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Sustainable Fisheries Scheme

Marine Stewardship Council Fisheries Assessment

ISF Iceland Saithe Fishery

Public Comment Draft Report

Client: Iceland Sustainable Fisheries ehf.

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Assessment Team Members:

Ásgeir Daníelsson, Ph.D.
Guðrún Marteinsdóttir, Ph.D.
Joseph E. Powers, Ph.D.
Louise le Roux M.Sc., Team Leader
Sigmar Arnar Steingrímsson, Ph.D.

Assessment Coordinators and Secretaries:

Gunnar Á. Gunnarsson Ph.D.
Louise le Roux M.Sc.

Conformity Assessment Body:

Vottunarstofan Tún ehf.
Parabakki 3
IS-109 Reykjavík
Iceland
Tel.: +354 511 1330
E-mail: tun@tun.is

Client:

Iceland Sustainable Fisheries ehf.
Borgartún 27
IS-105 Reykjavík
Iceland
Tel: +354 861 3082
E-mail: ge@icelandic.is

This is a Public Comment Draft Report submitted for stakeholder review. Stakeholders who wish to make comments are expected (a) to provide objective evidence in support of any claims or claimed errors of fact and (b) to use relevant template for available for download on MSC's website: http://www.msc.org/documents/get-certified/stakeholders/template_for_stakeholder_input.

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Acronyms and Abbreviations

| | |
|------------------------|--|
| B_{lim} | Limit biomass reference point below which recruitment of stock is expected to be impaired |
| B_{MSY} | Biomass corresponding to the maximum sustainable yield (biological reference point); the peak value on a domed yield-per-recruit curve |
| 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 version 1.3 |
| DF | Directorate of Fisheries |
| EEZ | Exclusive Economic Zone |
| ETP | Endangered, Threatened and Protected species |
| F | Fishing Mortality |
| FAO | Food and Agriculture Organization of the United Nations |
| GCR | Guidance to the MSC Certification Requirements v1.3 |
| GT | Gross Tonnage |
| HCR | Harvest Control Rule |
| ICES | International Council for the Exploration of the Seas |
| IPI stock | Inseparable or practically inseparable stocks |
| ITQ | Individual Transferable Quota |
| LRP | Limit Reference Point |
| LTL | LTL species: Low Trophic Level species |
| MII | Ministry of Industries and Innovation |
| MPA | Marine Protected Area |
| MRI | Marine Research Institute (Hafrannsóknastofnun) |
| MSC | Marine Stewardship Council |
| MSY | Maximum Sustainable Yield |
| nm | Nautical miles |
| NEAFC | North East Atlantic Fisheries Commission |
| OSPAR | The Convention for the Protection of the marine Environment of the North-East Atlantic |
| PI | Performance Indicator |
| PSA | Product Susceptibility Analysis |
| RBF | Risk Based Framework |

| | |
|---------------|---|
| SG | Scoring Guidepost |
| SI | Scoring Issue |
| SICA | Scale Intensity Consequence Analysis |
| TAC | Total Allowable Catch |
| TRP | Target Reference Point |
| VMS | Vessel monitoring system |
| UNCLOS | United Nations Convention on the Law of the Sea of 10 December 1982 |
| UNFSA | 1995 United Nations Fish Stocks Agreement |

1. Executive Summary

1.1 Scope of the Assessment

This report presents the results of a full assessment of the saithe (*Pollachius virens*) fishery within the Icelandic Exclusive Economic Zone (EEZ), North-east Atlantic, and ICES area Va2 against the Marine Stewardship Council's (MSC) Principles and Criteria for Sustainable Fishing (Appendix 1).

The report provides an account of the processes followed by the assessment team during the stages of information gathering and the scoring of the fishery against the MSC Principles and Criteria. The report provides a qualitative description of the fishery. The report is not intended to follow standard editing norms of scientific journals, but intends to address the needs of both fisheries specialists and other interested parties e.g. consumers and/or other stakeholders.

