.

Dewey, T. 2009. "*Fulmarus glacialis*" (On-line), Animal Diversity Web. Accessed June 24, 2017 at http://animaldiversity.org/accounts/Fulmarus_glacialis/

Hatch, S., D. Nettleship. (1998). Northern fulmar (*Fulmarus glacialis*). The Birds of North America On-line, 361: 1-20.

Huettmann, F., A. Diamond. (2000). Seabird migration in the Canadian north-west Atlantic Ocean: moulting occasions and movement patterns of immature birds. Canadian Journal of Zoology, 78: 624-627.

del Hoyo, J., A. El-liott, J. Sargatal (1992). Hand-book of the Birds of the World, Volume I. Barcelona: Lynx Editions.

Lilliendahl, K., & Sólmundsson, J. (1997). An estimate of summer food consumption of six seabird species in Iceland. ICES Journal of Marine Science: Journal du Conseil, 54(4), 624-630.

Løkkeborg, S., & Robertson, G. (2002). Seabird and longline interactions: effects of a bird-scaring streamer line and line shooter on the incidental capture of northern fulmars *Fulmarus glacialis*. Biological Conservation, 106(3), 359-364.

Mallory, M. L. (2006). The northern fulmar (*Fulmarus glacialis*) in Arctic Canada: ecology, threats, and what it tells us about marine environmental conditions. Environmental Reviews, 14(3), 187- 216.

PI 2.2.1	Common guillemot

Productivity	Rationale	Score
Average age at maturity	The first breeding season takes place at the age of 4-6 years (Ehrlich, 1988; del Hoyo et al., 1996; Terres, 1980).	2
Average maximum age	Average maximum age is 26 years (Bennett, 2001).	3
Fecundity	Eggs are laid between May and July in populations breeding on the Atlantic coast; females lay a single egg per year (Bennett, 2001).	3

Average maximum size	Common guillemots grow to a length of 38 - 43 cm, with wingspans of 64 - 71 cm, and average mass of 945 to 1044 g (Ehrlich 1988, del Hoyo, et al. 1996, Terres, 1980).	1
Average size at maturity	The average age of maturity is 4-6 years; the average size of an adult common guillemot ranges from 38 - 43 cm (Bennett, 2011; Ehrlich, 1988; del Hoyo et al., 1996; Terres, 1980).	2
Reproductive strategy	Common guillemots reproduce by laying eggs (Bennett, 2001).	2
Trophic level	The common guillemot is a surface diver which mainly feeds on fish. Based on stable isotope analyses it is known that this species occupies an upper position in marine trophic webs, at a trophic level of 4.0 (Hobson and Montevecchi, 1991).	3

Fishery	Anglerfish gillnet

Susceptibility	Rationale	Score
Availability	Common guillemots are found throughout Iceland, but the species is most common in the north-west, west, and north-east of the island (listed in order of decreasing abundance) (Lilliendahl and Solmudsson, 1997). The species is primarily pelagic, and spends most of its time at sea except for the breeding season, which is spent on coastal cliffs (Ehrlich 1988, del Hoyo, et al. 1996, Terres, 1980). Anglerfish nets are set close to the shore, and in recent years the main anglerfish fishing grounds were concentrated in a few locations located in the west and north-west of Iceland (Figure 3-16). A medium risk score has been given since although the general location of fishing grounds in the west and north-west of Iceland overlaps with areas where common guillemots are common, anglerfish gillnet fishing grounds are spatially restricted. The overall areal overlap can be expected to be 10-30%.	2
Encounterability	Common guillemots are surface divers that can remain submerged for up to one minute at a time. The birds can reach depths well over 100 m, but shallower dives are more efficient and normal diving depths are 20–50 m (Ehrlich 1988, del Hoyo, et al. 1996, Piatt and Nettleship, 1985; Terres, 1980). Seabirds which dive routinely are at a higher risk of encountering bottom-set nets (Benjamins et al., 2008 and references cited therein). Anglerfish gillnets are set at depths of 20-200 m, with an average setting depth of 65-80 m, where the best catches are generally taken (MFRI and Viktor Jónsson [anglerfish fisherman] pers. communication). Since common guillemots generally dive to depths of only 20-50 m, anglerfish nets are set in deeper waters, and anglerfish nets are not stretched in the water column (anglerfish nets have a floating line characterised by low buoyancy; MFRI, pers. communication), there is low overlap with the fishing gear.	1
Selectivity	The minimum mesh size of an anglerfish gillnet is 30 cm (MFRI pers. communication, October 2016) and size at maturity for common guillemots is 38-43 cm. However, the since the bird will use its wings when diving, the wing-span of this species also needs to be considered. It is consequently likely that individuals < half the size at maturity are retained by gear.	3
Post capture mortality	Default score for retained species (P2)	3

Common Guillemot PSA - References

Benjamins, S., Kulka, D. W., & Lawson, J. (2008). Incidental catch of seabirds in Newfoundland and Labrador gillnet fisheries, 2001–2003. Endangered Species Research, 5(2-3), 149-160.

Bennett, J. 2001. "*Uria aalge*" (On-line), Animal Diversity Web. Accessed June 24, 2017 at http://animaldiversity.org/accounts/Uria_aalge/

del Hoyo, J., A. Elliott, J. Sargatal, eds. 1996. Handbook of the Birds of the World. Vol. 3. Hoatzin to Auks. Barcelona: Lynx Editions.

Ehrlich, P. 1988. The Birder's Handbook: a Field guide to the Natural History of North American Birds. New York: Simon & Schuster.

Hobson, K. A., & Montevecchi, W. A. (1991). Stable isotopic determinations of trophic relationships of great auks. Oecologia, 87(4), 528531.

Lilliendahl, K., & Sólmundsson, J. (1997). An estimate of summer food consumption of six seabird species in Iceland. ICES Journal of Marine Science: Journal du Conseil, 54(4), 624-630.

Piatt, J.F., Nettleship, D.N., 1985. Diving depths of four alcids. The Auk 102, 293–297.

Terres, J. 1980. The Audubon Society Encyclopaedia of North American Birds. New York: Random House.

PI 2.2.1	Harbour porpoise	
Productivity	**Rationale**	**Score**
Average age at maturity	Sexual maturity is reached after five years (Nowak, 1999; Masi, 2000).	2
Average maximum age	The life span of harbour porpoises ranges from 6 to 20 years; the average maximum age is 13 years (Gaskin and Blair, 1977; Nowak, 1999; Masi, 2000).	2
Fecundity	A female will give birth to one calf per year (Johnston, 1999; Nowak, 1999).	3
Average maximum size	Harbour porpoises are small cetaceans that grow to a length of 1.5 m to 2 m, and weigh from 45 to 65 kg (Dollinger, 1988; Nowak, 1999).	2
Average size at maturity	Sexual maturity is reached after five years, and the average size of an adult harbour porpoise ranges from 1.5 m to 2 m (Masi, 2000).	2
Reproductive strategy	Females give birth to live calfs after an 11 month gestation period (Nowak, 1999; Massi, 2000).	3
Trophic level	Harbour porpoises mainly feed on fish and cephalopods. Herring, pollack, hake, sardines, and cod are commonly preyed upon (Nowak, 1999; Massi, 2000). This species thus occupies an upper position in marine trophic webs, at a trophic level of 4.1 (Pauly et al., 1998 and references cited therein).	3
Fishery	**Anglerfish gillnet**	
Susceptibility	**Rationale**	**Score**
Availability	Harbour porpoise is common in shallow waters all around Iceland, particularly in spring to autumn (Ólafsdóttir et al., 2002). During the last aerial survey conducted to estimate population numbers of this species the highest densities were estimated in Breiðafjörður, in the north-west of Iceland, as well as in inshore waters off East Iceland (Gilles et al. 2011). The anglerfish fishery usually takes place in late summer and extends into winter, with no fishery taking place spring (MFRI, pers. communication). Anglerfish nets are set close to the shore, and in	2

	recent years the main anglerfish fishing grounds were concentrated in a few locations located in the west and north-west of Iceland (Figure 3-16). A medium risk score has been given since although the general location of fishing grounds in the west and north-west of Iceland overlap with areas where this species is common, anglerfish gillnet fishing grounds are spatially restricted.	
Encounterability	When diving for food the harbour porpoise stays submerged for an average of 4 minutes, and is believed to be able to dive as deep as 200 m. Anglerfish gillnets are set at depths of 20-200 m, with an average setting depth of 65-80 m, where the best catches are generally taken (MFRI and Viktor Jónsson [anglerfish fisherman] pers. communication). There is thus the potential for a high overlap with fishing gear (i.e. high encounterability).	3
Selectivity	The minimum mesh size of an anglerfish gillnet is 30 cm (MFRI pers. communication, October 2016). Given the large size of even a juvenile harbour porpoise compared to the mesh size of anglerfish gillnets, there is a high potential that individuals < half the size at maturity are retained by gear.	3
Post capture mortality	Default score for retained species (P2)	3

Harbour Porpoise PSA - References

Gaskin, D.E. and B.A. Blair, 1977. Age determination of harbour porpoise, *Phocena phocena* (L.) in the western North Atlantic. Canadian Journal of Zoology 55: 18-30

Masi, A. 2000. "*Phocoena phocoena*" (On-line), Animal Diversity Web. Accessed June 24, 2017 at http://animaldiversity.org/accounts/Phocoena_phocoena/

Pauly, D., Trites, A. W., Capuli, E., & Christensen, V. (1998). Diet composition and trophic levels of marine mammals. ICES Journal of Marine Science: Journal du Conseil, 55(3), 467-481.

Dollinger (editor), P. 1988. Convention on International Trade in Endangered Species of Wild Fauna and Flora; Identification Manual Vol I. Mammalia. Switzerland: Secretariat of the Convention.

Nowak, R. 1999. Walker's Mammals of the World, 6th Ed. Vol II. Baltimore: John Hopkins University Press.

PI 2.2.1	Harbour seal

Productivity	Rationale	Score
Average age at maturity	Female harbour seals reach sexual maturity by age 3 to 4; male harbour seals reach sexual maturity at age 4 to 5 (Burns, 2008; Coltman, et al., 1998; Nowak, 2003).	1
Average maximum age	Wild harbour seals are estimated to reach an average lifespan of 40 years (de Magalhaes and Costa, 2009).	3
Fecundity	Female harbour seals typically give birth to a single pup every season with pregnancy rates that are about 85%. Twins have occasionally been reported. (Burns, 2008; Coltman, et al., 1998; Nowak, 2003).	3
Average maximum size	Harbour seals have an average length of 160 to 190 cm, and an average mass of 80 to 170 kg (Cale, 2012).	2
Average size at maturity	Female harbour seals reach sexual maturity by age 3 to 4; male harbour seals reach sexual maturity at age 4 to 5. Adult harbour seals have an average length of 160 to 190 cm (Burns, 2008; Cale, 2012; Coltman et al., 1998; Nowak, 2003).	2

Reproductive strategy	Females give birth to live calfs after a total gestation period of ca. 10 to 11 months (Burns, 2008; Coltman, et al., 1998; Nowak, 2003).	3
Trophic level	Harbour seals feed mainly on fish including species such as cod, hake, mackerel and herring, as well as cephalopods and crustaceans. This species thus occupies an upper position in marine trophic webs, at a trophic level of 4.0 (Pauly et al., 1998 and references cited therein).	3

Fishery	Anglerfish gillnet	
Susceptibility	**Rationale**	**Score**
Availability	During a recent harbour seal survey in Iceland, the highest number of individuals was found at the Westfjords, followed by the north of Iceland, Faxaflói, the Eastfjords, Breiðafjörður, and the south-coast. Only few seals were recorded in the north-east of the country (Þorbjörnsson, 2017). Anglerfish nets are set close to the shore, and in recent years the main anglerfish fishing grounds were concentrated in a few locations located in the west and north-west of Iceland (Figure 3-16). A precautionary medium risk score has been given since the general geographic location of the most important recent fishing grounds in the west and north-west of Iceland overlaps with areas where haul-out sites of this species are common. The areal overlap is however unlikely to exceed 30% due to a number of reasons: (i) anglerfish gillnet fishing grounds are spatially very restricted; (ii) there is no overlap with the considerable seal populations recorded at in the north of Iceland, the Eastfjords and the south coast; (iii) a more detailed comparison of the most important haul-out sites in the north-west of Iceland (Reykjanes, Borgarey, Ögurnes, Mjóifjörður, Vogasker and Laugaból) and anglerfish fishing grounds (off Bolungarvik) are concentrated shows that the sites in fact do overlap directly; (iv) anglerfish gillnets are deployed mainly from late summer to winter, and the fishing season thus only partly overlaps with the main haul-out seasons of harbour seals in Iceland (May/beginning of June and July/early August; Granquist and Hauksson, 2016), when seals are more likely to encounter fishing gears.	2
Encounterability	Harbour seals are known to stay within close proximity (usually 50 km) of their haul out-sites during foraging since this allows for an easier escape from predators (Grigg, et al., 2009; Nowak, 2003). Harbour seals can remain underwater for nearly 30 minutes without resurfacing and are able to dive to depths of over 400 m. However, an average dive lasts a few minutes and reaches a depth of 90 m (Baechler et al., 2002). Anglerfish gillnets are set close to the shore at depths of 20-200 m, with an average setting depth of 65-80 m, where the best catches are generally taken (MFRI and Viktor Jónsson [anglerfish fisherman] pers. communication). There is thus the potential for a high overlap with fishing gear (i.e. high encounterability).	3
Selectivity	The minimum mesh size of an anglerfish gillnet is 30 cm (MFRI pers. communication, October 2016). Given the large size of even a juvenile harbour seal compared to the mesh size of anglerfish gillnets, there is a high potential that individuals < half the size at maturity are retained by gear.	3

Post capture mortality	Default score for retained species (P2)	3

Harbour Seal PSA - References

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Appendix 1.3: Conditions, Recommendations and Client Action Plan

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

Six outline conditions were raised for lumpfish gillnet (UoA6).

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

Conditions

C1 - PI 1.2.2

Condition 1 **UoA: ISF Iceland anglerfish – All gears**	
Performance Indicator	**PI 1.2.2 There are well defined and effective harvest control rules in place**
Score	75
Rationale	The harvest control rule is based on calculating the TAC corresponding to a proxy of F_{MSY} in the latest stock assessment model. At least this part of the harvest control rule is well defined and is clearly consistent with the overall MSY-based harvest strategy. However, to what extent exploitation might be reduced as the limit reference point is approached is not clear. The clear target exploitation levels required and delivered by the harvest control rules, together with the intention to reduce exploitation below the trigger point, meet the SG60. However, the lack of a well-defined response should the stock fall below the trigger reference point prevents the SG80 being met.
Condition	A well-defined harvest control rule should be put in place that is consistent with the harvest strategy and defines how the exploitation rate will be reduced as the stock approaches the 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 reassessment of the harvest control rule. Score 75. Year 2: Evidence is available indicating reassessment of the harvest control rule. Score 75. Year 3: Evidence is available indicating reassessment of the harvest control rule. Score 75. Year 4: A new harvest control rule is adopted that reduces exploitation as the limit reference point is approached. Score 80.
Client action plan	**Years 1 and 2** 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 3** Follow up on results of engagement in year 1 and 2 regarding a harvest control rule. The client group promotes the necessity for a harvest control rule, ensuring reduced exploitation rates as the stock approaches a limit reference point. The client will conduct an evaluation of a harvest control rule, either through MFRI or internal options as set out above. The actions in year 3 are dependent on outcomes in previous years. If a clear and precautionary HCR is implemented by the MII in previous years, there is no need for further actions. If not, ISF will seek support within the client group to further look for alternatives to develop and adopt a precautionary HCR. ISF will record the process and maintain a log of all interactions where the action plan is being discussed and carried out in cooperation with all parties, e.g. MFRI, MII, and Directorate of Fisheries, Universities, independent consultants and ISF members. **Year 4** Implement measures developed and evaluated in year This may need to fit into MFRI assessment cycle. ISF will record the process and maintain a log of all interactions where the action plan is being discussed and carried out in cooperation with all parties, e.g. MFRI, MII, and Directorate of Fisheries, Universities, independent consultants and ISF members. *CAB assessment of progress*: **The CAB will assess progress of the condition by reviewing evidence supplied by the client and interviews with all parties involved as needed.**
Consultation on condition	Consultation with MFRI and MII

C2 - PI 2.2.1

Condition 2 **UoA: ISF Iceland anglerfish fishery using gillnets, anglerfish gillnets**	
Performance Indicator	**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.**
Score	Gillnets: 75 Anglerfish gillnets: 75
Rationale	**Harbour seal** Based on the most recent MFRI data available, gillnets account for a maximum of 46 harbour seal deaths per year, which would account for only 0.6% of the total estimated Icelandic population per year. However, this estimate refers to a worst-case-scenario based on the available information and needs to be considered with caution given the limitations of the available bycatch data (lack of logbook data, low coverage of lumpfish trips by on board observers, high variation in estimates [232 in 2014; 1288 in 2015]). There is no demonstrably effective partial strategy in place to manage seabird and marine mammal bycatch in Iceland. SG 80 is not met for both gillnets.