1.2 Assessment Team

The assessment was conducted by a team of four expert assessors, and a team leader who also provided input on chain of custody for the fishery:

- Louise le Roux M.Sc.: Team Leader and Chain of Custody input
- Joseph E. Powers Ph.D.: Principle 1 expert
- Sigmar A. Steingrímsson Ph.D.: Principle 2 expert
- Ásgeir Daníelsson Ph.D.: Principle 3 expert
- Guðrún Marteinsdóttir Ph.D.: Expert input on Principle 1 and saithe biology

1.3 Outline of the Assessment

A pre-assessment of the Icelandic saithe trawl fishery was conducted for a fishing company that later became a member of the client organisation of this assessment. Full MSC assessment of the ISF Iceland Saithe Fishery, covering five different fishing methods (bottom trawl, Danish seine, handline, longline and gillnet), was launched in April 2013. During the information gathering stage it became evident that the assessment of the saithe fishery in Iceland would benefit from adding the sixth fishing method (Nephrops trawl). A variation to that effect was later requested by Tún and then granted by the MSC, followed by invitation for stakeholders to comment on the added unit. Site visits and stakeholder consultations, attended by relevant team members, were conducted in August 2013. Data used in the assessment was gathered by reviewing publicly available reports and scientific journals, and from site visits to the client's facilities and interviews with stakeholders. The assessment team met to score the fishery against MSC principles. The Preliminary Draft Report for client review was submitted to the client in October 2013. The Client submitted a plan of action to address the conditions set by the assessment team. The report was then submitted for reviewing by two peers. Comments received and the team's responses are published in Appendix 2. The team has subsequently made some amendments to the report and clarified rationales for the scoring of some of the scoring guideposts.

1.4 Main Strengths and Weaknesses of the Assessed Fishery

Saithe is managed by the ITQ system in Iceland, and a TAC is issued annually. Monitoring and research is carried out by annual surveys, catch sampling and annual stock assessment including some risk assessment and reference points. A management plan for saithe was formally adopted in April 2013. Monitoring and surveillance systems are well established in Iceland for all fisheries, and include real-time information on catches, area closures, other relevant information, and various methods of verification of landings.

There is a need to address impacts on vulnerable areas other than corals, in particular areas of mass aggregation of large sponges or “ostur”. Recording of catches of vulnerable species such as corals and sponges could be improved in line with NEAFC regulations.

1.5 Overall Conclusion

The ISF Iceland Saithe Fishery reaches the minimum aggregate score of 80 for each of the three Principles and the minimum of 60 for each Performance Indicator. However it fails to reach the minimum score of 80 on one Performance Indicator, prompting the setting of a condition.

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

- Principle 1 – Target Species: 89.4
- Principle 2 – Ecosystem:
 - Bottom trawl 86.3
 - Danish seine 89.0
 - Longline 88.7
 - Handline 87.7
 - Gillnet 88.7
 - Nephrops trawl 87.7
- Principle 3 – Management System: 97.4

One Performance Indicator failed to reach the minimum score of 80:

- PI 2.4.1 – Habitats Outcome: Bottom Trawl 60

1.6 Draft Determination, Conditions and Recommendations

The assessment team recommends that the ISF Iceland Saithe Fishery is granted certification against the MSC Principles and Criteria for responsible fishing.

This *draft determination* is made provided the following condition is sufficiently addressed in a plan of action submitted by the Client (see also section 6 and Appendix 1.2):

Condition 1 (PI 2.4.1): Existing measures for the protection of vulnerable habitats shall be evaluated, with the aim of implementing conservation and management measures which correspond to those applied by NAFO and NEAFC. Scientific information on the extent of potential damage by fishing gear to areas of “ostur” shall be evaluated in addition to evaluating the need for closing such areas to potentially damaging fishing activities.

The team also made two recommendations regarding the saithe fishery:

Recommendation 1 (PI 2.1.1): Since Iceland is a signatory to various international conservation conventions it is recommended that all vessels in the client fleet be required to return live grey (common) skate, *Raja Dipturus batis*, to the sea after capture as soon as practically possible.

Recommendation 2 (PI 2.3.1): Skippers of all vessels in the client fleet should be required to record all bycatch and ETP species (ie. turtles, birds, marine mammals, elasmobranchs) caught, irrespective of whether they are landed or viable individuals returned back to sea.

2. Authorship and Peer Reviewers

2.1. Team members

Louise le Roux M.Sc., Assessment Coordinator and Team Leader, CoC input

Louise le Roux graduated in 1997 in Fisheries Biology from the University of Iceland. In 1993-1998 she was in charge of research on the deep-sea red crab at the Namibian Ministry of Fisheries and Marine Resources. Duties included administration, management advice and stock assessment. In 1998-2000 she lectured and was involved in the development and teaching of various courses for the Natural Resources B.Sc. program on fisheries biology, management and population dynamics at the University of Namibia. She also briefly taught for the Fisheries Training program at the United Nations University in Iceland. From 2001 Ms. le Roux has worked for deCode Genetics Inc., currently as R&D manager. Louise le Roux has attended MSC CAB training seminars where the assessment methodology, certification requirements and the use of the Risk Based Framework have been covered. She has served on Tún's fisheries certification committee and is currently deputy coordinator for Tún's sustainable fisheries scheme, where her responsibilities include the leading of expert teams conducting pre- and full assessments.

Joseph E. Powers, Ph.D., Expert Assessor: Principle 1

Joseph E. Powers completed a Ph.D. degree in fisheries science from Virginia Polytechnic Institute and State University, Virginia, U.S.A. Prior to taking on his present position of Associate Professor of Marine Resource Assessment in the Department of Oceanography and Coastal Sciences at the Louisiana State University, Dr. Powers served as Senior Stock Assessment Scientist for the US National Marine Fisheries Service where he among other things conducted research to develop and support environmentally sound national and international fisheries management programs. He chaired the Standing Committee for Research and Statistics of the International Commission for the Conservation of Atlantic Tunas (ICCAT) in 1998-2001, coordinating international research and developing stock assessment research on tuna fisheries. Dr. Powers has been a leading US scientist conducting stock assessments for Atlantic tuna and billfish species including bluefin tuna, swordfish, albacore and marlins for the ICCAT. He has considerable experience in conducting population dynamics studies, scientific stock assessments, in communicating results to constituents and managers, and serving as a fisheries manager. He has written extensively for numerous scientific publications on marine biology, stock assessment, fishery management and related issues. Dr. Powers has served as an assessor and peer reviewer of several MSC fishery assessment projects.

Sigmar A. Steingrímsson, Ph.D., Expert Assessor: Principle 2

Dr. Sigmar Steingrímsson graduated in 1989 with a Ph.D. in Marine Biology from the University of Liverpool. He currently holds the position of department expert on environmental impact assessment (EIA) with the Icelandic National Planning Agency. Dr. Steingrímsson has extensive research experience in marine biology with the ecology of the seabed as his principal expertise. He has been involved in the designing and managing of fundamental research e.g. on the mapping of benthic invertebrates and cold water coral reefs in Icelandic waters and has studied the distribution of vulnerable deep water habitats around Iceland in relation to bottom fishing. He has also directed research on the ecology of several coastal areas in connection with EIA. He was a member of a government committee on the conservation of vulnerable deep water habitats and has represented Iceland in numerous working groups on marine ecology within ICES, including ecosystem effects of fishing activities. For several years Dr. Steingrímsson was heavily involved in Iceland's participation in the OSPAR convention. He has attended several seminars on the MSC fishery assessment methodology, and during the last two years he has served as lead assessor for the Atlantic Cod and Haddock fishery and has been a lead expert assessor of three MSC fishery pre-assessments.

Ásgeir Daníelsson Ph.D., Expert Assessor: Principle 3

Dr. Ásgeir Daníelsson graduated in 1985 with a Ph.D. in Economics from the University of Manchester. Dr. Daníelsson currently holds the position of head of research and forecasting in the Economics department of the Central Bank of Iceland. He has lectured on microeconomics, statistics, macroeconomics and fisheries economics at the University of Iceland and University of Akureyri. He has over 20 years' experience of macroeconomic analysis of the Icelandic fisheries for the Central Bank of Iceland and previously the National Economic Institute. He has been involved in and advised numerous national and international task forces on the utilization of living marine resources and fisheries management. From 1993-1994 and 2001-2004 he was a member of a committee, set up by the Icelandic Minister of Fisheries, formulating a long term policy on exploitation of fish stocks. He has worked with the "Nairobi group" set up by the UN's UNEP and UNSD, and was later commissioned by the FAO to provide a guide on the incorporation of environmental factors into national accounting with special regard to fisheries and the living marine environment. Dr. Daníelsson has written and co-authored several peer-reviewed publications, as well as research reports on the utilization of fish stocks in Icelandic waters, ITQ efficiency and environmental- and economic accounting of fisheries. During the last three years Dr. Daníelsson has served as Principle 3 expert for two MSC fishery assessments.