	Harbour porpoise The Risk Based Framework was used to assess PI 2.2.1 - Secondary Species Outcome for the anglerfish gillnet UoA. The result of this RBF assessment was a score of 75 - pass with condition. Two species scored below SG 80: harbour seal and harbour porpoise. Full details are available in Appendix 1.2.
Condition	Harbour seal (gillnet, anglerfish gillnet) and harbour porpoise (anglerfish gillnet) must be shown highly likely to be within biologically based limits, or it must be demonstrated that there is a partial strategy of demonstrably effective mitigation measures in place such that the UoAs do not hinder recovery and rebuilding.
Milestones	Year 1: Develop and propose a partial or full strategy that ensures that the UoAs do not hinder any recovery and rebuilding of harbour seal (gillnet, anglerfish gillnet) and harbour porpoise (anglerfish gillnet). Resulting score: 70 Year 2: Consult with industry and all stakeholders on the proposed strategy and amend accordingly. Resulting score: 70 Year 3: Formally commit to the new strategy and, with industry, commence its implementation. Resulting score: 70 Year 4: 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** Marine mammals*: **Improve on board logging:*** Engage with fishery operators in order to improve logbook recording of marine mammals interaction. Marine mammals*: **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 interaction is at a level that is sufficient to detect increased risk to the population. Marine mammals*: **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 interaction in the fishery or engage with independent parties to evaluate the risk to marine mammals by the fishery. ISF will call for recommendations for methods from the fishermen to prevent marine mammals coming to the gillnets. ISF will form a stakeholder panel to mitigate information on progress and to channel tasks regarding the condition to representative stakeholders within or outside of ISF. The panel will convene twice a year during the lifetime of the certificate, or as needed, and be comprised of ISF representatives and from other stakeholders as fitting for each condition. ***Improvements expected:*** Better information on interaction with marine mammals is expected. ***Auditing:*** At the Year 1 audit; ISF will present i) Results from further research of marine mammals interaction; ii) an analysis of available data on the interaction in gill nets fishery and iii) any available data giving an indication of population trends in habour seal and harbor porpoise. **Year 2** Marine mammals: ***Improve on board logging:*** Continue engagement with fishery operators to ensure adequate logbook recording interaction. Marine mammals: ***Evaluate need for partial strategy:*** Continue engagement with the Directorate of Fisheries and the Marine Research Institute to promote monitoring marine mammals interaction in the fishery and to determine if logbook recording and monitoring is adequate.

	<u>Marine mammals:</u> ***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 in the fishery or continue engagement with independent parties to continue evaluation of the risk to marine mammals in the fishery. <u>Marine mammals:</u> ***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, if necessary. In year 2 ISF will have a report from the industry what have been done and success of it. ***Improvements expected:*** Continued information on interaction with marine mammals is expected. ***Auditing:*** At the Year 2 audit, ISF will present i) Suggestions on methods been to be done to prevent marine mammals as interaction; ii) an initiative to work with authorities on a partial strategy. **Year 3** <u>Marine mammals:</u> ***Improve on board logging:*** Prepare a written report (or commission such a report) during Year 3 on the reliability of logbook recordings and monitoring. <u>Marine mammals:</u> ***Evaluate need for partial strategy:*** Present a draft plan for addressing impacts on marine mammals, if necessary depending on research results. <u>Marine mammals:</u> ***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. ***Improvements expected:*** An outline for a partial strategy addressing solutions to interaction. ***Auditing:*** At the Year 3 audit, ISF will present i) a completed report on logbook reliability; ii) a draft partial strategy to address interaction; iii) evidence of cooperation between ISF, NASBO (National Association of Small Boat Owners) and MRI on solutions. **Year 4** 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 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. ***Improvements expected:*** An outline for a partial strategy addressing solutions to interaction. ***Auditing:*** At the Year 4 audit, ISF will present i) evidence of implementation of the strategy ii) a review of the effectiveness of plans, actions and strategies implemented in first 4 years with recommendations for further actions.
Consultation on condition	Consultation between the fishing industry (NASBO and ISF members), the Marine and Freshwater Research institute, and the Directorate of Fisheries will be necessary as part of fulfilment of this condition.

C3 – PI 2.2.2

Condition 3 **UoA: ISF Iceland anglerfish fishery using gillnets, anglerfish gillnets, longlines**	
Performance Indicator	**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.
Score	Gillnets: 65 Anglerfish gillnets: 65 Longlines: 75
Rationale	The measures in place do not represent a partial strategy implemented to manage by-catch of out-of-scope secondary species like birds and mammals. This condition is harmonised with that for ISF Iceland cod and halibut fisheries. Information available on the fishery / species involved indicates that the partial strategy currently in place is not sufficient and may not work to ensure the fishery does not pose a risk for bycatch populations. The measures in place for managing bycatch of vulnerable species such as seabirds and mammals are generally not designed to manage impact on that component specifically (e.g. temporal and seasonal closures are not designed to reduce bycatch of vulnerable species), and other measures require improvements to be appropriate for the fishery (e.g. more logbook returns / more observer trips are required to gather bycatch data). The measures may not have been implemented as appropriate in all cases for (cod) gillnets and lumpfish gillnets. In the case of anglerfish gillnets insufficient information is available to ascertain that measures are being implemented as appropriate.
Condition	A demonstrably effective partial strategy should be put in place such that the gillnet, anglerfish gillnet and longline fisheries do not hinder recovery and rebuilding of vulnerable out-of-scope secondary marine mammal and seabird species. This should include a regular review of the potential effectiveness and practicality of alternative measures to minimise fishery related mortality of unwanted catch of vulnerable species such as harbour seal, harbour porpoise, European shag, greater black-backed gull and fulmar, as well as regular reviews to ensure that the relevant measures are implemented as appropriate.
Milestones	Year 1: Develop and propose a partial or full strategy that ensures that the gillnet, anglerfish gillnet and longline fisheries do not hinder recovery and rebuilding of vulnerable out-of-scope secondary marine mammal and seabird species such as harbour seal, harbour porpoise, European shag, greater black-backed gull and fulmar. Initiate a regular review process to identify and evaluate alternative measures that would reduce unwanted catch. Resulting score: 70 Year 2: Consult with industry and all stakeholders on the proposed strategies and amend accordingly. Resulting score: 70 Year 3: Formally commit to the new strategies and, with industry, commence their implementation. Resulting score: 70 Year 4: Demonstrate that the adopted strategies have been fully adopted and are being implemented in an effective manner. Demonstrate that at least one review (of a regular process) to reduce unwanted catch has taken place. Resulting score: 80

Client action plan	**Year 1** Marine mammals and seabirds*:* ***Improve on board logging:*** Engage with fishery operators in order to improve logbook recording of marine mammals and the 6 abovementioned seabirds species bycatch. Marine mammals and seabirds *:* ***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 the seabirds bycatch is at a level that is sufficient to detect increased risk to the population. Marine mammals and seabirds*:* ***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. ISF will call for recommendations for methods from the fishermen and the industry to prevent marine mammals and seabirds coming to the gillnets and long line. ISF will form a stakeholder panel to mitigate information on progress and to channel tasks regarding the condition to representative stakeholders within or outside of ISF. The panel will convene twice a year during the lifetime of the certificate, or as needed, and be comprised of ISF representatives and from other stakeholders as fitting for each condition. ***Improvements expected:*** Better information on bycatch of harbour seal, harbour porpoise and fulmar, shag, cormorant, Northern gannet, great black-backed gull and common guillemot is expected. ***Auditing:*** At the Year 1 audit; ISF will present i) Results from further research of marine mammals and seabirds bycatch; ii) an analysis of available data on the bycatch in gill nets and long line fishery and iii) any available data giving an indication of population trends in harbour seal, harbor porpoise and the 6 abovementioned auk bird species. **Year 2** Marine mammals and seabirds: ***Improve on board logging:*** Continue engagement with fishery operators to ensure adequate logbook recording interaction & bycatch. Marine mammals and seabirds: ***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. Marine mammals and seabirds: ***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. Marine mammals and seabirds: ***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. ***Improvements expected:*** Continued information on interaction with harbour seal, harbor porpoise and bycatch of fulmar, shag, cormorant, Northern gannet, great black-backed gull and common guillemot is expected. ***Auditing:*** At the Year 2 audit, ISF will present i) Suggestions on methods been to be done to prevent marine mammals and seabirds as bycatch; ii) an initiative to work with authorities on a partial strategy.

	Year 3 Marine mammals and seabirds: ***Improve on board logging:*** Prepare a written report (or commission such a report) during Year 3 on the reliability of logbook recordings and monitoring. Marine mammals and seabirds: ***Evaluate need for partial strategy:*** Present a draft plan for addressing impacts on marine mammals and seabirds as bycatch, if necessary depending on research results. Marine mammals and seabirds: ***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. ***Improvements expected:*** An outline for a partial strategy addressing solutions to bycatch. ***Auditing:*** At the Year 3 audit, ISF will present i) a completed report on logbook reliability; ii) a draft partial strategy to address bycatch; iii) evidence of cooperation between ISF, NASBO (National Association of Small Boat Owners) and MRI on solutions. **Year 4** 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 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. ***Improvements expected:*** An outline for a partial strategy addressing solutions to bycatch. ***Auditing:*** At the Year 4 audit, ISF will present i) evidence of implementation of the strategy ii) a review of the effectiveness of plans, actions and strategies implemented in first 4 years with recommendations for further actions.
Consultation on condition	Consultation between the fishing industry (NASBO and ISF members), the Marine and Freshwater Research institute, and the Directorate of Fisheries will be necessary as part of fulfilment of this condition.

C4 – PI 2.2.3

Condition 4 **UoA: ISF Iceland anglerfish fishery using gillnets, anglerfish gillnets and longlines**	
Performance Indicator	**PI 2.2.3 Secondary species information** **Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species**
Score	Gillnets: 75 Anglerfish gillnets: 75 Longlines: 75
Rationale	Logbook returns have been poor, and variations in estimated numbers of bycatch species evident in the most recent data provided by the MFRI indicate that the available information may not be accurate and verifiable for all bycatch species, including for the main secondary species being considered in the present assessment. The quantitative

	information available is thus not adequate to assess impacts of the UoA on main secondary species with respect to status.
Condition	<u>Gillnets and Longlines</u> Reporting provides some quantitative information on of seabird and marine mammal bycatch that is both available and adequate to assess the impact of the UoA on main secondary species with respect to their status. The information should be assessed by MFRI on a regular basis and different sources of information should be compared (e.g. logbook data, survey data, observer data etc.). Where disparities are determined, efforts should be made to improve the accuracy of data available on bycatch of seabirds and marine mammals. This condition has been reworded slighlty but is nevertheless harmonised with that for ISF Iceland golden redfish, ISF Iceland saithe & ling, ISF Iceland cod and ISF Iceland halibut fisheries. <u>Anglerfish Gillnets</u> Reporting provides some quantitative information on seabird and marine mammal bycatch that is adequate to assess productivity and susceptibility attributes for the main secondary species. The information should be assessed by MFRI on a regular basis and different sources of information should be compared (e.g. logbook data, survey data, observer data etc.). Where disparities are determined, efforts should be made to improve the accuracy of data available on bycatch of seabirds and marine mammals.
Milestones	Year 1: There shall be evidence of the Client's plan to encourage and enable fishing vessels to record all seabird and marine mammal bycatch in electronic logbook systems. Score 75 Year 2: By the end of Year 2 there shall be evidence that some quantitative information on of seabird and marine mammal bycatch is both available and adequate to assess the impact of the UoA on main secondary species with respect to their status. Score 80
Client action plan	**Year 1** <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 bycatch and marine mammal interaction. ***Improvements:*** ISF will present an introduction of data and information being collected for the first year. ***Auditing:*** At the audit, ISF will present progress on logbook reporting of seabird bycatch and its adequacy to assess the impact of the UoA with respect to their status. **Year 2** <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. ***Improvements:*** ISF will present further data and information being collected for the first 2 years. ***Auditing:*** At the audit, ISF will present progress on logbook reporting of seabird bycatch and its adequacy to assess the impact of the UoA with respect to their status. **Year 3**

	Auditing: At the 3rd and subsequent audits, ISF will provide compiled data and analysis of bycaught secondary species, so that it can be seen that the data collected is meaningful and adds to the management strategies of those species
Consultation on condition	Consultation between the fishing industry (NASBO and ISF members), the Marine and Freshwater Research institute, and the Directorate of Fisheries will be necessary as part of fulfilment of this condition.

C5 – PI 2.3.2

Condition 5 **UoA: ISF Iceland anglerfish fishery using gillnets, anglerfish gillnets, and longlines**	
Performance Indicator	**PI 2.3.2 The UoA has in place precautionary management strategies designed to 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.**
Score	Gillnets: 70 Anglerfish gillnets: 70 Longlines: 70
Rationale	**Cod gillnets** The measures in place cannot be considered a full management strategy which has been designed to manage impacts on marine mammal and seabird species. The measures currently in place are not sufficient and may not work to ensure the fishery does not pose a risk for ETP populations as evidenced by the outcome score of SG 60 for black guillemot and common loon in the case of lumpfish gillnets. The measures in place for managing bycatch of vulnerable species such as seabirds and mammals are generally not designed to manage impact on that component specifically (e.g. temporal and seasonal closures are not designed to reduce bycatch of vulnerable species), and other measures require improvements to be appropriate for the fishery (e.g. more logbook returns / more observer trips are required to gather bycatch data). The fact that black guillemot and common loon did not achieve SG80 under PI 2.3.1 indicates that measures may not have been implemented as appropriate for lumpfish gillnets. **Anglerfish gillnets** In the case of anglerfish gillnets the assessment team did not find any evidence that any ETP species are being impacted. Given the lack of data available for this gear and the fact that the RBF had to be used to score PI 2.2.1 the team consders that a precautionary score in line with the other gillnets being assessed is appropriate until more data is available to confirm that no ETP species are being impacted by this gear.
Condition	A strategy should be put in place that is expected to ensure the UoAs do not hinder the recovery of ETP marine mammal and seabird species. This should include a regular review of the potential effectiveness and practicality of alternative measures to minimise fishery related mortality of unwanted catch of vulnerable seabird and marine mammal species, as well as regular reviews to ensure that the relevant measures are implemented as appropriate. This condition can be implemented together with condition 3.

Milestones	Year 1: Develop and propose a partial or full strategy that ensures that the gillnet, anglerfish gillnet, and longline fisheries do not hinder recovery and rebuilding of vulnerable ETP marine mammal and seabird species. Initiate a regular review process to identify and evaluate alternative measures that would reduce unwanted catch. Resulting score: 70 Year 2: Consult with industry and all stakeholders on the proposed strategies and amend accordingly. Resulting score: 70 Year 3: Formally commit to the new strategies and, with industry, commence their implementation. Resulting score: 70 Year 4: Demonstrate that the adopted strategies have been fully adopted and are being implemented in an effective manner. Demonstrate that at least one review (of a regular process) to reduce unwanted catch has taken place. Resulting score: 80
Client action plan	**Year 1** Marine mammals and seabirds *:* ***Improve on board logging:*** Engage with fishery operators in order to improve logbook recording of marine mammals and seabirds bycatch. Marine mammals and seabirds*:* ***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. Marine mammals and seabirds*:* ***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. ISF will call for recommendations for methods from the fishermen and the industry to a prevent marine mammals and seabirds coming to the gillnets and long line. ISF will form a stakeholder panel to mitigate information on progress and to channel tasks regarding the condition to representative stakeholders within or outside of ISF. The panel will convene twice a year during the lifetime of the certificate, or as needed, and be comprised of ISF representatives and from other stakeholders as fitting for each condition. ***Improvements expected:*** Better information on bycatch of marine mammals and seabirds is expected. ***Auditing:*** At the Year 1 audit; , ISF will present i) Results from further research of marine mammals and seabirds bycatch; ii) an analysis of available data on the bycatch in gill nets and long line fishery and iii) any available data giving an indication of population trends in marine mammals and seabirds. **Year 2** Marine mammals and seabirds: ***Improve on board logging:*** Continue engagement with fishery operators to ensure adequate logbook recording interaction & bycatch. Marine mammals and seabirds: ***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.

	Marine mammals and seabirds: ***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. Marine mammals and seabirds: ***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. ***Improvements expected:*** Continued information on interaction with marine mammals and seabirds is expected. ***Auditing:*** At the Year 2 audit, ISF will present i) Suggestions on methods been to be done to prevent marine mammals and seabirds as bycatch; ii) an initiative to work with authorities on a partial strategy. **Year 3** Marine mammals and seabirds: ***Improve on board logging:*** Prepare a written report (or commission such a report) during Year 3 on the reliability of logbook recordings and monitoring. Marine mammals and seabirds: ***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. Marine mammals and seabirds: ***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. ***Improvements expected:*** An outline for a partial strategy addressing solutions to bycatch. ***Auditing:*** At the Year 3 audit, ISF will present i) a completed report on logbook reliability; ii) a draft partial strategy to address bycatch; iii) evidence of cooperation between ISF, NASBO (National Association of Small Boat Owners) and MRI on solutions. **Year 4** 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. ***Improvements expected:*** An outline for a partial strategy addressing solutions to bycatch. ***Auditing:*** At the Year 4 audit, ISF will present i) evidence of implementation of the strategy ii) a review of the effectiveness of plans, actions and strategies implemented in first 4 years with recommendations for further actions.
Consultation on condition	Consultation between the fishing industry (NASBO and ISF members), the Marine and Freshwater Research institute, and the Directorate of Fisheries will be necessary as part of fulfilment of this condition.