Guðrún Marteinsdóttir, Ph.D., expert input on Principle 1 issues

Dr. Guðrún Marteinsdóttir is a fish ecologist and fishery analyst who graduated in 1991 with a Ph.D. in Fish Ecology from Rutgers University in New Jersey. From 2001 she has been employed as a full Professor of Fishery Science in the Department of Biology at the University of Iceland. Dr. Marteinsdóttir has over two decades' experience of fisheries scientific research. Her expertise centres on the biology, behaviour and dynamics of demersal fish stocks; especially the genetics, stock structure, recruitment and environmental factors affecting cod. Recently, her focus has been on hydrodynamic variation and its effects on fish stocks. For this purpose she is leading a large effort in constructing a three dimensional ocean model for the Icelandic region (www.marice.is/code) and a hydrodynamic information system for the North Atlantic that will benefit both researchers and the industry. This work includes many species, especially pelagic species but also demersal species including cod and saithe. Additionally, Dr. Marteinsdóttir is leading a large research group at the University (www.marice.is) and has been a leading or senior author on a number of peer reviewed publications on cod, haddock, halibut, saithe, wolfish, lobster and salmon. She served as the Principal Researcher and Program Leader of an eight year research project authorised by the Icelandic Marine Research Institute on the influence of stock structure and environmental conditions as they affect the recruitment processes of cod. Dr. Marteinsdóttir has served as the coordinator of numerous nationally and/or EU funded fish biology research projects. During the last 15 years she has served on several EU, NAFO and ICES committees devoted to research on living resources, climate change and environmental policy. Dr. Marteinsdóttir is familiar with the MSC fisheries assessment methodology. In the last five years she has served as an assessor of pre-assessments, as well as full assessment and first surveillance of the Atlantic cod, haddock and wolfish fishery.

2.2. Peer Reviewers

The following experts were confirmed as peer reviewers of this assessment report.

Bryce Beukers-Stewart Ph.D.

Bryce is a fisheries biologist and marine ecologist whose work has ranged from temperate estuaries to tropical coral reefs and the deep-sea. The central thread in his research has been to gain an increased understanding of the factors regulating marine populations and communities so as to ensure their sustainable exploitation, primarily by fisheries. He has been a lecturer in the Environment department at the University of York since 2007. For much of his career Bryce's research has focussed on the biology and management of fisheries. He has published widely on this subject in the international peer-reviewed literature and presented at numerous conferences. His initial studies focussed on the biology of deep-water fish in order to provide fisheries management advice to the Australian government. Since moving to the UK in 1999 he has conducted considerable research on the biology and impacts of scallop fisheries. This work involved an intensive stock assessment programme to provide management advice to the Isle of Man government and other projects aimed at quantifying and reducing the environmental impact of scallop dredging. In particular, his research which showed that marine protected areas (MPAs) and stock enhancement could provide benefits to both fisheries and conservation has been highly influential in developing new marine management legislation in the Isle of Man and the United Kingdom. Current research topics include further work on MPAs, the management and reduction of fisheries discards, and investigating the effects of climate change on marine ecosystems. He also gained experience of undertaking sustainability assessments on a wide range of fish and shellfish species while co-ordinating the UK Marine Conservation Society's programme to promote ecologically sustainable fisheries and mariculture from 2005 to 2007. A large part of this work was to maintain the seafood consumer awareness website www.fishonline.org and to provide tailored advice for seafood suppliers, processors and retailers. Bryce has subsequently continued this work as a private consultant to various prestigious clients such as Marks and Spencer, Young's Bluecrest and celebrity chefs. To date he has peer-reviewed Marine Stewardship Council assessments of both the New Zealand southern scallop fishery and the Faroe Islands queen scallop fishery.

John Henry Nichols, C.Biol., MSB

Mr John Nichols is a former UK government fisheries biologist with 42 years research experience in plankton ecosystems in the North Atlantic specializing in the taxonomy of North Atlantic & NW European plankton including phytoplankton, micro and meso-plankton, ichthyoplankton and young fish. He has been a member of ICES working groups on herring, mackerel, horse mackerel, sardine and anchovy assessments; and mackerel and horse mackerel egg surveys. He was also a member of ICES study groups on herring larval surveys and plankton sampling. He was scientist in charge of numerous research vessel surveys for fish stock assessment purposes and directly involved in the assessment of pelagic and western demersal fish stocks from 1994 to 2000. Since retirement from his government post Mr. Nichols has participated in numerous MSC assessments as the Principle 1 expert. The assessments include the Thames estuary herring, PFA North Sea Herring, Hastings Fleet Dover sole, the north –east coast of England bass fishery, the SW mackerel handline fishery re assessment, the Norwegian pelagic fisheries and a North Sea plaice fishery, and recently the Faroe Island Saithe fishery. He has also been a peer reviewer for numerous MSC assessment reports, including two on Scottish pelagic fisheries.

3. Description of the Fishery

3.1 Unit(s) of Certification and Scope of Certification Sought

The ISF Iceland Saithe fishery is a wild capture fishery. The fishery conforms to Criteria A1 and B14 of MSC Principle 3, i.e. it is not “conducted under a controversial unilateral exemption to an international agreement” and does “not use destructive fishing practices such as fishing with poisons or explosives”. At the time of assessment, the team is not aware of any controversy or disputes in the fishery or of the presence of IPI (inseparable or practically inseparable) stocks in the catch.

Table 3.1 summarises the main features of the unit of certification that is the subject of this assessment. The fishery is conducted in Icelandic waters, in particular the North East Atlantic, ICES division area Va2 within the Icelandic EEZ. The client is Iceland Sustainable Fisheries ehf., which incorporates a number of Icelandic fisheries, fish processing units and trading companies.

| Table 3.1: Units of Certification for the ISF Iceland Saithe Fishery | |
|---|---|
| Fish stock | Saithe (<i>Pollachius virens</i>) in subarea Va |
| Location of Fishery | FAO Statistical Area 27 / ICES Va; Icelandic Exclusive Economic Zone |
| Management | Ministry of Industries and Innovation |
| Fishing Methods | Bottom trawl, Nephrops trawl, Danish seine, Gillnet, Long line, Handline |
| Fishery Practices | All registered Icelandic vessels that carry valid permits for fishing within the Icelandic Exclusive Economic Zone issued by the Icelandic Directorate of Fisheries, and that fish, supply and/or sell saithe to Iceland Sustainable Fisheries ehf. and/or its authenticated certificate sharers. |

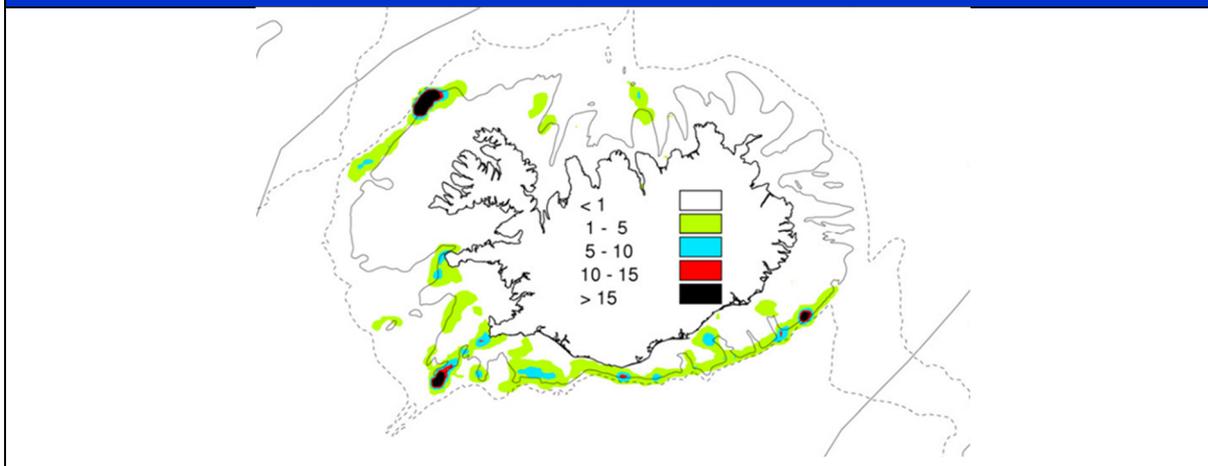
Any new entry to the group of registered Icelandic vessels targeting the saithe stock and/or that are incidentally catching saithe in other MSC certified fisheries within Icelandic jurisdiction will be eligible for certificate sharing.

3.2 Overview of the fishery

Codfishes (gadoids) have been fished extensively around Iceland for all of the 20th century. Most important of these is the cod itself which has nearly always been Iceland’s no. 1 export. However, saithe and haddock are usually included among the 5 most commercially important species in Iceland. Saithe catches have ranged from 30,000 to 130,000t annually since 1950. Saithe was important in German fishing operations in the past. However, current catches are almost exclusively taken by Icelandic vessels.

The majority of saithe is caught by bottom trawl, and fishing takes place all year round. Saithe are targeted directly, but it is also taken as bycatch in the cod and haddock fisheries. The highest catches of saithe are taken along the continental shelf and off the south and west coast of Iceland, which are presumed to be saithe’s main feeding grounds.

Figure 3.1:
Main fishing grounds for saithe around Iceland



Source: <http://www.fisheries.is/main-species/codfishes/saithe/> ; Anon. 2013

Saithe is managed by the ITQ system in Iceland, as are most other fisheries. A TAC is issued annually by the MRI. A management plan for saithe was published by the MII and adopted in April 2013 (<http://eng.atvinnuvegaraduneyti.is/publications/news/nr/7627>).