C6 – PI 2.3.3

<table>
<tr><td colspan="2">Condition 6
UoA: ISF Iceland anglerfish fishery using cod gillnets, anglerfish gillnets and longlines</td></tr>
<tr><td>Performance Indicator</td><td>PI 2.3.3 ETP species information
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>Score</td><td>Gillnets: 70
Anglerfish gillnets: 70
Longlines: 70</td></tr>
<tr><td>Rationale</td><td><u>Cod gillnets, longlines</u>
Logbook returns have been poor, and variations in estimated numbers of bycatch species evident in the most recent data provided by the MFRI indicate that the available information may not be accurate and verifiable for all bycatch species, including for the ETP species being considered in the present assessment. The low number of trips monitored by observers in the smaller fisheries, including gillnets, continues to make extrapolation of bycatch estimates difficult (MFRI, pers. communication); although the quality of the data has improved in the last 5 years. The quantitative information available is thus not 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. SG 80 is not met.
Anglerfish nets
In the case of anglerfish gillnets the assessment team did not find any evidence that any ETP species are being impacted. Given the lack of data available for this gear and the fact that the RBF had to be used to score PI 2.2.1 the team consders that a precautionary score in line with the other gillnets being assessed is appropriate until more data is available to confirm that no ETP species are being impacted by this gear.</td></tr>
<tr><td>Condition</td><td><u>Gillnets and Longlines</u>
Reporting provides some quantitative information on of seabird and marine mammal bycatch that 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 ETP species. The information should be assessed by MFRI on a regular basis and different sources of information should be compared (e.g. logbook data, survey data, observer data etc.). Where disparities are determined, efforts should be made to improve the accuracy of data available on bycatch of seabirds and marine mammals.
<u>Anglerfish Gillnets</u>
Reporting provides some quantitative information on ETP seabird and marine mammal bycatch (if applicable) that is adequate to assess productivity and susceptibility attributes for ETP species. The information should be assessed by MFRI on a regular basis and different sources of information should be compared (e.g. logbook data, survey data, observer data etc.). Where disparities are determined, efforts should be made to improve the accuracy of data available on bycatch of seabirds and marine mammals.</td></tr>
</table>

	This condition can be implemented together with condition 4.
Milestones	Year 1: There shall be evidence of the Client's plan to encourage and enable fishing vessels to record all seabird and marine mammal bycatch in electronic logbook systems. Score 75 Year 2: By the end of Year 2 there shall be evidence that some quantitative information on of seabird and marine mammal bycatch is both available and adequate to assess the impact of the UoA on ETP species with respect to their status. Score 80
Client action plan	**Year 1** <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. ***Improvements:*** ISF will present an introduction of data and information being collected for the first year. ***Auditing:*** At the audit, ISF will present progress on logbook reporting of seabird bycatch and its adequacy to assess the impact of the UoA with respect to their status. **Year 2** <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. ***Improvements:*** ISF will present a further data and information being collected for the first 2 years. ***Auditing:*** At the audit, ISF will present progress on logbook reporting of seabird bycatch and its adequacy to assess the impact of the UoA with presentation of analysis of data collected so far. **Year 3** ***Auditing:*** 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.
Consultation on condition	Consultation between the fishing industry (NASBO and ISF members), the Marine and Freshwater Research institute, and the Directorate of Fisheries will be necessary as part of fulfilment of this condition.

C7 – PI 2.4.1

Condition 7 UoA: ISF Iceland anglerfish bottom trawl fishery	
Performance Indicator	**PI 2.4.1: The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area covered by the governance body(s) responsible for fisheries management in the area(s) where the UoA operates.**
Score	Bottom trawlers: 75

Rationale	The slope areas off the south coast of Iceland are very steep, with depths descending from around 400 m to more than 1500 m within few nautical miles, and parts of the slope areas are considered difficult for trawling. Therefore, vulnerable habitats have some depth refuge from fisheries impacts in Icelandic waters. Nevertheless, in the past the bottom trawl fishery has reduced coral habitat structure and the present fishing patterns of the UoA overlap with vulnerable habitats of corals. There is explicit protection of several *Lophelia* areas where no fishing gear with bottom contact are allowed, including bottom trawling since permanent area closures for bottom trawling are in operation along the shelf break off W Iceland including seabed on the shallow part of the Reykjanes Ridge where *Lophelia* reefs occur (Figure 3-20; Figure 3-21). No such closures are in place to protect coral gardens characterised by aggregations of colonies or individuals of one or more coral species of leather corals (Alcyonacea), (Gorgonacea), sea pens (Pennatulacea), black corals (Antipatharia), and hard corals (Scleractinia) other than *Lophelia*. There is no explicit protection of areas which are rich in sponge communities where no fishing gear with bottom contact are allowed, although a number of seasonal or annual closures to bottom trawling exist which might have beneficial effects on the sponge habitats occurring there. No recording of benthic bycatch by commercial fishing vessels is in place. This has been harmonised with the ISF Iceland cod and haddock, ISF Iceland golden redfish, ISF Iceland saithe and ling and ISF Greenland halibut fisheries, where there is a condition for this PI.
Condition	By the fourth surveillance audit necessary conservation and management measures for all vulnerable marine habitats shall be in place and implemented, such that the trawl fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. This condition is harmonised with that for ISF Iceland haddock, ISF Iceland golden redfish and the ISF Iceland saithe & ling fisheries.
Milestones	Year 1: There shall be evidence of the Client's plan to evaluate potential damage to *Lophelia* reefs, sponges, coral gardens appropriate to this UoA. There shall be evidence of engagement with the Marine and Freshwater Research Institute (MFRI) with the goal of evaluating potential damage to all vulnerable habitats by fishing activities. If MFRI is unable to provide support for the implementation of the plan, the fishery shall prepare the plan on the basis of other means (e.g. independent consultants or scientists or other means as appropriate). The plan may include an Environmental Impact Assessment or other similar analysis. Score 75 Year 2: By the end of Year 2 there shall be evidence of ongoing work towards the implementation of the plan; i.e. developing options for conservation and management measures to all vulnerable habitats, such that the fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. These options may be developed with the support of MFRI, or may be developed within the client group, as appropriate. Options may include closed areas, move on thresholds or other actions as appropriate, but should be sufficient to ensure that there serious and irreversible harm to sponges and coral gardens is highly unlikely. Score 75 Year 3: Evaluate the options developed in year 2. Consider suggested modifications, if needed and finalise and agree on conservation and management measures. By the end of the year a partial strategy for the protection of *Lophelia* reefs, sponges, coral gardens

	from trawling shall be agreed upon, either at client group level or at a higher level. Score 75 Year 4: Implement the agreed upon partial strategy. Score 80. A formal commitment to the agreed upon conservation and management measures shall remain in place for the duration of the certification period.
Client action plan	**Year 1** Based on work done (pilot project with HB Grandi) ISF will meet with MRI and request an engagement by MRI to conserve vulnerable habitats and ask for options and plans to prevent serious or irreversible harm to habitat structures, if necessary. ISF will engage their members to agree upon and implement methods of benthic bycatch monitoring by ISF member vessels, as agreed with WWF during the objections process ***Improvements:*** Implementation of a monitoring plan will have begun to monitor impacts on coral gardens, sponges and *Lophelia* reefs and reduce them to acceptable levels as required. ***Auditing:*** At the Year 1 audit, ISF will present evidence from the monitoring efforts. ISF will form a stakeholder panel to mitigate information on progress and to channel tasks regarding the condition to representative stakeholders within or outside of ISF. The panel will convene twice a year during the lifetime of the certificate, or as needed, and be comprised of ISF representatives and from other stakeholders as fitting for each condition. **Year 2** ISF will meet with MRI to discuss findings from annual research on sponge and coral incidents. The meeting is intended to review statistics and discuss alternative actions, if needed. ISF will meet with members of the client group to discuss the condition and ask for feedback on actions made by each member to address the condition. The actions will be formalized into a plan, intended for engagement by members of the client group to meet the condition. The purpose is to ensure that bottom trawling is highly unlikely to cause serious or irreversible harm **to sponges and coral gardens.** ***Improvements:*** The plan, if required, is updated according to the results of ongoing monitoring, and agreed by ISF and all relevant parties. ***Auditing:*** At the Year 2 audit, ISF will present an action plan, with evidence that it has been agreed by all participating parties (e.g. a signed agreement, meeting minutes, letters of support etc.) **Year 3** ISF will meet with members from the client group to discuss effects of actions taken in year 2 and adjust for improved efficiency, as needed. The goal is to protect deep sea sponge aggregations and coral gardens from impacts of trawling and seek an agreement among the members of the client group for this type of conservation. The actions of Year 3 are contingent on the outcome of findings showing whether and how conservation actions are required. If a plan has been proven necessary and agreed upon in year three, ISF will monitor the implementation of the plan in year 4 in cooperation with the members of the client group. ***Improvements:*** If required, the plan is implemented; it is updated as new information is available. ***Auditing:*** At the Year 3 audit, ISF will present the updated plan if necessary, with evidence of implementation (e.g. benthic logbook data, MRI report or other similar). **Year 4** ISF will meet with members from the client group to discuss effects of actions taken in year 3 and adjust for improved efficiency, as needed. The goal is to protect deep sea

	sponge aggregations and coral gardens from impacts of trawling and seek an agreement among the members of the client group to this type of conservation. The actions of Year 4 are contingent on the outcome of findings showing whether and how conservation actions are required. If a plan has been proven necessary and agreed upon in year three, ISF will monitor the implementation of the plan in year 4 in cooperation with the members of the client group. ***Improvements***: If required, the plan is implemented; it is updated as new information is available. ***Auditing***: At the Year 4 audit, ISF will present the updated plan if necessary, with evidence of implementation (e.g. benthic logbook data, MRI report or other similar).
Consultation on condition	Consultation between the fishing industry (SFS and HB Grandi or other ISF member) and the Marine and Freshwater Research Institute will be necessary as part of fulfilment of this condition.

C8 – PI 2.4.2

Condition 8 UoA: ISF Iceland anglerfish bottom trawl & *Nephrops* trawl fisheries	
Performance Indicator	**PI 2.4.2: There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats**
Score	Bottom trawlers: 75 *Nephrops* trawlers: 75
Rationale	The Icelandic management strategy for marine habitats in general, and VMEs in particular, is mainly implemented through a system of closed areas which effectively prevent both bottom trawls and *Nephrops* trawls from being used in known areas of cold-water coral concentrations along the edge of the continental shelf. A known hydrothermal vent area is also closed to trawling. This represents a partial strategy for cold water corals and hydrothermal vents, but is not yet in place for coral gardens or sponge concentrations, and does not meet SG80 for these two VME types. Vessels abide by commonly accepted move-on rules when encountering VMEs in these areas, but these are informal.
Condition	By the fourth surveillance audit necessary conservation and management measures for deep-sea sponge aggregation and coral gardens shall be in place and implemented, such that there is a partial strategy in place and implemented for these habitat types specifically, ensuring that the bottom and *Nephrops* trawl fisheries do not cause serious or irreversible harm to habitat structure and function in Icelandic waters. This strategy will include, where necessary, appropriate formalised move-on measures to avoid interactions with ALL forms of VMEs. With regard to the bottom trawl UoA, this condition is harmonised with that for ISF Iceland haddock, ISF Iceland golden redfish and the ISF Iceland saithe & ling fisheries. With regards to Nephrops UoA, this condition is harmonised with that for ISC Icelandic cod and halibut.
Milestones	Year 1: There shall be evidence of the Client's plan to evaluate potential damage to deep-sea sponge aggregations and coral gardens appropriate to this UoA. There shall be evidence of engagement with the Marine and Freshwater Research Institute (MFRI) with the goal of evaluating potential damage to all vulnerable habitats by fishing activities. If MFRI is unable to provide support for the implementation of the plan, the fishery shall prepare the plan on the basis of other means (e.g. independent consultants or scientists

	or other means as appropriate). The plan may include an Environmental Impact Assessment or other similar analysis. In addition, measures to repeatedly avoid interactions with VMEs will be developed and formalised within the UoAs. Score 75 Year 2: By the end of Year 2 there shall be evidence of ongoing work towards the implementation of the plan; i.e. developing options for conservation and management measures to all vulnerable habitats, such that the fishery does not cause serious or irreversible harm to habitat structure, on a regional or bioregional basis, and function. These options may be developed with the support of MFRI, or may be developed within the client group, as appropriate. Options may include closed areas, move on thresholds or other actions as appropriate, but should be sufficient to ensure that any serious and irreversible harm to deep-sea sponge aggregations and coral gardens is highly unlikely. Score 75 Year 3: Evaluate the options developed in year 2. Consider suggested modifications, if needed and finalise and agree on conservation and management measures. By the end of the year a partial strategy for the protection of deep-sea sponge aggregations and coral gardens from trawling shall be agreed upon, either at client group level or at a higher level. Score 75 Year 4: Implement the agreed upon partial strategy. Score 80. A formal commitment to the agreed upon conservation and management measures shall remain in place for the duration of the certification period.
Client action plan	**Year 1** Based on work done (pilot project with HB Grandi), ISF will meet with MRI and request an engagement by MRI to conserve vulnerable habitats and ask for options and plans to prevent serious or irreversible harm to habitat structures, if necessary. ISF will engage their members to agree upon and implement methods of benthic bycatch monitoring by ISF member vessels, as agreed with WWF during the objections process ***Improvements:*** Implementation of a monitoring plan will have begun to monitor impacts on coral gardens, sponges and other VMEs and reduce them to acceptable levels as required by the authority. ***Auditing:*** At the Year 1 audit, ISF will present evidence from the monitoring efforts. ISF will form a stakeholder panel to mitigate information on progress and to channel tasks regarding the condition to representative stakeholders within or outside of ISF. The panel will convene twice a year during the lifetime of the certificate, or as needed, and be comprised of ISF representatives and from other stakeholders as fitting for each condition. **Year 2** ISF will meet with MRI to discuss findings from annual research on all VMEs incidents. The meeting is intended to review statistics and discuss alternative actions, if needed. ISF will meet with members of the client group to discuss the condition and ask for feedback on actions made by each member to address the condition. The actions will be formalized into a plan, intended for engagement by members of the client group to meet the condition. The purpose is to ensure that bottom trawling is highly unlikely to cause serious or irreversible harm to all VMEs. ***Improvements:*** The plan, if required, is updated according to the results of ongoing monitoring, and agreed by ISF and all relevant parties.

	Auditing: At the Year 2 audit, ISF will present an action plan, with evidence that it has been agreed by all participating parties (e.g. a signed agreement, meeting minutes, letters of support etc.) **Year 3** ISF will meet with members from the client group to discuss effects of actions taken in year 2 and adjust for improved efficiency, as needed. The goal is to protect deep sea sponge aggregations, coral gardens and other VMEs from impacts of trawling and seek an agreement among the members of the client group for this type of conservation. The actions of Year 3 are contingent on the outcome of findings showing whether and how conservation actions are required. If a plan has been proven necessary and agreed upon in year three, ISF will monitor the implementation of the plan in year 4 in cooperation with the members of the client group. ***Improvements:*** If required, the plan is implemented; it is updated as new information is available. ***Auditing:*** At the Year 3 audit, ISF will present the updated plan if necessary, with evidence of implementation (e.g. benthic logbook data, MRI report or other similar). **Year 4** ISF will meet with members from the client group to discuss effects of actions taken in year 3 and adjust for improved efficiency, as needed. The goal is to protect deep sea sponge aggregations and coral gardens from impacts of trawling and seek an agreement among the members of the client group to this type of conservation. The actions of Year 4 are contingent on the outcome of findings showing whether and how conservation actions are required. If a plan has been proven necessary and agreed upon in year three, ISF will monitor the implementation of the plan in year 4 in cooperation with the members of the client group. ***Improvements***: If required, the plan is implemented; it is updated as new information is available. ***Auditing***: At the Year 4 audit, ISF will present the updated plan if necessary, with evidence of implementation (e.g. benthic logbook data, MRI report or other similar).
Consultation on condition	Consultation between the fishing industry (SFS and HB Grandi or other ISF member) and the Marine and Freshwater Research Institute will be necessary as part of fulfilment of this condition.

Recommendations

Recommendation 1 **UoAs: Bottom trawl, *Nephrops* trawl, Danish seine.**	
Performance Indicator	**PI 2.2.3 Secondary species information** Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species
Purpose	Interactions with seabird and marine mammals should be recorded in the electronic logbooks of client vessels. However, logbook returns since their introduction in 2009 have indicated very few such entries, which contradicts the results of formal MFRI surveys, such as the MFRI spring gillnet survey.
Recommendation	The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are

	determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals. This recommendation applies to all gears except gillnets, anglerfish gilnets, and longlines (where this issue is covered in Condition 4).
Client Action Plan	ISF will meet with MFRI and the Directorate of Fisheries to explain how important it is to have the logbooks credible regarding recorded marine mammals and seabirds as bycatch. ISF will discuss that action can be done by ISF member and other fishing ships around Iceland.
Consultation on Recommendation	Consultation between the fishing industry (SFS, LS and HB Grandi or other ISF member) and Marine Research institute as well as the Directorate of Fisheries will be necessary as part of fulfilment of this condition.