The client of this assessment is Iceland Sustainable Fisheries ehf. (ISF), an organization that was founded in 2012. At that time Icelandic Group PLC (IGP) had already obtained MSC certification for the whole of the Icelandic cod and haddock fisheries. Sæmark Seafood had previously obtained certification for the same stocks but with fewer fishing gears. Yet another group of companies were planning certification for other fisheries. IGP and these other companies joined forces to set up ISF with the aim of amalgamating overlapping certifications and jointly managing further assessments. Membership of ISF has been steadily increasing. As of 20 October 2013 a total of 28 fishing, fish processing, sales and marketing companies had joined ISF. Most of their fish is sold to European markets but some to North America as well. ISF is open to new members who wish to share the benefits of MSC certification. Costs of its management and investment in fishery assessments are shared by the members, which pay an initial amount and annual fees. ISF's membership is expected to grow as it implements its objective of investing in further assessments and MSC certification is acquired for more fish stocks.

3.3 Principle One: Target Species Background

3.3.1 Saithe Biology

Saithe (*Pollachius virens*; pollock in NW-Atlantic) is a gadoid species occurring on both sides of the north Atlantic, from the Barents Sea and Spitsbergen to the Bay of Biscay, around Iceland, in southwest Greenland, and in the western Atlantic from Hudson Strait to North Carolina¹. In the Northeast Atlantic there are several stocks e.g. southwest Greenland, around Iceland, off the Norwegian coast into the Barents Sea, and north and east of the British Isles (Cargnelli et al. 1999; Jónsson 1996).

Saithe occurs all around Iceland but is less common in colder waters at the north and east coasts (Fig. 3.1; <http://www.fisheries.is/main-species/codfishes/saithe/>). It is found at different depths, from the surface to 450m ((Jonsson 1992; Gunnarsson et al. 1998). Based on logbook data from Icelandic vessels, it is most common at 250m (Armansson et al., 2007). The size of saithe in Icelandic catches is generally 70-110cm, but the largest fish caught around Iceland was 132cm.

¹ <http://www.fao.org/fishery/species/3016/en>

Saithe is an opportunistic predator, can be classified as benthopelagic, in addition to displaying some schooling behaviour. It feeds mainly on pelagic organisms, with krill being important for juveniles as well as for adults. Capelin and sandeel are important food items for saithe around Iceland (Jónsson 1996 & 1997; <http://www.fisheries.is/main-species/codfishes/saithe/>). The diet of saithe consists almost entirely of fish (mainly ammodytids and capelin) and euphausiids. The most important variables in diet were season (particularly in summer) and depth (Jaworski & Ragnarsson 2006).

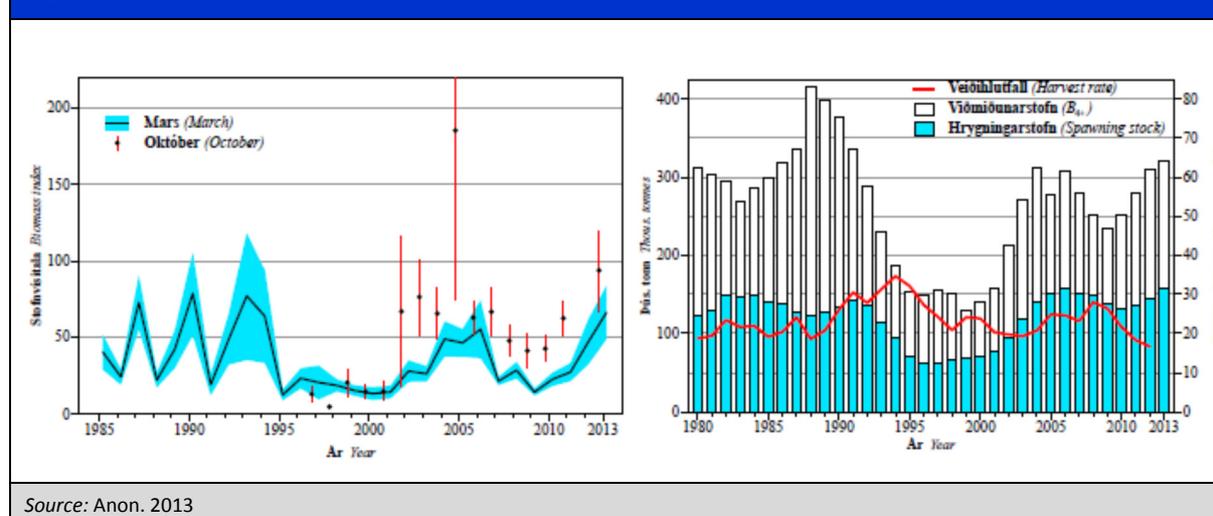
Saithe differ from other gadoids in terms of migratory and schooling behavior. They are strong facultative schoolers that move freely through the water column and spend less time on the bottom than other gadoids (Scott and Scott, 1988). Tagging studies have confirmed migration between regions where individuals tagged off Iceland have been caught along mainland Europe and vice versa. However, Armannsson et al. (2007) showed that around Iceland saithe has a high affinity to their tagging locations, but move considerably within that area. Results also indicated seasonal offshore-inshore migrations during summer and migratory route variability related to feeding grounds. There were no indications of large-scale emigration of saithe out of Icelandic waters (Armannsson et al. 2007; Homrum et al. 2013).