Recommendation 2 **UoA: ISF Iceland cod fishery – All gears**	
Performance Indicator	**Traceability**
Purpose	Management of risks to segregation and traceability within the fishery
Recommendation	The team requests that the client issues a reminder to all of the client members, as well as auctions, to observe the following: - to ensure full segregation of catch of each species by gear in the event more than one gear is applied during the same fishing trip; - to ensure full segregation of catch of each species by management region, i.e. fish caught inside the Icelandic EEZ is kept separate, in the event a vessel catches the same species on the same trip inside and outside the Icelandic EEZ – and – - to observe and implement appropriate measures of packing and labelling certified products prior to moving them to sub-contracting cooler or freezer storages upon landing, to ensure client members´ responsibility for product integrity prior to sale or further handling.
Client Action Plan	ISF will meet with representatives of agencies involved in MSC CoC auditing in Iceland to map out the risks involved and most efficient means of ensuring necessary segregation and traceability within the fishery. ISF will also discuss this matter among ISF members and communicate the results to the wider fishing community.
Consultation on recommendation	Consultation with agencies conducting MSC CoC auditing (Tún, Sýni) and with the fishing industry, incl. ISF members, will be necessary as part of fulfilment of this condition.

Outline conditions for the ISF Iceland anglerfish lumpfish gillnet UoA

Table A1.3.11: Outline Condition 1

Outline Condition 1 **UoA: ISF Iceland anglerfish fishery using lumpfish gillnets**	
Performance Indicator	**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.**
Score	Lumpfish gillnets: fail (score <60)
Rationale	**Harbour seal** Based on the most recent MFRI data available, gillnets account for a maximum of 46 harbour seal deaths per year, which would account for only 0.6% of the total estimated Icelandic population per year. However lumpfish gillnets were responsible for an estimated maximum of 1288 harbour seal deaths in 2014 - 2015, which would have impacted 16.83% of the estimated Icelandic population. However, this estimate refers to a worst-case-scenario based on the available information and needs to be considered with caution given the limitations of the available bycatch data (lack of logbook data, low coverage of lumpfish trips by on board observers, high variation in estimates [232 in 2014; 1288 in 2015]). Since the IUCN considers that harbour seals has a status of 'Least Concern' in the Eastern Atlantic (including in Iceland) based on an assessment which was recently updated (Bowen, 2016), the team considers that the team considers that this species is likely to be within biologically based limits. SG 60 is met for both gillnets and lumpfish gillnets. However, since the recent harbour seal survey results show a severe reduction in numbers of seals at the surveyed areas since the last full count in 2011, implying that the population size is likely to be smaller than that defined in the management objectives by the Icelandic government, the team considers that this species is not highly likely to be within biologically based limits, and that there is no evidence of recovery. Moreover, there is no demonstrably effective partial strategy in place to manage seabird and marine mammal bycatch in Iceland. SG 80 is not met for both gillnets and lumpfish gillnets. The Risk Based Framework was used to assess PI 2.2.1 - Secondary Species Outcome for the anglerfish gillnet UoA. The result of this RBF assessment was a score of 75 - pass with condition. Two species scored below SG 80: harbour seal and harbour porpoise. Full details are available in Appendix 1.2. **European shag / Great cormorant** In the case of lumpfish gillnets the estimated population impacts are much higher, but given the limitations of the bycatch estimates (only combined numbers for both species available, lack of logbook data, low coverage of lumpfish trips by on board observers, high variation in estimates [487 in 2014; 930 in 2015]), and the fact that this species has an IUCN status of 'Least Concern' in Europe, overall the team considers that it is likely that both cormorants and European shags are above biologically based limits. SG 60 is met for lumpfish gillnets. Due to the high bycatch numbers and the lack of a demonstrably effective partial strategy to manage the impacts of the UoA on these species, SG 80 is not met for both species for lumpfish gillnets. **Grey seal**

	Based on the most recent MFRI data available, lumpfish gillnets accounted for a maximum of 1216 grey seal deaths per year, which accounts for a concerning 24.32-35.76% of the total estimated annual number of grey seals which visit Icelandic waters to feed. Since the IUCN considers that this species should have a status of 'Least Concern' in the north-eastern Atlantic (including in Iceland), and overall population numbers of the north-eastern Atlantic population, which includes Iceland, are known to be increasing, the team considers that that this species is likely to be within biologically based limits; SG 60 is met for lumpfish gillnets. Given the high population level impacts of lumpfish gillnets on grey seals and the lack of a demonstrably effective partial strategy to manage marine mammal bycatch in this fishery, SG 80 is not met.
Condition	Harbour seal , European shag, great cormorant and grey seal must be shown highly likely to be within biologically based limits, or it must be demonstrated that there is a partial strategy of demonstrably effective mitigation measures in place such that the UoA does not hinder recovery and rebuilding.
Milestones	Year 1: Develop and propose a partial or full strategy that ensures that the UoAs do not hinder any recovery and rebuilding of harbour seal , European shag, great cormorant and grey seal. Resulting score: 70 Year 2: Consult with industry and all stakeholders on the proposed strategy and amend accordingly. Resulting score: 70 Year 3: Formally commit to the new strategy and, with industry, commence its implementation. Resulting score: 70 Year 4: Demonstrate that the adopted strategy has been fully adopted and is being implemented in an effective manner. Resulting score: 80
Client action plan	
Consultation on condition	

Table A1.3.12: Outline Condition 2

Outline Condition 2 **UoA: ISF Iceland anglerfish fishery using lumpfish gillnets**	
Performance Indicator	**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.**
Score	Lumpfish gillnets: 65
Rationale	<u>Scoring issue (a):</u> There are thus measures in place, which are expected to maintain / not hinder rebuilding of main secondary species at / to levels which are highly likely to be within biologically based limits, or to ensure that the UoA does not hinder their recovery. SG 60 is met. These measures however do not represent a partial strategy specifically implemented to manage by-catch of out-of-scope secondary species like birds and mammals. Harbour seal (gillnet, lumpfish gillnet, anglerfish gillnet), European shag (lumpfish gillnet), great cormorant (lumpfish gillnet), grey seal (lumpfish gillnet), and harbour porpoise (anglerfish gillnet) failed to reach SG 80 for PI 2.2.1, and several bird

	species caught as bycatch in Icelandic longlines are known to have decreasing population trends (European shag, greater black-backed gull, fulmar). SG 80 is not met and a condition is imposed. This condition is harmonised with that for ISF Iceland cod and halibut fisheries. <u>Scoring issue (b):</u> There are a number of measures that aim to ensure compliance with the law, including monitoring and surveillance which are conducted by the DF and the coast guard to ensure compliance of regulations. Annual assessment of discarding by MFRI indicates that discarding is very limited, and control and surveillance information indicates that temporal and permanent fishing ground closures are respected. However, information available on the fishery / species involved indicates that the partial strategy currently in place is not sufficient and may not work to ensure the fishery does not pose a risk for bycatch populations as evidenced by the outcome score of SG 60 for European shag, great cormorant, harbour seal, and grey seal. The measures in place for managing bycatch of vulnerable species such as seabirds and mammals are generally not designed to manage impact on that component specifically (e.g. temporal and seasonal closures are not designed to reduce bycatch of vulnerable species), and other measures require improvements to be appropriate for the fishery (e.g. more logbook returns / more observer trips are required to gather bycatch data). SG 80 is not met. <u>Scoring issue (e):</u> The fact that several species do not achieve SG80 under PI 2.2.1 (European shag, great cormorant, harbour seal, grey seal) indicates that the measures may not have been implemented as appropriate in all cases for (cod) gillnets and lumpfish gillnets. In the case of anglerfish gillnets insufficient information is available to ascertain that measures are being implemented as appropriate. Moreover, there are here are further measures used in other fisheries which could be appropriate for gillnets in this case (e.g. limits to area, season or times, pingers or weak lines to allow escape from entanglement), and no evidence was found to indicate that they should not be used. As such, gillnets, anglerfish gillnets and lumpfish gillnets fail to achieve SG 80.
Condition	A demonstrably effective partial strategy should be put in place such that the lumpfish gillnet fishery does not hinder recovery and rebuilding of vulnerable out-of-scope secondary marine mammal and seabird species. This should include a regular review of the potential effectiveness and practicality of alternative measures to minimise fishery related mortality of unwanted catch of vulnerable species such as harbour seal, European shag, great cormorant and grey seal, as well as regular reviews to ensure that the relevant measures are implemented as appropriate.
Milestones	Year 1: Develop and propose a partial or full strategy that ensures that the lumpfish gillnetfishery do not hinder recovery and rebuilding of vulnerable out-of-scope secondary marine mammal and seabird species such as harbour seal, European shag, great cormorant, and grey seal. Initiate a regular review process to identify and evaluate alternative measures that would reduce unwanted catch. Resulting score: 70 Year 2: Consult with industry and all stakeholders on the proposed strategies and amend accordingly. Resulting score: 70 Year 3: Formally commit to the new strategies and, with industry, commence their implementation. Resulting score: 70 Year 4: Demonstrate that the adopted strategies have been fully adopted and are being implemented in an effective manner. Demonstrate that at least one review (of a regular process) to reduce unwanted catch has taken place. Resulting score: 80

Client action plan	
Consultation on condition	

Table A1.3.13: Outline Condition 3

Condition 3 **UoA: ISF Iceland anglerfish fishery using lumpfish gillnets**	
Performance Indicator	**PI 2.2.3 Secondary species information** **Information on the nature and amount of secondary species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage secondary species**
Score	Lumpfish gillnets: 75
Rationale	Some quantitative information on bycatch rates of main secondary species (out-of-scope marine mammal and seabird species in the present assessment) is available, as is information on the status of marine mammal and seabird species. SG 60 is thus met. However logbook returns have been poor, and variations in estimated numbers of bycatch species evident in the most recent data provided by the MFRI indicate that the available information may not be accurate and verifiable for all bycatch species, including for the main secondary species being considered in the present assessment. The low number of trips monitored by observers in the smaller fisheries, including gillnets, continues to make extrapolation of bycatch estimates difficult (MFRI, pers. communication); although the quality of the data has improved in the last 5 years. The quantitative information available is thus not adequate to assess impacts of the UoA on main secondary species with respect to status. SG 80 is not met and a condition is imposed, which is harmonised with that for ISF Iceland cod and halibut fisheries.
Condition	By the second surveillance audit electronic logbook reporting provides some quantitative information on of seabird and marine mammal bycatch that is both available and adequate to assess the impact of the UoA on main secondary species with respect to their status. The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals. This condition is harmonised with that for ISF Iceland golden redfish, ISF Iceland saithe & ling, ISF cod and ISF halibut fisheries.
Milestones	Year 1: There shall be evidence of the Client's plan to encourage and enable fishing vessels to record all seabird and marine mammal bycatch in electronic logbook systems. Score 75 Year 2: By the end of Year 2 there shall be evidence that some quantitative information on of seabird and marine mammal bycatch is both available and adequate to assess the impact of the UoA on main secondary species with respect to their status. Score 80
Client action plan	
Consultation on condition	

Table A1.3.14: Outline Condition 4

<table>
<tr><th colspan="2">Outline Condition 4
UoA: ISF Iceland anglerfish fishery using lumpfish gillnets</th></tr>
<tr><td>Performance Indicator</td><td>PI 2.3.1 The UoA does not hinder recovery of ETP species</td></tr>
<tr><td>Score</td><td>Lumpfish gillnets: 70</td></tr>
<tr><td>Rationale</td><td>Black guillemot
Although bycatch rates appear to be high in the case of lumpfish gillnets, the team considers that this information needs to be considered with caution, and that the fishery is likely not to hinder recovery of this species due to the species' high abundance and its IUCN status of ‘Least Concern’ in Europe. SG 60 is met for lumpfish gillnets. It cannot be argued that the direct effects of the UoA are highly likely to not hinder recovery of this species so SG 80 is not met.
Common loon
Although population level impacts of the lumpfish gillnet fishery on common loons at first glance appear high, these estimates should be interpreted with caution since they are based on a worst-case scenario and there are limitations with both the bycatch estimates (low coverage of lumpfish trips by on board observers, variation in estimates [46 individuals caught in 2014; none in 2015]) and with population estimates (last common loon population estimate was carried out in 2000 and data quality is 'medium' according to BirdLife, 2015). Draft 2016 bycatch data made available to the assessment team by the towards the end of the present assessment process also did not record any common loon individuals in lumpfish gillnets as bycatch (MFRI, pers. communication). Moreover, there are measures in place which can be expected to ensure that the UoA does not hinder recovery and rebuilding of this species (see PI 2.2.2). SG 60 is met for lumpfish gillnets. Since it is not highly likely that the UoA does not hinder recovery of this ETP species, SG 80 is not met.</td></tr>
<tr><td>Condition</td><td>It must be demonstrated that the direct effects of the lumpfish gillnet UoA are highly unlikely to hinder recovery of black guillemots and common loon by implementing demonstrably effective mitigation measures.</td></tr>
<tr><td>Milestones</td><td>Year 1: Develop and propose a partial or full strategy that ensures that the UoAs do not hinder any recovery of black guillemots and common loon.
Resulting score: 70
Year 2: Consult with industry and all stakeholders on the proposed strategy and amend accordingly.
Resulting score: 70
Year 3: Formally commit to the new strategy and, with industry, commence its implementation.
Resulting score: 70
Year 4: Demonstrate that the adopted strategy has been fully adopted and is being implemented in an effective manner.
Resulting score: 80</td></tr>
<tr><td>Client action plan</td><td></td></tr>
<tr><td>Consultation on condition</td><td></td></tr>
</table>

Table A1.3.15: Outline Condition 5

<table>
<tr><td colspan="2">Condition 5
UoA: ISF Iceland anglerfish fishery using lumpfish gillnets</td></tr>
<tr><td>Performance Indicator</td><td>PI 2.3.2 The UoA has in place precautionary management strategies designed to 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>Score</td><td>Lupfish gillnets: 65</td></tr>
<tr><td>Rationale</td><td><u>Scoring issue (b):</u>
There are measures in place, which are expected to ensure the UoAs do not hinder the recovery of ETP species. SG 60 is met. The measures in place cannot be considered a full management strategy which has been designed to manage impacts on marine mammal and seabird species, and as such SG 80 is not met.
<u>Scoring issue (c):</u>
There are a number of measures that aim to ensure compliance with the law, including monitoring and surveillance which are conducted by the DF and the coast guard to ensure compliance of regulations. However, information available on the fishery / species involved indicates that the measures currently in place is not sufficient and may not work to ensure the fishery does not pose a risk for ETP populations as evidenced by the outcome score of SG 60 for black guillemot and common loon in the case of lumpfish gillnets. The measures in place for managing bycatch of vulnerable species such as seabirds and mammals are generally not designed to manage impact on that component specifically (e.g. temporal and seasonal closures are not designed to reduce bycatch of vulnerable species), and other measures require improvements to be appropriate for the fishery (e.g. more logbook returns / more observer trips are required to gather bycatch data). SG 80 is not met.
<u>Scoring issue (e):</u>
The review of the onboard observer data by MFRI scientists represents an ongoing review of the effectiveness of current measures to minimise unwanted ETP interactions. The evaluation of the performance of the current measures occurs annually, and as such is regular. Research on measures to minimise unwanted catches of seabirds and marine mammals in lumpfish gillnets is ongoing as a collaborative effort involving NGOs, the fishing industry and scientists; the results will also be applicable to (cod) gillnets. SG 60 is met for gillnets and lumpfish gillnets.
However, the fact that black guillemot and common loon did not achieve SG80 under PI 2.3.1 indicates that measures may not have been implemented as appropriate for lumpfish gillnets. Moreover, there are here are further measures used in other fisheries which could be appropriate for gillnets in this case (e.g. further limits to area, season or times specifically to avoid areas / seasons when marine mammals or seabirds are common, pingers or weak lines to allow escape from entanglement), and no evidence was found to indicate that they should not be used. As such, gillnets and lumpfish gillnets fail to achieve SG 80.</td></tr>
<tr><td>Condition</td><td>A strategy should be put in place that is expected to ensure the lumpfish gillnet UoA does not hinder the recovery of ETP marine mammal and seabird species. This should include a regular review of the potential effectiveness and practicality of alternative measures to minimise fishery related mortality of unwanted catch of vulnerable seabird and marine mammal species, as well as regular reviews to ensure that the relevant measures are implemented as appropriate.
This condition can be implemented together with condition 3.</td></tr>
</table>

Milestones	Year 1: Develop and propose a partial or full strategy that ensures that the lumpfish fishery does not hinder recovery and rebuilding of vulnerable ETP marine mammal and seabird species such as black guillemot and common loon. Initiate a regular review process to identify and evaluate alternative measures that would reduce unwanted catch. Resulting score: 70 Year 2: Consult with industry and all stakeholders on the proposed strategies and amend accordingly. Resulting score: 70 Year 3: Formally commit to the new strategies and, with industry, commence their implementation. Resulting score: 70 Year 4: Demonstrate that the adopted strategies have been fully adopted and are being implemented in an effective manner. Demonstrate that at least one review (of a regular process) to reduce unwanted catch has taken place. Resulting score: 80
Client action plan	
Consultation on condition	

Table A1.3.16: Outline Condition 6

Outline Condition 6 **UoA: ISF Iceland anglerfish fishery using lumpfish gillnets**	
Performance Indicator	**PI 2.3.3 ETP species information** **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.**
Score	Lumpfish gillnets: 70
Rationale	Some quantitative information on bycatch rates of ETP marine mammal and seabird species is thus available. SG 60 is thus met. However logbook returns have been poor, and variations in estimated numbers of bycatch species evident in the most recent data provided by the MFRI indicate that the available information may not be accurate and verifiable for all bycatch species, including for the ETP species being considered in the present assessment. The low number of trips monitored by observers in the smaller fisheries, including gillnets, continues to make extrapolation of bycatch estimates difficult (MFRI, pers. communication); although the quality of the data has improved in the last 5 years. The quantitative information available is thus not 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. SG 80 is not met.
Condition	By the second surveillance audit electronic logbook reporting provides some quantitative information on of seabird and marine mammal bycatch that is both available and adequate to assess the impact of the lumpfish gillnet UoA on ETP marine mammal and seabird species with respect to their status. The returns from electronic logbooks should be assessed by MFRI on a regular basis and compared to survey and ad

	hoc observer data. Where disparities are determined, efforts should be made to improve accurate logbook returns for the catch of seabird and marine mammals. This condition can be implemented together with condition 4.
Milestones	Year 1: There shall be evidence of the Client's plan to encourage and enable fishing vessels to record all seabird and marine mammal bycatch in electronic logbook systems. Score 75 Year 2: By the end of Year 2 there shall be evidence that some quantitative information on of seabird and marine mammal bycatch is both available and adequate to assess the impact of the UoA on ETP species with respect to their status. Score 80
Client action plan	
Consultation on condition	.

Appendix 2: Peer Review Reports

Report from Peer Reviewer 1

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes/No**	**CAB Response**
Justification: I believe they have for P2 and P3, but given the current status of this stock, I have strong concerns with P1, and I think additional material is needed in P1 before the current scoring can be accepted. Some of the rationale provided around HCR, MSY and PRI is too speculative or not clear enough. My concerns with PI are outlined in detail in that Section below. I have referred to some clauses in the MSC Scoring Guidance document to help focus my review. For P2, I have outlined some concerns with certain clauses, mainly around the harbor seal bycatch increase. I think the team did a very good job with the numerous scoring tables in P2 – these are easy to follow. I do not have any major issues with P3 – very straightforward.		The team addressed the comments about P1 and tried to provide better rationale in the justifications of the scoring. For P2, additional information on the harbour seal bycatch and the team's scoring rationale has been added to the report. See also the replies of the team to specific queries below.

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? [Reference: FCR 7.11.1 and sub-clauses]	**Yes/No**	**CAB Response**
Justification: There are numerous conditions outlined in the report. I think they are well written in general and that the milestones are reasonable. I do not have any major concerns with their wording, and I believe they should achieve the SG80 outcomes as indicated. I have indicated some suggestions for a couple of the conditions.		

If included:

Do you think the client action plan is sufficient to close the conditions raised? [Reference FCR 7.11.2-7.11.3 and sub-clauses]	**Yes/No**	**CAB Response**
Justification: Yes – for the most part these are well thought out and should be sufficient. I note that considerable consultation and cooperation will be required in some cases to achieve the necessary outcomes, but that this seems likely in the Icelandic system.		

Table 40 For reports using one of the default assessment trees:

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.1	N	N		SI a. Given the recent poor recruitment, I would like to see some additional justification for choosing SG80 "highly likely" over SG60 "likely" (that the current stock size is above the PRI). This stock's S/R data shows 2 good year classes from lower SSB (1998, 2001), and no good year classes from higher (recently declining) SSB in 2008-2014.The stock index is currently above the level of 1998 and 2001, and I suppose that is the main rationale? Is there any analysis to suggest that the 1998-2001 level is a reasonable PRI? SI b. The only ref. pt. available for this stock is Fproxy, and a level of 0.8 has been chosen as the target. Has there been any analysis of why 2001-15 was chosen as the reference period, why 0.8 was chosen as a target level, and what is its relationship with MSY? This is important relative to SA 2.2.3.1 : "… the team shall justify their use as reasonable proxies of stock biomass for the PRI and/or MSY."	The team agrees that the info about the status of the stock are limited. However the team tried to better justify the scoring and added more specific justification for SI a. The team confirms that the main reasons to score 80 here are: 1 – The biomass index in 2015 is above the level observed in the initial part of the series. 2 – The biomass index is a bove the level of 1998 that produced a relative high recruitment in 2000. In SI b Justification is clearly stated that "IS-SMB biomass index of anglerfish 40 cm and larger, along with catch, is used to calculate Fproxy (catch/survey biomass). The target Fproxy was defined as 80% of the mean Fproxy from the reference period of 2001–2015 (MFRI, 2016a)". MFRI did not perform any specific analysis on the use of 80%. However such level can be considered precautionary taking into account that during the period characterized by a value of Fproxy=1 the stocks showed the highest biomass index.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	**CAB Response**
1.1.2	N/A as long as previous PI is scored at SG80 level	N/A			
1.2.1	N	N		SI a, b. HCR and ref pt seem to be the same thing – Fproxy =0.8. Is it reasonable to expect that the suggested harvest strategy (constant Fproxy of 0.8) will keep the stock at a sustainable level, given the recent declines in biomass at about that level of F? Doesn't there need to be more evidence for a score of SG80 in Si b than just stating that the F has come down slightly in recent years, (and has only been below Fproxy twice)? SI c, d, e. Agreed SI f. Can agree with SG80 scoring, but some of the justification speaks of measures "foreseen", or which "could be applied". Isn't this too speculative? Also, 2.1.2 and 2.2.2 SI e are scored at SG100 – does some of that rationale also apply here?	The team agrees that the Fproxy have been below 0.8 only in the last two year. However, taking into account the biomass and F-proxy trends it is clear that the HS is mantaining the stock at BMSY level for a longer period satisfying SG 80 in SI a and b. The team stresses also that the HS is not only dealing with the selection of the reference point but with the whole process, from data monitoring to TAC control. SI f: taking into account that discard of anglerfish is negligible the measures in place to minimise UoA-related mortality of unwanted catch of the target stock are appropriate. In 2.1.2 and 2.2.2 the scoring is higher because there are specific measures foreseen for some of the primary and secondary species.

1.2.2	N	N	Y. I think the condition is a good one. Perhaps could note that the limit RP will need to be defined as part of the process?	SI a. I have difficulty in seeing how the HCR (constant Fproxy=0.8) can be expected to reduce F as the PRI is approached, especially since the PRI is not clearly defined itself. Some further explanation is needed and would be most helpful here. GSA 2.5 states (and assuming these clauses apply here): " *…teams should note that HCRs based on taking a constant percentage of the year's estimated biomass should not be regarded as meeting the requirement of avoiding the PRI unless some lower threshold is defined."* *"If a management strategy is based solely around a target reference point, the HCR, when combined with the target reference point should ensure that the stock remains well above the PRI and ensure that the exploitation rate is reduced as this point is approached. This is an implied limit reference point*." Also have some concern with the points in SA 2.5.2 re declining biomass.	The team agrees with the reviewer and set a condition in SI a that is in full agreement with the GSA 2.5, which includes: *"unless some lower threshold is defined"* *Here a lower threshold, i.e. 80% of Fproxy is defined.* The team believes that a score of 60 is met because, during the MII interview it was clear that the MII is going to reduce the fishing pressure in the case MFRI notices stock reduction. Such evidence is also stated in the MII letter. Therefore there is a generally understood HCR in place. The same condition has been raised for other stocks (greenland halibut, plaice, tusk, etc.).
1.2.2 contd				I recognize that there is a condition set here but I think much stronger rationale is needed on how the current HCR meets SG60. Is the statement that MII "implicitly" stated that "apprpriate actions" are "foreseen" enough evidence? Seems very vague. Does *SA 2.5.3 a*	Additional justification has been provided in SI a.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				apply? Perhaps there is something in the ICES approach that could be elaborated on? Are there other MSC certified stocks with a similar profile that could be used as an example? Iceland lumpfish stock assessment/management also uses Fproxy, but has an additional B reference point I believe. Assuming the points in SI a are addressed, I agree with the scoring for SI b&c. I don't think the rationale for SI b considers all the main uncertainties though, such as MSY and PRI levels for this stock.	The uncertinities in SI b are related with the availability of survey data to set the level of exploitation in accordance with the ref. point. Survey data take into account the main uncertinies such as the stock dynamic and migration patterns. Therefore SG 80 is fully met.
1.2.3	Y	Y		SI a,c. Agreed. SI b. It would be good to have a sentence or 2 on the stock assessment process – who does it, how often, etc. Either here or in 1.2.4 SI e perhaps. Are any detailed science reports produced?	The team added the sentence as requested in SI b.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.4	Y-mainly	Y		Agree with scoring and rationale, except I would like to see a little more elaboration of the ICES method/ref pts mentioned in the justification in SI b, rather than just a reference to this.	The team added the requested info.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.1.1	Y	Y		I had a look through the Iceland stock status document to get a feel for all the species, rather than go through all the relevant CES advice. Agree in general with scoring totals. One or 2 species here or there could perhaps receive a different SG score, but would not affect the overall PI score. I am a little confused on which redfish stock is the deepwater redfish in Table 14 – does not appear to match any redfish stocks in the Iceland stock status document for 2016? Or have I missed something? Maybe provide some rationale as to why this stock is "highly likely" to be above the PRI. SI b. Gillnet, Longline. DW Redfish is listed as minor primary species in both UoA., and is said to have stock status around the MSY level. In SI a, bottom trawl clause, it is stated that it is unclear whether this stock is at/above its MSY level. (again, assuming I have the correct/comparable redfish stock in all cases)	The description of the deepwater redfish (*Sebastes mentella*) stock structure and status has been improved. The information presented is based on information provided by the ICES 2016 NWWG report and the ICES 2017 advice.The justifications in SI a for the relevant gears have also been modified.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.1.2	Y	N?		Agree with scoring SI a,b,c,d. SI e. An annual review occurs for the primary species, but not for the target species? (1.2.1 SI f did not get scored at SG100). Shouldn't these 2 SI be scored at the same level?	The annual review is carried out on different primary species (such as cod). Therefore the resulting SI scoring is different from the P1.
2.1.3	Y	Y-mostly		SI a, c. Agree for almost all stocks, but maybe not DW redfish, given the earlier concerns expressed? Not sure if that is enough to reduce scores from SG100 or not, but it should be mentioned in rationale. SI b. Agreed.	The team considers that the Icelandic data collection system (which includes both detailed fisheries dependent data and fisheries independent surveys) provides high quality quantiative data on the amount and nature of all primary species taken, and that this data is adequate to determine the risk posed by the UoA to the stocks under consideration. Deep water redfish is evaluated by the ICES NWWG (see modified text), and the available data is deemed sufficient to establish an annual TAC by ICES. Scoring of PI 2.1.3 was harmonised with other recent MSC assessments (Icelandic cod).

2.2.1	Y	maybe	Y. Would like to see some idea of what by-catch would have to be reduced to in the short term (e.g. for harbour seals) so that rebuilding and recovery are not hindered.	Tables in SI a are complex but well laid out and quite logical, and the rationale is well presented. I agree with scoring, but have some questions & concerns with the estimates of harbour seals caught in lumpfish nets, as this is the reason this UoA fails. (It is noted that only 0.23% of the lumpfish GN catch is anglerfish). The team notes that these are new estimates for harbour seal catches, and that they increased by a factor of 5.5 (to 1288) between 2014 and 2015. There was an even larger % increase for grey seal.The earlier numbers, which are quoted in the most recent (2016 I think) MSC surveillance report for the lumpfish gillnet fishery, are 448 and 376 for 2014 and 2015. I think the difference in the 2 sets of numbers needs to be discussed further, given some of the caveats the team has noted around the sampling/data for lumpfish nets (I do recognize the text on pages 51-52 on this). Could also include any available analysis of differences in the lumpfish GN fishery/effort between the 2 years, as possible explanation of the increase (total lump catch ~50% higher in 2015 over 2014). Also, are there any harbour seal bycatch data now available for 2016 (and/or partial-year numbers for 2017) to see if the increase observed in 2015 was sustained? (contd. below)	The failing of the lumpfish UoA was due to two factors: (1) higher bycatch estimates provided by the MFRI, and (2) an updated population estimate of the Icelandic harbour seal population which concluded that in 2016 the harbour seal population was 36% lower than a government issued management objective for the minimum population size of harbour seals in Iceland (Þorbjörnsson, 2017). Both information sources are recent and were not available to previous MSC assessment teams. A paragraph on the fluctuating bycatch numbers, the team's approach to scoring in light of these variations and data on the number of observed trips / fishing effort have been added to the report. There was an increase from 3000 lumpsucker nets set in 2014 to 3769 nets set in 2015 by the Icelandic fishing fleet (MFRI, pers. communication). This increase at least partially explains the higher bycatch estimate for 2015, but the team agrees that better bycatch data is required and shares the reviewer's concerns regarding the fluctuations in these estimates. Conditions have been imposed to recitfy this situation. To the best knowledge of the assessment team agreed incidental take limits do not exist for harbour seals as they do for instance for harbour porpoises where a total anthropogenic removal above 1.7% of the best available estimate of abundance is

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					considered unacceptable (ASCOBANS 2016). Draft data for 2016 indicates 624 harbour seals were caught as by-catch in 3309 nets set (MFRI, pers. communication), which results in an annual population mortality estimate of 8.2% for 2016, or an average of 9.3% in 2014-2016. These estimates are lower than the 'worst-case scenario' the team based it's assessment on as a precautionary approach, but the team still considers these to be too high to argue that the measures in place are expected to ensure that the UoA does not hinder recovery or rebuiding of harbour seals given the generally poor status of this population.
2.2.1 contd.				What bycatch number (or percentage) would be considered as not hindering recovery of harbour seals, given the decreasing trend in that seal population? I suppose if that number is lower than 300-400, then the increase noted in the new data is not that relevant to the scoring? Of course it is much worse for the recovery of the seals, and would likely make achieving the necessary reduction much more difficult.	See above reply.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.2.2	Y	Y	Y – Condition looks OK.	Agree with scoring and rationale.	No comment necessary.
2.2.3	Y	N	Y – Condition looks OK.	Rationale OK. Shouldn't the 95 scores in this PI be 90 (2 SI scored at SG100, 1 SI at SG80?)	Score has been lowered to SG90 as suggested.
2.3.1	Y	Y	Y – Condition looks OK.	Agree with scoring and rationale	No comment necessary
2.3.2	Y	N?	Y – Condition looks OK.	Agree with all scoring. SI e. LL box in SG100 says Y, but last sentence of rationale says LL does not meet SG 100. I think the earlier part of this parag. indicates that SG100 is met. Score of 70 is correct (I think) based on the Y/N scores for LL in each SI.	Thank you for pointoing out this typo in the scoring summary. The team does not consider that the current process represents a 'biennial review of the potential effectiveness and practicality of alternative measures to minimise UoA-related mortality ETP species', and as such PI 2.3.2 scores SG80 for LL. The overall score however remained unchanged at 70 in line with CR 7.1.5.2 (i) since the performance of the scoring issues is half-way between SG60 and SG80 (2x SG60 & 2x SG80).
2.3.3	Y	Y	Y – Condition looks OK.	Agree with all scoring and rationale	No comment necessary.

2.4.1	Y	N?	Y – Condition looks OK.	Should the PI scores of 90 be 85 (1 SG 100 and 2 SG 80 for the Sis), and should the 95 be 90 (2 SG100 and 1 SG80)?	Scoring bottom trawl, Danish seine, anglerfish gillnet and lumpfish gillnet UoAs was revised based on the reviwer's comment and feedback received from ASI. The team considers that the MSC standard is open to interpretation on how to combine scoring element scores in the case of PI 2.4.1 since differnet scoring elements are considered for different scoring issues. According to MSC-FCR-V2.0-7.10.7.4 'Table 4 shall be used to determine the overall score for the PI from the scores of the different scoring elements', but MSC-FCR-V2.0-7.10.7.3 states 'Scores should be determined for each scoring element by applying the process in section 7.10.5 to each scoring element'. The process in section 7.10.5 explains how to score PIs by combining scoring issues at PI level. In other words the question is whether to use Table 4 to combine scores for all scoring elements (as suggested by ASI during review of the present assessment), or whether to to first combine scores of all elements for each SI and to then combine SI scores for the PI in line with FCR 7.10.5.
2.4.2	Y	Y	Y – Condition looks OK.	Agree with all scoring and rationale.	No comment necessary.
2.4.3	Y	Y		Agree with all scoring and rationale	No comment necessary.
2.5.1	Y	Y		Agree with all scoring and rationale	No comment necessary.