Spawning starts earlier than for other codfishes and takes place from January to March off the south and southwest coast (Jonsson 1992, Gunnarsson et al. 1998). Spawning sites are thought to be located off the southeast and northwest coasts (Armannsson et al., 2007), however spawning Saithe have been collected at numerous locations along the south coast, mostly at deeper locations than cod and haddock (Butler and Marteinsdottir, ongoing work at MARICE, Univ. Iceland). Saithe reach maturity at 5 to 7 years of age (Anon 2013). 0-group saithe are common in shallow waters from mid-June, and then move to deeper waters as they age. Juvenile saithe generally reside in the littoral and sub-littoral zones during the first 1-2 years of life.

3.3.2 Stock structure

Based on spatial distribution and tagging results saithe has been divided into several management units in the Northeast Atlantic. These include the Northeast Arctic, North Sea and West of Scotland, Iceland and Faroe Islands (rev. in Armannsson et al. 2007). Recent analysis of archived tagging data showed that saithe in Icelandic waters rarely migrate out of the Icelandic waters. In contrast, saithe in Faroe and Norwegian waters were more likely to be found outside their regions including Icelandic waters (Homrum et al. 2013).

Figure 3.2: Biomass index from annual groundfish surveys (left) and spawning stock biomass, reference biomass (age 4+) and harvest rate of saithe.



Information on the genetic structure of saithe stocks is limited. The study by Eiriksson and Arnasson (in press) is the only study that has attempted to estimate genetic variation among saithe in the North Atlantic. Analyzing variation at a mitochondrial gene, researchers observed limited trans-Atlantic genetic structure indicating that there is a high gene flow between regions and potentially a very recent expansion of the ancestral stock.

3.3.3 Status of the stock

Mean weight at age of saithe was exceptionally low from 2005 to 2009, but has increased, especially for 6-8 year olds, and now measures close to a long-term average. There is a negative relationship between yearclass size and mean weight in saithe. Such weight changes have been interpreted as indicating immigration of slow growing saithe to Icelandic waters. However, it is difficult to determine whether these changes in growth rate are due to population- or environmental factors. A similar pattern of weight change has been observed in the spring groundfish survey, but variability within yearclasses is higher in the survey. Estimates of sexual maturity are also obtained from the survey. Sexual maturity is also variable and dependent on location of saithe during the survey. Maturity is estimated using a model with input from the survey.

The groundfish survey using bottom trawls is not ideal to measure biomass indices for saithe, since it is a schooling fish which often dwells in waters substantially above the bottom. This is reflected in the highly variable survey biomass indices (Fig. 3.2), especially prior to 1996. This variability is one of the major uncertainties in stock assessment of saithe. However, indices from the survey can be used to indicate stock sizes, e.g. indices for 2004-2006 was relatively high, then decreased by about half from 2007-2011, and were high again in 2012-2013. Indices from the autumn survey indicate similar trends (Anon. 2013).

Stock assessment is based on a catch at age model and is supported by data on age based catch and survey indices. There are three different periods of fishing behavior; 1980-1996, 1997-2003 and the period after 2004. During the second period, the proportion of catches from gillnets decreased. For the last period there are indications that an increasing proportion of the fishing have been on smaller fish.

The spawning stock biomass (Fig. 3.2) for 2013 is estimated to be 158,000t and the fishable stock or reference biomass (>4yr) was 321,000t. The fishable stock is considered to be of a similar size to that of 2004-2006, but substantially smaller than from 1988-1991. The harvest rate (catch/fishable stock) for 2012 was estimated to be 17% and the fishing mortality 0.19.

Strong yearclasses in 1998-2000 and 2002 resulted in a relatively high fishable stock from 2003-2007, resulting in average catches of 65,000t per year and a harvest rate close to 23%. However, fishing was not reduced after these yearclasses disappeared from the stock, and the harvest rate for 2008 and 2009 was 27%.