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.5.2	Y	Y		Agree with all scoring and rationale	No comment necessary.
2.5.3	Y	Y		Agree with all scoring and rationale	No comment necessary.
3.1.1	Y	Y		Agree with all scoring and rationale	
3.1.2	Y	Y		Agree with all scoring and rationale	
3.1.3	Y	Y		Agree with all scoring and rationale	
3.2.1	Y	Y		Agree with scoring and rationale, including partial score.	
3.2.2	Y	Y		Agree with all scoring and rationale	
3.2.3	Y-mostly	Y		Any data on compliance that can be referenced? I agree with SI scoring. (Should the score for the PI be 90 or 95 – I am unsure)	Yes – added text. The DoF annual report gives the number and nature of violations. In 2015 75% were logbook offences. Following a warning, 0.6% of cases resulted in a loss of license. 2 of 3 scoring issues achieve SG100 = 95 score (3.2.3d does not have an SG100)

Performance Indicator	Has all available relevant information been used to score this Indicator? (Yes/No)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.4	Y- probably	Y		Agree with scoring – any evidence of external review of the Icelandic stock assessments, or of the management side? (I note the reference to ICES review of methods, precautionary approach etc)	Yes, as stated the stock assessments are reviewed within the ICES process.

Table 41 For reports using the Risk-Based Framework:

Performance Indicator	Does the report clearly explain how the process(es) applied to determine risk using the RBF has led to the stated outcome? Yes/No	Are the RBF risk scores well-referenced? Yes/No	Justification: Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response:
1.1.1				
2.1.1				
2.2.1	Y	Y	The team is to be commended for producing the RBF. Although it is difficult for me to evaluate the scoring fully without the inputs available to the team, I think they have done a good job explaining the scores and presenting the rationale and differences for the various species and gears. I did not check the final weighted scores, but I assume they have been calculated correctly, and note that the team provided a link to the MSC scoring spreadsheet on page 210 (if anyone did want to enter the scores and check). I did verify that the scores listed in the PI scoring tables were those which appear in the spreadsheet view on page 211.	The inputs used for scoring by the team are fully referenced and should thus be available to anybody who wishes to verify the assumptions made.
2.3.1				
2.4.1				
2.5.1				

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

The Background Sections are well written and most sections contain the relevant information in sufficient detail to evaluate the PIs. I have made some notes on the report text itself (see last point below). In Background 3.3.1, Status of the Stock, parag 5 should be updated to reflect the most recent information – the biomass has been declining in recent years (as noted in the last parag. of this section). Same goes for the catch description in the second last parag. – current catches are around 1000 tons, not 2500 tons.

It is clear that the anglerfish stock is declining sharply from recent higher levels, recruitment appears to be poor, and the short term outlook is not positive, despite a recent reduction in the Fproxy. I am not sure if the stock size observed before these recent higher levels represents the long-term outlook for this stock, or whether that was some lower level following (possibly) higher exploitation prior to the declaration of the Icelandic EEZ. This raises some additional questions about MSY and PRI levels relevant to P1.

The assessment uses Fproxy = catch/survey biomass. Is there any information on catchability (q) of anglerfish in the survey trawl, or in survey trawls used elsewhere?

I recognize that this report was written prior to the 2016 bycatch data being available. But it should be available now, and would be most useful to compare to the 2014-2015 data, particularly on harbour and grey seal bycatch in certain UoA.

I have compared the scoring of a few PIs with those in some other Icelandic MSC reports for other stocks, and have found no major disagreements. The team has noted in several places where harmonization has occurred.

There are a few places where I have pointed out that minor adjustments to scoring are required based on the existing SI scores (e.g. PI 2.2.3, 2.4.1). If accepted, these would also have an impact on the weighted scores for P2, but should not be significant.

Rather than list in text form here, I have hi-lited a few typos, editorial/format comments, etc. in the report itself, and attached a copy of that along with this review form. I hope that is acceptable, and that it helps with final review of the report.

Report from Peer Reviwer 2

Summary of Peer Reviewer Opinion

Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?	**Yes/No**	**CAB Response**
Justification: In Principle 1 I have queried some scores, or the justifications for scores. If the team were to revise scoring down as a result of these queries, then this could change the overall outcome of the assessment. Principle 2 appears to be very thorough and seeks to clearly explain how a variety of elements are scored for a variety of gears; a difficult task. However, the scale and scope of the assessment means that it is difficult to take full account of all variables in the short space of a peer review. Could reporting have been written more succinctly? In spite of this, it appears that the scoring process has been generally robust. In some places I have queried whether some primary species should be considered secondary and some secondary species considered ETP. However, a number of conditions are identified which should lead to overall improvements in the performance of the fishery. It would appear that the assessment team have reached an appropriate conclusion. However, a particular concern is highlighted for Anglerfish gillnet. This scores much better than other gillnets for secondary and ETP, in spite of appearing to take place in a similar area and having considerably less information to quantify impact. Instead, there is a reliance on the RBF PSA and in particular on the scoring of 'availability'. For example, a score of 3 for availability for harbour seal would cause the anglerfish gillnet to also fail (it is currently scored 2). A recent publication points to quite high concentrations in the area of the fishery. In Principle 3 I have queried some scores, or the justification for scores. Given that there are some high scores in P3, which are justified, it is likely that even if the team were to revise scoring down as a result of these queries, then this would not change the overall outcome of the assessment – although it may lead to further conditions.		The Team replied to the comments about P1 but did not change the scoring. The team disagreed with the comments regarding primary species allocation, but three bird species were reassigned from secondary to ETP species. A more detailed justification why the anglerfish gillnet score for 'availability' is appropriate has been included in the RBF PSA for harbour seals, and replies to specific comments on this issue are presented below. Anglerfish gillnet scores for ETP species have been lowered as a precaution as suggested, even though the team found no evidence that any ETP species are actually being caught by this gear.

Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe? ***[Reference: FCR 7.11.1 and sub-clauses]***	**Yes/No**	**CAB Response**
Justification: All conditions are 2 to 3 pages long, meaning they are hard to follow and hard to pinpoint exactly the reason for the condition. Consideration should be given to whether these can be written more succinctly to pinpoint exactly the issue and exactly the action required. Yes. However, condition 1 lists the same milestone for the first 3 years. This may lead to some confusion at the time of surveillance. Does this mean the fishery has to be no further on in year 3 than in year 1? Perhaps this could be qualified with year 1 – planned, year 2 – underway, year 3 – completed and year 4 – adopted? Condition 2 – the condition is on outcome status, but the rational states the condition has been imposed to improve available information and finally the milestones all refer to the need to develop management. This should be clarified, so that the focus is on either status, management or information. Condition 3 – it states that several gears fail to meet SG60 – is this a typo, or does it relate to an earlier version of the scoring?		Agree - Some of the rationale text is removed The condition 1 foreseen the change in management procedure that are difficult to plan in less than 3 years. Moreover, similar condition are raided for other stocks under MSC process. The rationale presented in Condition 2 is based on the rationale presented in the scoring table. The statement 'A condition has been imposed to improve the available information' was referring to Condition 4; the sentence has been deleted to avoid confusion. The milestones refer to management actions since this is what is required to improve the outcome status. Condition 3 - this was a typo and should have read 'SG80', thank you for spotting it.

If included:

Do you think the client action plan is sufficient to close the conditions raised? ***[Reference FCR 7.11.2-7.11.3 and sub-clauses]***	**Yes/No**	**CAB Response**
Justification: Yes		

Table 42 For reports using one of the default assessment trees:

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.1.1	Yes	No		Section 3.3.1 of the report (the section about stock status) should be reworded as some phrases in the present tense relate to the past and are no longer correct. For example it states "The stock size of anglerfish has been increasing since 1998". Only much later in the report section is this statement corrected with reference to the more recent decline in stock status. Figure 5-6 shows that the biomas index has fallen dramatically in recent years. It also shows that fishing mortality has been above Fproxy target for all apart from the last 2 years. Scoring issue (a) concludes that the stock status is "highly likely" to be above PRI – even though this reference point is not defined – primarily using the argument that the stock has previously been at lower levels. This is a plausible argument but, given the context of the rapidly falling biomas, this perhaps lacks sufficient quantitative evidence for a high level of confidence (especially as the stock assessment is not probabilisitc). A more precautionary score may be advisable for scoring issue a. This appears to be even more the case when considering stock	The section 3.3.1 has been modified as suggested. However the team disagree in reducing the scoring as suggested. In the justification of SI b is clearly stated that the Fproxy in the period where high values of biomass were observed (2005-2011) was around 1. Therefore the team belives that such level of exploitation is in accordance with FMSY. Both in SI a and b justifications for the 80 scores are substantiated. In the first case because the recruitment could be high even with lower level of biomass as observed in 1998. In the second case because the exploitation has been at level consistent with FMSY for 2 GT.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
				status relative to MSY (SIb). The justification states Fproxy has been consistent with Fmsy however this justification appears unclear. Figure 5.6 clearly shows that F proxy has been above Fproxy target in all but the last couple of years. A score of 80 both for the PI and for scoring issue b is not clearly justified.	
1.1.2				If 1.1.1 is scored down (as appears to be warranted on the basis of the stock status and fishing mortality charts presented in figure 5-6) then rebuilding should be scored.	The team disagree in changing the scoring in P1.1.1.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.1	Y	Y		SIa: This correctly identifies the parts of the harvest strategy. Although the description of the HCR is overstated (see below for comment on 1.2.2) the overall scoring is appropriate. SIb: It is reasonable to use the fact that Fproxy is below F proxy target (in recent years) as justification that the harvest strategy is achieving it's objectives. The scoring is therefore justified. SIc: the scoring is appropraite, but a little more detail may improve the justification. SIc & SId: brief comment provided is sufficient. SIe: The crux of scoring relies on the statement that "measures imply ongoing review". This is not explicitly meeting the SG80 guidepost, but in the context of what the authority is doing to minimise unwanted catches it is probably reasonable to conclude that this activity meets the intent of SG80.	No response.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.2	No	No		SIa: It is correct to conclude that the HCR is not well defined therefore SG80 is not met. SIb: Given that HCRs are not well defined it is questionable to suggest that the HCR is robust to uncertainties. Further justification is therefore required to support a score or SG80 for this SI. SIc: Surveys and monitoring are not tools to control exploitation rate, nor are they defined in the HCR. TAC is the tool used to control exploitation rate (and perhaps also various technical measures and licencing). In the justification reference is made to 'table 4'. This should be table 5. This is a more up to date table than the one on the referred stock assessment. This shows that in 3 years from 2010 to 2013 the Agreed TAC exceeded the Advised TAC and the catches in turn exceeded the agreed TAC. In 2014/15 the TAC was overshot by 8%. This should be discussed under scoring issue c and used to qualify the statement that 'expoitation levels for the last 3 seasons are in line with the national TAC'. . Overall, scoring at the SG80 level for this SI may still be appropriate, but the justification should more tighty focus on the effectiveness of the 'tool'.	The team modified the justification of SI b and c as suggested.

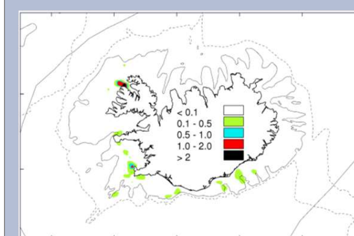
Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.3				The stock biology section of the report states that "Further research is required on maturation processes including: the function of the gelatinous veil, spawning behaviour, spawning areas, and fecundity. Much information pertaining to the physiological, genetic, ecological, and abundance of anglerfish is incomplete or not understood and *requires further research*". It is not clear if this relates to the stock under assessment here or if these uncertaities have since been addressed. It may be useful to address the information uncertainties identified in the chapter in the scoring justification. SIa: Scoring at the SG100 level requires comprehensive information on stock structure, stock productivty and stock abundance. Most of the justification focusses on fleet activity and to a lesser extent environmental information. In order for SG100 to be met it must be shown that there is comprehensive information for all parameters listed in the scoring guidepost.	The team disagree with the review justification, because there is clear evidence that MFRI collect oceanographic data as well as bilogical data of the target stock. Most of the uncertinities have been addressed and the a beam trawl survey just started providing more infor on the stock biology.

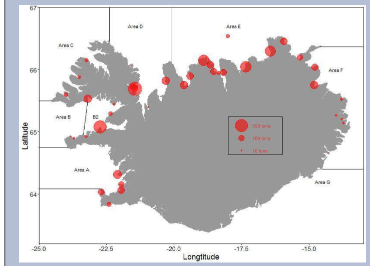
Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
1.2.4				SIc states that the "assessment estimates stock status relative to reference points that are appropriate to the stock and can be estimated". However, MSY and PRI are not defined. Instead the only reference point is Fproxy target which is a generic reference point determined as 80% of the mean Fproxy in 2001–2015. It would appear that the stock assesment is not able to estimate more analytical refenence points. This should be more fully discussed in the justification and further consideration should be given of whether SG80 is met for SIc.	As evidenced in ICES WKLIFE 3 (ICES, 2013), the use of survey index and the estimation of Fproxy are appropriate approaches to evaluate stocks with this type of data. In SI c the justification of the fact that the assessment takes uncertainty into account is justified by the use of survey biomass index with a confiedence interval.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.1.1	Yes	Yes		This is a complex assessment of many gears with differing catch profiles. The team have made a good job of seeking to present this complexity through elemental scoring. The catch composition data and allocation of primary / secondary / main / minor appears thorough. One general comment – table 6 should avoid using the acronym PRI for primary as this is used by MSC for Point of Recruitment Impairment. Additionally the paragraph about "The landings of deepwater redfish….." (bottom page 35) could be clarified, as this appears to be quite an important point. As stock status for deepwater redfish is not known consideration should be given to including this as a secondary species and scoring with the RBF. Given the low resilience of deepwater redfish, this is particularly important for the bottom trawl UoA where catches are 4%. The justifcation for a score of 80 for this species appears weak.	PRI has been replaced by 'PRIM' to avoid confusion as suggested. The description of the deepwater redfish (*Sebastes mentella*) stock structure and status has been improved. The information presented is based on information provided by the ICES 2016 NWWG report and the ICES 2017 advice.The justifications in SI a for the relevant gears have also been modified. The team disagree that it is necessary to use the RBF to assess deep water redfish. The ICES framework for category 3 stocks is applied, stock advice is issued on an annual basis, and Iceland is following the recommended TAC since 2013/2014: http://www.hafro.is/Astand/2016/english/demersalbeakedredfish_2016.pdf

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.1.2	Yes	Yes		Generally, the decision to not do elemental scoring seems reasonable given all primary species are subject to similar managament. However, for Scoring issue c – some primary species lack stock assessment and stock status is uncertain – notably deepwater redfish. This may therefore change the score for the trawl UoA. Consideration should be given to changing those stocks which cannot be estimated relative to reference points to secondary species and including in the RBF exercise. For scoring issue e to score at the SG100 it would be preferable to reference an actual review, rather than routine management processes.	Scoring for SI e is harmonised with other recent MSC assessments; as explained in the report the team considerst that there are multiple alternative measures being implemented simultaneously and that these measures are continuously being reviewed in the Icealndic management system.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.1.3	Yes	Yes		Again, decision to not do elemental scoring seems reasonable given all primary species are subject to similar data collection processes. However, for Scoring issue a – some primary species lack stock assessment and stock status is uncertain – notably deepwater redfish. Is this due to uncertainty with data? In which case for any UoAs where this species is main, scoring may be less.	The team considers that the Icelandic data collection system (which includes both detailed fisheries dependent data and fisheries independent surveys) provides high quality quantiative data on the amount and nature of all primary species taken, and that this data is adequate to determine the risk posed by the UoA to the stocks under consideration. Deep water redfish is evaluated by the ICES NWWG (see modified text), and the available data is deemed sufficient to establish an annual TAC by ICES. Scoring of PI 2.1.3 was harmonised with other recent MSC assessments (Icelandic cod).
2.2.1	Y	N		Several bird species are listed at Vulnerable by IUCN. These should therefore be listed as ETP in the assessment (see SA3.1.5.3). The high catches of harbour seal bycatch in lumpfish gillnet has correctly been identified and is justification for failing to meet SG60. However, it would be helpful to clarify why the catch profile of the anglerfish gillnet is likely to be different? Is this because they are deployed in a different area	The three relevant bird species have now been listed as ETP. Scoring rationales have been revised but there was no change to scores / the assessment outcome. The catch profile of anglerfish gillents and lumpfish gillnets is different due to two major factors:

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	**CAB Response**
				(not according to table 25) or a different season where harbour seal bycatch is less likely? If the only difference between the 2 gillnet gears is that there is *less* information from the anglerfish gillnet fishery, then careful consideration should be given whether to align the scores. The scoring of harbour seal in the RBF PSA exercise for anglerfish gillnet relies upon a score of 2 for availability. For this, an areal overalp of less than 30% must be demonstrated. Areal surveys show that harbour portpoise is mostly concentrated in The Westfjords, North West and Flaxafloi – which correlates with the area of the fishery. So justification for a score of less than 30% availability should be strengthened. https://www.researchgate.net/publication/315110781_Aerial_census_of_the_Icelandic_harbour_seal_Phoca_vitulina_population_in_2016_Population_estimate_trends_and_current_status	(1) Differences in the location of the main fishing grounds. Anglerfish fishing grounds are mainly contentrated in the north-west of Iceland, whereas fishing grounds for lumpfish have a wider distribution (anglerfish only make up 0.23% of the lumpfish net catches):  Anglerfish fishing grounds in 2015 (MFRI, 2016)

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	**CAB Response**
					 Lumpfish fishing grounds in 2016 (Kennedy/MFRI, 2017). As was stated in the heading of Table 25 (now Table 26): '*maps of gillnet fishing effort include cod gillnets, anglerfish gillnets and lumpfish gillnets*'. The Table has been amended to make this more obvious. (2) The fishing seasons of the two gears are different. Anglerfish gillnets are deployed mainly from late summer to winter, whereas lumpfish gillnets are deployed in March - August (https://doi.org/10.1093/icesjms/fsu170). The fishing season for lumpfish thus overlaps with the main pupping and

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					moulting period of Icelandic seals, when seals are found closer to their haul-out sites on land and thus more likely to encounter fishing gears set close to land (https://doi.org/10.1007/s00300-016-1904-3). With regards to scoring areal overlap in the RBF PSA for harbour seal (we assume the mention of 'harbour porpoise' in the reviewer's comment was meant to read 'harbour seal'), the team has added additional justifications to the harbour seal PSA as suggested.
2.2.2	Y	N		There is a statement which states "Harbour seal (gillnet, lumpfish gillnet, anglerfish gillnet), common loon (lumpfish gillnet), European shag (lumpfish gillnet), great cormorant (lumpfish gillnet), grey seal (lumpfish gillnet), and harbour porpoise (anglerfish gillnet) failed to reach SG 60 for PI 2.2.1". This does not correspond to scoring in 2.2.1.	Thank you for spotting this typo, the statment should have read "Harbour seal (gillnet, lumpfish gillnet, anglerfish gillnet), common loon (lumpfish gillnet), European shag (lumpfish gillnet), great cormorant (lumpfish gillnet), grey seal (lumpfish gillnet), and harbour porpoise (anglerfish gillnet) failed to reach SG 80 for PI 2.2.1".
2.2.3	Y	Y			No comment necessary.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.3.1	N	N		In reference to ETP information it appears that the understanding of impact is based on logbook returns and a low level of observer coverage in some fisheries. Given that should a fuller range of ETP species be referred to in 2.3.1? The basis on which some species have been filtered out of the assessment is not clear. For example, only 3 species of bird and 1 seal are considered. But there are a number of papers refering to whale and dolphin bycatch in gillnet fisheries in Iceland. If these have been considered, then this should be included in the justification: http://www.int-res.com/articles/esr_oa/n020p071.pdf In the scoring justification it is positive that the assessment team have sought to present mortality estimates against population estimates. Given the paucity of information about ETP impacts of Anglerfish gillnets it would seem unreasonable to score this at the SG100 level. An absence of evidence of impact does not equate to evidence of absence of impact. It would be more appropriate to include anglerfish gillnet with the the other gillnet.	Based on the reviewer's feedback 3 additional bird species are now considred as ETP. Reeves et al. (2013) is a global review of marine mammal bycatch and the team does not consider all the species listed in the article relevant for the present assessment. As is explained in the report, the team based its assessment on updated bycatch estimates provided specifically for the purpose of this assessment by the MFRI. In addition the team verified that all ETP species considered in recent MSC assessments such as the recent Icelandic cod report (which included cod gillnets) were taken into account. This was done to ensure that (i) the assessments were harmonised wherever possible, and (ii) no species included previous assessments based on older data sources such as Pálsson et al (2015) were left out. No species were 'filtered out' in this process. The team however agrees that the logbook returns are poor and that a higher level of observer coverage is required to improve the available data on

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
					incidental bycatch of ETP species. Since the quality of the by-catch data is still poor the team agrees that there may be other spcies of whales and dolphins which are on occasion entangled in gillnets and which are not represented in the data on bycatch rates considered in this and previous MSC assessments. A number of conditions have been imposed to address precisely this problem. Regarding the anglerfish gillnet score the team does consider that bycatch of marine mammals such as seals for instance is lower (see responses to earlier comments / additional PSA justifications re availability), however we agree with the reviewer's comment that absence of evidence of impact does not equate to evidence of absence of impact. Scoring for anglerfish nets has been lowered from SG90 (not SG100 level as stated by the reviewer) to SG80 to be in line with cod gillnets as suggested.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.3.2	N	N		It is positive that Iceland is now an active member of WGBYC - https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2017/WGBYC/wgbyc_2017.pdf . The 2017 report refers to pinger trials in Icelandic Gillnet fisheries, which they intend to report on in 2018. This would seem to be relevant to this assessment. The assessment rightly recognises the need for a conditon for gillnet, lumpfish gillnets, longlines. However, as the only differnce for the anglerfish gillnet is that there is less evidence available to assess impact, then this gear should also be included in the condition. Additional information is required to justify an overall score of 100 for anglerfish gillnet for ETP managament, in the context of the absence of information that required RBF to be used for 2.3.1.	Reference to Iceland's participation in WGBYC and the pinger trials has been added to the report, thank you for bringing this to our attention. The overall score for anglerfish nets has been lowered, and the gear has been added to the relevant condition as suggested.
2.3.3	Y	N		The assessment rightly recognises the need for a conditon for gillnet, lumpfish gillnets, longlines. However, as the only difference for the anglerfish gillnet is that there is less evidence available to assess impact, then this gear should also be included in the condition.	Although there are reasons why it is likely that anglerfish nets catch fewer ETP species than other types of gillnets (see earlier replies), the team agrees with the precautionary approach of adding this gear to the condition until more evidence on the impacts of this gear is available.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.4.1	Y	Y		The assessment correctly identifies the need for a condition on trawl impacts on lophelia. Other scoring appears appropriate.	No comment necessary.
2.4.2	Y	N		It is not clear why trawl habitat management scores SG80 for lophelia, when this same VME scores at SG60 for 2.4.1. By contrast, management scores SG60 for nephrops trawl for coral gardens and sponges scores, in spite of an SG80 for status.	Coral gardens, sponges and *Lophelia* all scored at SG60 level for PI 2.4.1, SI b (VME habitat status). As is explained in the report, the Icelandic management strategy for VMEs is mainly implemented through a system of closed areas which effectively prevents both bottom trawls and *Nephrops* trawls from being used in known areas of cold-water coral concentrations along the edge of the continental shelf. The team considered that this represents a partial strategy for cold water corals which is not yet in place for coral gardens or sponge concentrations. This explains the difference in the PI 2.4.2 scores for these VME habitat types.
2.4.3	Y	Y		A score of 85 is appropriate.	No comment necessary.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.5.1	Y	N		There appears to be too narrow a focus on anglerfish and the targetted anglerfish fishery. This PI should address the impacts of the UoAs – i.e. all gears, even when anglerfish is only a minor species. As such, harmonsiation with those other gears may be warranted. A quick check of the other ISF demersal fisheries suggests scoring at SG 80 is more usual.	The team disagrees that it is inappropriate to focus on anglerfish fishery and does not agree that the score should be harmonised with other MSC assessments. The 'target stock' for the purpose of the present assessment is anglerfish for all UoAs, and scoring rationales of other ISF fisheries are focussed on the relevant target species (see for instance the scoring rationale of the MSC Icelandic cod or haddock assessments). As such the approach is harmonised; the difference in scoring is due to the fact that the Icelandic anglerfish fishery does not have the same impacts on key elements of ecosystem structure and function as for instance the Icelandic cod fishery has.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
2.5.2	Y	N		For scoring issue a - The Fisheries Management Act is not an ecosystem strategy. A fuller description should be provided of the reference "Ministry of the Environment 2010" in order to demonstrate that this is an ecosystem strategy. Implementation of routine monitoring of fishing does not seem like SG100 level evidence of implementation of ecosystem managament.	The full title of the reference for 'Ministry of the Environment 2010' was included in the reference list in section 7 of the report as follows: '*Ministry for the Environment. 2010. Stefnumörkun Íslands um líffræðilega fjölbreytni. Framkvæmdaáætlun (national strategic plan for preservation of biological diversity)*'. As explained in the scoring rationale, the team considers that the Icelandic strategy contains several measures to address the main impacts of the UoAs on the ecosystem, and that at least some of these measures are in place. Scoring of this PI was harmonised with other MSC assessments of demersal species (see recent cod, haddock assessments), which scored lower on ecosystem outcome status; we consider lowering the score for the anglerfish assessment to be unjustified.
2.5.3	Y	Y			No comment necessary.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.1.1	Yes	Yes		Given that the fishery takes place entirely in the Iceland EEZ the requirement for cooperation with other parties is limited. Similarly the requirement for a high level dispute resolution mechanism is limited, in the context of this fishery. The scoring for 3.1.1 is therefore justified. For completeness however, table 34 of the report does state that "A small proportion (0.2% in 2016) of Anglerfish is caught by Faroese vessels, operating within the Icelandic EEZ through bilateral agreement". Is this a share of the TAC or a bycatch allowance? It may therefore be worth making reference to this bilateral agreement here and consider any dispute resolution mechanisms in place at this bilateral level.	
3.1.2	Yes	Yes		Roles and responsibilities are clearly defined and the consultation process is effective. Scoring and justification are appropriate.	

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.1.3	Yes	No		The difference between a score of 80 and a score of 100 is very small and much-discussed by MSC assessors! My understanding is that the key difference is that at SG100 there must be a management policy requirement that objectives *are set*, not simply that there are objectives which require certain actions. SG 80 is clearly met – objectives and the precautionary approach are both explicit. The justification for scoring at SG100 as opposed to SG80 is based on the statement "since these principles are codified in formal law, their application is required by management policy". This appears to be a requirement to follow (i.e. apply) objectives, rather than a management policy requirement for objectives to be set. In order to justify a score of SG100, it should be clearly stated what is in place over and above the requirements of SG80.	No change. This is clearly open to various interpretations throughout the assor community. The explanation here suggests a matter of semantics, which could easily be lost in translation. Harmonisation: The score and jsutification is consistent with previous Icelandic assessments.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.1	No	No		This PI is focussed on fishery specific objectives. It should therefore address the objectives in place for Anglerfish (and the gears used to catch anglerfish). The objective referred to in the justification is in the Fisheries Management Act. However, the only objective in that appears to be *" to promote their conservation and efficient utilisation, thereby ensuring stable employment and settlement throughout Iceland*". http://www.fisheries.is/management/fisheries-management/the-fisheries-management-act/ . The act makes no mention of MSY or anglerfish.I have not checked the other (earlier) references for objectives. There is no management plan for anglerfish referred to. In order to justify scores above the SG60 level (i.e. implicit objectives), then explicit fishery specific objectives should be referred to. In relation to P1 Fproxy target may be seen as some form of measurable objective.	Amended text, no change to score. The Fisheries Management Act states objectives that support the fishery-specific management applied to this fishery. For example the setting of a TAC (which is explictly defined and specific to Anglerfish) is required to deliver the objectives stated in the Act. Agree the F target is the fishery-specific measure supporting the objective. Additional reference to the technical measures used that support objectives.

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.2	Yes	Yes		Although there is no fishery management plan in place for anglerfish (so it cannot be stated that decisions are guided by fishery secific objectives) the annual quota allocation process follows an established process, with the stock assessment being used as the basis for advice (following the ICES framework for category 3 stocks). And the Fishery Management Act then states that the minister will set the TAC "having obtained the recommendation of the MRI". The score given is appropriate.	
3.2.3	Yes	Yes		The Icelandic system of monitoring, control, system does appear to be comprehensive. Justification is clear and scoring is appropriate.	

Performance Indicator	Has all available relevant info been used to score this Indicator? (Y/N)	Does the information and/or rationale used to score this Indicator support the given score? (Yes/No)	Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA)	**Justification** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	CAB Response
3.2.4	No	No		No actual review reports or evaluation reports are provided as references in support of scoring. Is the routine process of on-going review the same an actual review or an evaluation? I understand the intent of this PI to be the latter – i.e. dedicated reviews & evaluations are needed. Have there been reviews or evaluations of the MCS system, or the quota system, or closed areas, or licencing, or the bilateral agreement etc, etc.? Scoring issue a looks at the "parts" of the management system. Scoring issue b looks at the holisitc fishery specific managament system. Reference to reviews of scientific advice should be included in scoring issue a (i.e. when considering "parts" of the management system). The comment in scoring issue a that "there is no holistic evaluation of the management system as such" should be moved to scoring issue b. The only external review referred to is an ICES review of the fishery science (which is a "part" of the management system, so belongs in scoring issue a). This contradicts the finding of PI.1.2.4 which clearly states that there is no external review of the stock assessment. Overall the justification does not appear sufficient for SG80 to be met – possibly for both scoring issues but particularly for scoring issue b.	No change to score, however text revised to clarify that: • ICES does not review (corrected), but assessment approach follows ICES, which is subject to comprehensive review. • The Fisheries Committee is made up of various stakeholders (industry and scientists) and can be considered external. In terms of harmonisation, this scoring is consistent with other certified Icelandic fisheries.

Table 43 For reports using the Risk-Based Framework:

Performance Indicator	**Does the report clearly explain how the process(es) applied to determine risk using the RBF has led to the stated outcome? Yes/No**	**Are the RBF risk scores well-referenced? Yes/No**	**Justification:** Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. Note: Justification to support your answers is only required where answers given are 'No'.	**CAB Response:**
1.1.1				
2.1.1				
2.2.1			See justification for 2.2.1 above.	
2.3.1				
2.4.1				
2.5.1				

Appendix 3: Stakeholder Submissions

Appendix 3.1: Stakeholder Submissions Regarding Conditions

Appendix 3.1.1 Letter from the Directorate of Fisheries

FISKISTOFA
TRAUST - FRAMSÆKNI - VIRÐING

Icelandic Sustainable Fisheries

Akureyri, 20. 02. 2017
0012/2017 – 1.1.1

Effort to minimize bycatch of marine mammals and seabirds in Icelandic fisheries

Fiskistofa has in recent years joined the various stekeholders within Icelandic fisheries, the scientific community and civil society in efforts to reduce the amont of bycatch of marine mammals and seabirds. In cooperation with the same parties, Fiskistofa has taken measures in order to encourage improvent in registering such bycatch in logbooks.

Fiskistofa welcomes future cooperation with ISF and its partners in this field.

On behalf of
Fiskistofa

Eyþór Björnsson
Director General

sími 569 7900 • www.fiskistofa.is

Appendix 3.1.2 Letter from the National Association of Small Boat Owners

LANDSSAMBAND
smábátaeigenda

Icelandic Sustainable Fisheries
Grandagarður 16
101 Reykjavík
Iceland

Reykjavík, 14.2.2017

Memorandum of understanding.

In December 2014 the Icelandic lumpfish was MSC certified. In Iceland the largest share of the lumpfish is fished by small boats which are NASBO members. The certificate has a condition regarding information on the nature and amount of bycatch in lumpfish nets and fisheries. A second conditions is regarding a strategy which needs to be in place for managing bycatch. The condition stipulates that the fishery should not pose a risk of serious or irreversible harm to bycatch populations. NASBO has been working with ISF since 2015 on a solution on these matters with good results and the two conditions are each on target.

The NASBO welcomes future cooperation with ISF in this area and for other fish species. NASBO is willing to work on consultations between the fishing industry SFS, the DF as well as the MFRI and MRI to fulfil conditions regarding bycatch with in fisheries and other issues needed to maintain MSC certifications on fisheries by small boat owners and members of NASBO.

On behalf of NASBO,

Axel Helgason

Landssamband smábátaeigenda | Hverfisgötu 105 | 101 Reykjavík | Sími 552 7922 | ls@smabatar.is | smabatar.is

Appendix 3.1.3 Letter from the Marine and Freshwater Research Institute

Icelandic Sustainable Fisheries
Grandagarður 16
101 Reykjavík

MARINE & FRESHWATER RESEARCH INSTITUTE

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

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

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

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

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

On behalf of Marine and Freshwater Research Institute,

Guðmundur Thordarson
Head of Demersal Division

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

Appendix 3.1.4 Letter from the Ministry of Industries and Innovation

Icelandic Sustainable Fisheries ehf.
Grandagarði 16
101 Reykjavík

ATVINNUVEGA- OG
NÝSKÖPUNARRÁÐUNEYTIÐ

Ministry of Industries and Innovation

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

Reykjavík September 22, 2017
Reference: ANR17090278/11.0

Icelandic authorities emphasize responsible and sustainable utilization of marine resources. Stock assessment as well as advice on total allowable catch (TAC) is received from the Icelandic Marine Research Institute (MRI) and from the International Council for the Exploration of the Sea (ICES). Icelandic authorities have since 2007 followed the policy to base fisheries management in Icelandic waters on the application of long term management plans (LTMP) and have developed harvest control rules (HCR) for several species of major importance, which have been evaluated by ICES. Since 2013, the Minister of Fisheries has, in deciding total allowable catch, followed the advice of the MRI 100% for all the stocks that the Minister decides the TAC for.

MRI has built the advice for Anglerfish (Lophius piscatorius) on an advisory rule based on the precautionary approach. This is the same format as ICES follows concerning data limited stocks (DLS, category 3). Since 2013 the Minister has decided the TAC for anglerfish according to this advisory rule and, as for other species, followed the advice of the MRI to the point.

On behalf of the Minister of Fisheries and Agriculture

Sigurgeir Þorgeirsson

Annas Jón Sigmundsson

Appendix 3.2: Comments from ASI GmbH

As a part of its annual surveillance of the CAB, ASI (Accreditation Services International GmbH) conducted an assessment of this assessment, including a desk study of the Peer Review Draft Report (PRDR). The comments below, which relates particularly to this expedited assessment, resulted from that desk study.

Comment 1	
Normative reference and requirement	MSC-FCR-V2.0-7.10.7.4 7.10.7.4 Table 4 shall be used to determine the overall score for the PI from the scores of the different scoring elements.
Description	The team has not always followed table 4 to determine the overall score for the PI from the scores of the different scoring elements.
Evidence observed (pertaining to this expedited assessment)	The team did not determine the overall score for the PI according to the rules provided in FCR table 4 (Combining element scores). In order to assess PI 2.4.1 - Habitat Outcome, the team identified which scoring elements were the “commonly encountered habitats” (to be assessed in scoring issue a), “vulnerable marine ecosystems” (in scoring issue b) and “minor habitats” (scoring issue c) affected by each Unit of Assessment (UoA). The overall scores for this PI are presented in the Peer Review Draft Report (PRDR, page 180). Among them, the team awarded: - 70 score for the bottom trawl (UoA 1) - 85 score for the Danish seine (UoA 3) - 90 score for the angelfish gillnet (UoA 5) - 90 score for the lumpfish gillnet (UoA 6) However, according to the scoring tables prepared by the team: - the bottom trawl (UoA 1) affects nine (9) different scoring elements, of which three (3) were scored as 60 and six (6) were scored as 80. That is, all elements meet SG60; most achieve higher performance, at or exceeding SG80; only a few fail to achieve SG80 and require intervention action, which would correspond to a 75 score instead of the 70-score awarded by the team. - the Danish seine (UoA 3) affects eight (8) different scoring elements, of which three (3) were scored as 80 and five (5) were scored as 100. That is, all elements meet SG80; most achieve higher performance at SG100, and only a few fail to achieve SG100, which would correspond to an 95 score instead of the 85-score awarded by the team. - the angelfish gillnet (UoA 5) affects ten (10) different scoring elements, of which six (6) were scored as 80 and four (4) were scored as 100. That is, all elements meet SG80; a few achieve higher performance, but most do not meet SG100, which would correspond to an 85 score instead of the 90-score awarded by the team. - the lumpfish gillnet (UoA 6) affects nine (9) different scoring elements, of which five (5) were scored as 80 and four (4) were scored as 100. That is, all elements meet SG80; a few achieve higher performance, but most do not meet SG100, which would correspond to an 85 score instead of the 90-score awarded. This finding is graded as a minor non-conformity, as is not considered to be a complete failure to fulfil an accreditation requirement, or a breakdown of a critical element of the CAB’s management system.
CAB response	The assessment team wishes to point out that Table 4 describes a score of 90 as “All elements meet SG80; some achieve higher performance at SG100, but some do not.” As UoAs 5 & 6 both score 4/10 at 100, this can be interpreted as a 90 score. The FCR does not state ‘some’ equates to exactly 50%. The Guidance to MSC´s FCR, article G7.10.7, states the following: *In considering the scoring of individual PIs based on the performance of different scoring elements, the terms below should be used:*

	- Few: Most of the scoring elements should be taken to indicate 'minority: majority' or 'less than half: greater than half' (e.g. if there were 6 scoring elements, the ratios '1:5' and '2:4' would both be represented by the terms 'few:most'). *- Some: 'Some' should be taken to indicate a roughly equal split of scoring elements.* The team did not use FCR table 4 to determine the overall score for the PI since different scoring issues relate to different scoring elements. Whilst MSC-FCR-V2.0-7.10.7.4 states that 'Table 4 shall be used to determine the overall score for the PI from the scores of the different scoring elements', MSC-FCR-V2.0-7.10.7.3 states that 'Scores should be determined for each scoring element by applying the process in section 7.10.5 to each scoring element'. The process in section 7.10.5 explains how to score individual PIs by combining scoring issues at PI level. Since different scoring elements were considered for different scoring issues for PI 2.4.1 the team determined a score for every scoring issue using Table 4, and then combined these scores using the process in section 7.10.5. For example for Danish Seines (where the largest discrepancy in the score awareded by the team was observed): SI a - 5 x SG100 = score of 100 SIb - 2 x SG80 = score of 80 SIc - 1 x SG80 = score of 80 PI level score according to MSC-FCR-V2.0-7.10.5.3.iii is 85 since performance agains the scoring issues is slightly above SG80 (a few scoring issues are fully met, but most are not fully met). In the opinion of the team the MSC standard is open to interpretation, which is evidenced by the fact that several peer reviewers, the team and ASI experts suggested different scores for this PI. In the opinion of the team if Table 4 is simply used to combine element scores this effectively means giving scoring issues for which more scoring elements are considered more importance (for instance in a hypothetical asessment considering ten comonly encountered habitats but only one VME habitat). The anglerfish assessment report has been updated as suggested by ASI, i.e. by determining the overall score for the PI according to the rules provided in FCR table 4 as suggested by ASI.

Comment 2	
Normative reference and requirement	MSC-FCR-V2.0-7.11.1 7.11.1 The CAB shall set one or more auditable and verifiable conditions for continuing certification if the UoA achieves a score of less than 80 but equal to or greater than 60 for any individual PI.
Description	The scores presented for each PI in Appendix 1.3 (Conditions) do not correspond to those given in the report.
Evidence observed (pertaining to this expedited assessment)	In Appendix 1.1 - Performance Indicator Scores and Rationale - of the Peer Review Draft Report (PRDR), the following scores were given by the assessment team: PI 2.2.1, score 75 for both gillnet and anglerfish gillnet UoAs PI 2.2.2, score 65 for gillnet, anglerfish Gillnet and lumpfish Gillnet, and score 75 for longline UoAs. PI 2.2.3, score 75 for gillnet, anglerfish Gillnet, lumpfish Gillnet and longline UoAs PI 2.3.1, score 70 for lumpfish gillnet UoA PI 2.3.2, score 65 for gillnet and lumpfish gillnet, and score 70 for longline UoAs PI 2.3.3, score 70 for gillnet, lumpfish gillnet and longline UoAs. PI 2.4.1, score 70 for bottom trawl PI 2.4.2, score 75 for bottom trawl and Nephrops trawl UoAs

	The instructions for the Full Assessment Reporting Template / Appendix 1.3 (Conditions) requires inserting the relevant PI number, text and score, for each of the conditions set. However, the PI scores presented in Appendix 1.3 of the PRDR do not correspond to those given in the scoring tables. Instead of the required PI score value, the CAB inserted the reference to the scoring issue guidepost met at the SG 60 level. For example, in condition number 4 for PI 2.2.3 (page 220) the CAB states "Scoring issue (a): 60", instead of inserting the actual PI score (i.e. 75). This finding is graded as a minor non-conformity, as is not considered to be a complete failure to fulfil an accreditation requirement, or a breakdown of a critical element of the CAB's management system.
CAB response	The assessment team wishes to point out that MSC´s Fisheries Certification Requirements are subject to interpretation. The team harmonised the way P2 conditions were presented with other recent assessments such as the recent ISF Iceland Cod / the ISF Greenland Halibut assessments. As indicated in the report the scores presented do not refer to the PI level scores but to the SI level scores of scoring elements which failed to reach SG 80. The team notes that in the 'MSC Full Assessment Reporting Template v2.0.doc', the instructions in 'Table A1.3' only state ' insert from scoring template table' whithout detailing whether the PI level score or the score of the scoring element affected by the UoA which failed to reach SG80 should be inserted. Conditions have been revised to refer to the PI scores.

Comment 3	
Normative reference and requirement	MSC-FCR-V2.0-7.11.2 7.11.1.2 The CAB shall draft conditions to follow the narrative or metric form of the PISGs used in the final tree.
Description	The CAB has not drafted some of the conditions following the required narrative or metric form of the PISGs.
Evidence observed (pertaining to this expedited assessment)	The CAB did not draft the condition for PI 2.2.3 - (UoA 5 - anglerfish gillnet) following the required narrative. The team used the Risk Based Framework (RBF) to assess the four (4) main secondary species (PI 2.2.1) identified in the anglerfish gillnet Unit of Assessment (UoA 5): common guillemot, northern fulmar, harbour seal and the harbour porpoise. For PI 2.2.3 (Secondary species information), the MSC default assessment tree includes an alternative SG80 text ("Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species") to be used in cases where the RBF is applied to PI 2.2.1, as it is the case (see related finding). The team awarded a 75 score for the PI 2.2.3 – (UoA 5 - anglerfish gillnet) and a condition was therefore raised (condition 4). It is noted that the same condition is also used for UoA 4 (gillnets) and UoA 7 (longlines). MSC FCR 7.11.1.2 requires drafting conditions to follow the narrative or metric form of the PISGs used in the final tree. However, instead of using the alternative SG80 text shown above (i.e. referring to productivity and susceptibility) the team used the default SG80 text ("Some quantitative information is available and is adequate to assess the impact of the UoA on the main

	secondary species with respect to status”), which is not applicable because the RBF was used to score PI 2.2.1 for this UoA, as discussed above. Apart from this: - It is also noted that the CAB included, as part of the narrative, a deadline for meeting the condition (“By the second surveillance…” instead of using the space set for establishing timeframes (box “Milestones”). - The narrative of the condition explicitly requires “electronic logbook reporting provides some quantitative information on of seabird and marine mammal bycatch” which although could be considered as a valid mean for obtaining such information, it is prescriptive because specifies how the information should be obtained. It should be up to the client to propose the method to obtain the required information (e.g. means other than electronic logbooks, such as observers, non-electronic forms, video, etc. could be potentially also used). This finding is graded as a minor non-conformity, as is not considered to be a complete failure to fulfil an accreditation requirement, or a breakdown of a critical element of the CAB’s management system.
CAB response	Given (i) the considerable number of conditions raised in the anglerfish assessment, and (ii) the fact that the same data collection procedures already in place other gillnets are being applied to anglerfish gillnets as from 2016, the team preferred to keep the conditions as simple as possible and to use the same wording for all types of gillnet fisheries to avoid confusion for the client. The condition narrative was harmonised with conditions of other recent overlapping fisheries (e.g. ISF Iceland Cod / the ISF Greenland Halibut). The narrative of the condition has been rephrased in the assessment report.

Comment 4	
Normative reference and requirement	MSC-FCR-V2.0-7.10.1 After the team has compiled and analysed all relevant information (including technical, written and anecdotal sources), they shall score the UoA against the Performance Indicator Scoring Guideposts (PISGs) in the final tree. The team shall: 7.10.1.1 Discuss evidence together. 7.10.1.2 Weigh up the balance of evidence. 7.10.1.3 Use their judgement to agree a final score following the processes below.
Description	The team scored the UoA against the required Performance Indicator Scoring Guideposts (PISGs) in the final tree, but did not always used the correct PISG text.
Evidence observed (pertaining to this expedited assessment)	The team used the Risk Based Framework (RBF) to assess the four (4) main secondary species (PI 2.2.1) identified in the anglerfish gillnet Unit of Assessment (UoA 5): common guillemot, northern fulmar, harbour seal and the harbour porpoise. For PI 2.2.3 (Secondary species information), the MSC default assessment tree includes an alternative SG80 text (“Some quantitative information is adequate to assess productivity and susceptibility attributes for main secondary species”) to be used in cases where the RBF is applied to PI 2.2.1, as it is the case. The team used a single table - PI 2.2.3 Evaluation Table for Secondary species information – to present the scores and justification of scores corresponding to all the Units of Assessment, which include both data-deficient and non-data-deficient species. However, the only text presented in PI 2.2.3 – Scoring Issue a - SG80 (page 150), refers to the default text (“Some quantitative information is available and is adequate to assess the impact of the UoA on the main secondary species with respect to status”), which is not applicable to data-deficient species.

	On the other hand, although the Scoring Guidepost (SG) presented is not adequate to score the data-deficient species, it is clear from the team´s justification provided within the table, that the data-deficient scoring elements were effectively assessed against the correct SG language, because there is explicit reference to available productivity and susceptibility information, which is the type of information required for scoring data-deficient species. Therefore, this finding is graded as an Opportunity For Improvement, because although the evidence observed indicates that the requirement has been effectively implemented (the team assessed the scoring elements against the correct PISG), additional effectiveness or robustness might be possible with a modified approach (include the correct PISG text).
CAB response	The omission of the correct PISG text was an oversight by the assessment team. The correct PISG text has been included in the PI 2.2.3 Evaluation Table for secondary species information.

Comment 5	
Normative reference and requirement	MSC-FCR-V2.0-7.4.6 7.4.6 After receiving an application for certification, the CAB shall review all pre-assessment reports about the fishery and other information that is available to it, and shall determine the unit of assessment required.
Description	The definitions of the Unit of Assessment are not clearly presented in the Peer Review Draft Report (PRDR).
Evidence observed (pertaining to this expedited assessment)	The assessment of this fishery comprises seven (7) Units of Assessments (UoAs) corresponding to the seven (7) fishery methods used to catch the anglerfish. This is clear when reading the PRDR, for example in section 1.5 (Overall Conclusion) or in section 6.2 (summary of PI Level Scores) in which each gear is accompanied by the UoA number (e.g. bottom trawl = UoA 1). However, section 3.1.1 of the PRDR, precisely the section in which the Units of Assessment are presented, is not entirely clear how the UoA are defined. A single table (page 14) is used to present the seven UoAs, but it is not explicitly stated (apart from using bold letters) that each gear is considered as an individual UoA. This finding is graded as an Opportunity For Improvement because although the evidence observed indicates that the requirement has been effectively implemented (UoA have been defined), additional effectiveness or robustness might be possible with a modified approach.
CAB response	In a lengthy, complex report, the assessment team sought to make the UoA table clear & concise. However the assessment team accepts presentation could have been clearer in this regard. Presentation has been amended to make it clear which UoAs and UoCs are considered.

Appendix 4: Surveillance Frequency

Table A4.1 : *Surveillance level rationale*

Year	***Surveillance activity***	***Number of auditors***	***Rationale***
Year 1 (2019)	Off-site audit	2 auditors	Any new information on marine mammals or birds, whether it is research or new bycatch information, is easily available online, on websites or directly from the appropriate stakeholder (e.g. client, MFRI or DF). Progress on conditions regarding habitat, the potential damage to deep-sea sponges, corals and other vulnerable marine habitats can likewise be evaluated by information provided remotely. Any new information is usually available online and the MFRI and DF can easily be contacted for remote meetings if needed. The CAB concludes that an off-site surveillance is therefore sufficient.
Year 2 (2020)	On-site	2 auditors	Although most relevant documents can be obtained online or electronically, an on-site audit for year 2 is considered to provide more detailed information on the methods that the client will propose to reduce bycatch and the action plan for vulnerable habitats.
Year 3 (2021)	Off-site	2 auditors	See above. Information is readily available online, stakeholder cooperation is good, they are easy to contact via e-mail or phone and can be reached for remote meetings. Off-site surveillance would therefore suffice for this fishery.
Year 4 (2022)	On-site surveillance audit	2 auditors	As year 4 marks the starts of re-assessment an on-site surveillance is recommended. Although most of relevant documents can be obtained online or electronically, face-to-face meetings would provide more detailed status of the fishery before re-assessment.

Table A4.2: *Timing of surveillance audit*

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

Table A4.3: *Fishery Surveillance Program*

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

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

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

Information appropriate to determination	Information from electronic monitoring of position, observer data, logbooks, fisher interviews, dockside monitoring etc. is required for audits but cannot be easily transmitted to a remote auditor in a form that can be easily interpreted.	Where Information from electronic monitoring of position, observer data, logbooks, fisher interviews, dockside monitoring etc. is required to verify performance against MSC standard, this information is available to be transmitted electronically to auditors in a form that can be easily interpreted.	The Directorate of Fisheries publishes data on landings/electronic logbooks online in real time. Information on infringements are also published online, in addition to annual reports. Ability to verify remotely: High
Transparency of the management system	Level of transparency of information by management is low such that information about performance of the fishery is generally not easily and widely available.	There is a high level of transparency in management, such that information on the fishery is widely and publicly available or known to the wider group of stakeholders. Any information provided on the fishery can be easily verified	Information on fisheries is transparent and widely available online and public. Information provided by the fishery can easily be verified by checking online sources or through direct contact with relevant officials. Ability to verify remotely: High
Vessels, gear or other physical aspect of the fishery	There are milestones and conditions that require inspection of vessels or other physical aspects of the fishery during the audit and there are no reliable mechanisms for verifying these aspects of the fishery from a remote location.	There are no milestones that require investigation of physical aspects of the fishery or if there are, there are reliable mechanisms to enable verification of developments with respect to that milestone from a remote location.	Milestones in the cod fishery do not require investigation of physical aspects of the fishery and can easily be verified by documentation or remote meetings. Ability to verify remotely: High

Appendix 5: Objections Process