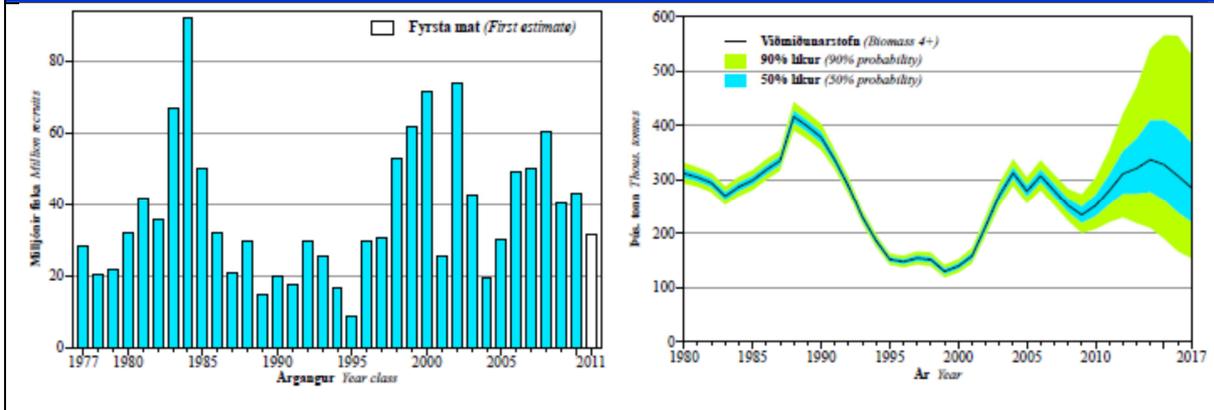
Recruitment into the stock is assessed by estimates of 3 year old saithe. The yearclasses from 1998-2000 and 2002 are considered to be large, but subsequent recruitment has been average (Fig. 3.3).

Projections indicate that the catch for 2013 will be around 52,000t, based on current fishing compared. Increasing fishable stock of 337,000t and a spawning stock biomass (SSB) of 177,000t are predicted for 2014 (Fig. 3.3).

There are considerable differences in stock assessment for the last year, with the catch-at-age model showing higher estimates. This difference in stock estimates between models indicates that there are uncertainties regarding the current stock size. This is caused by uncertainties in survey indices and that the population size predicted by the catch-at-age model is likely to be too high.

In April 2013 a management plan for saithe was adopted. The management plan is based on a Harvest Control Rule (HCR) where the upcoming TAC is set as an average of the last TAC and 20% of the current year's reference (fishable) biomass. Lower harvest rates are applied if the SSB goes below the reference point Btrigger, which is 65,000t. Saithe TAC for the 2013/14 will be 57,000t according to the HCR.

Figure 3.3:
Year class size at age 3 (left) and reference biomass projections (right) for saithe.



Source: Anon. 2013

3.3.4 History of fishing and management

Key species have been identified in the Icelandic Ecosystem and saithe is not considered to be an LTL species. Trophic level, based on diet studies, is estimated to be 4.4 ± 0.8^2 . However, saithe is considered to be of economic and ecological importance in the Icelandic Marine Ecosystem (Jaworski & Ragnarsson 2006).

Saithe catch for 2012 was around 52,000t, which was 700t more than in 2011. Saithe landings in the last decade were the lowest for the period 1998-2001; around 30,000t. After 2001 catches increased and reached 76,000t in 2006, but subsequently decreased. In 2012, 77% of catches were from bottom trawls and 7% from gillnets. A substantial change was observed in saithe catch by gear during the 1990s. Between 1982-1996, 26% of the catch on average came from gillnets. After this period catches from gillnets consisted mostly less than 10% of total catch (Anon. 2013).

Table 3.2:
Catch of Saithe (tonnes) around Iceland for various fishing gear

| | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13* |
|----------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Bottom trawl | 58,130.10 | 48,361.00 | 44,674.40 | 41,502.73 | 37,922.34 | 35,715.37 |
| Danish seine | 877.20 | 1452.40 | 1219.10 | 1486.18 | 1341.76 | 1501.05 |
| Gillnet | 4051.05 | 8801.68 | 6787.15 | 3415.32 | 4094.71 | 3120.52 |
| Handline | 2418.65 | 2919.80 | 3411.27 | 3850.73 | 3662.72 | 1624.03 |
| Longline | 542.37 | 606.44 | 539.91 | 717.09 | 676.41 | 826.57 |
| Nephrops trawl | 86.35 | 175.16 | 268.80 | 455.34 | 458.14 | 527.48 |
| Total | 66,105.72 | 62,316.47 | 56,900.63 | 51,427.39 | 48,156.08 | 43315.02 |
| Iceland Total | 66,849.27 | 62,197.78 | 57,547.42 | 51,695.63 | 49,783.28 | --- |
| TAC | 80,000.00 | 65,000.00 | 50,000.00 | 50,000.00 | 52,000.00 | 50,000.00 |

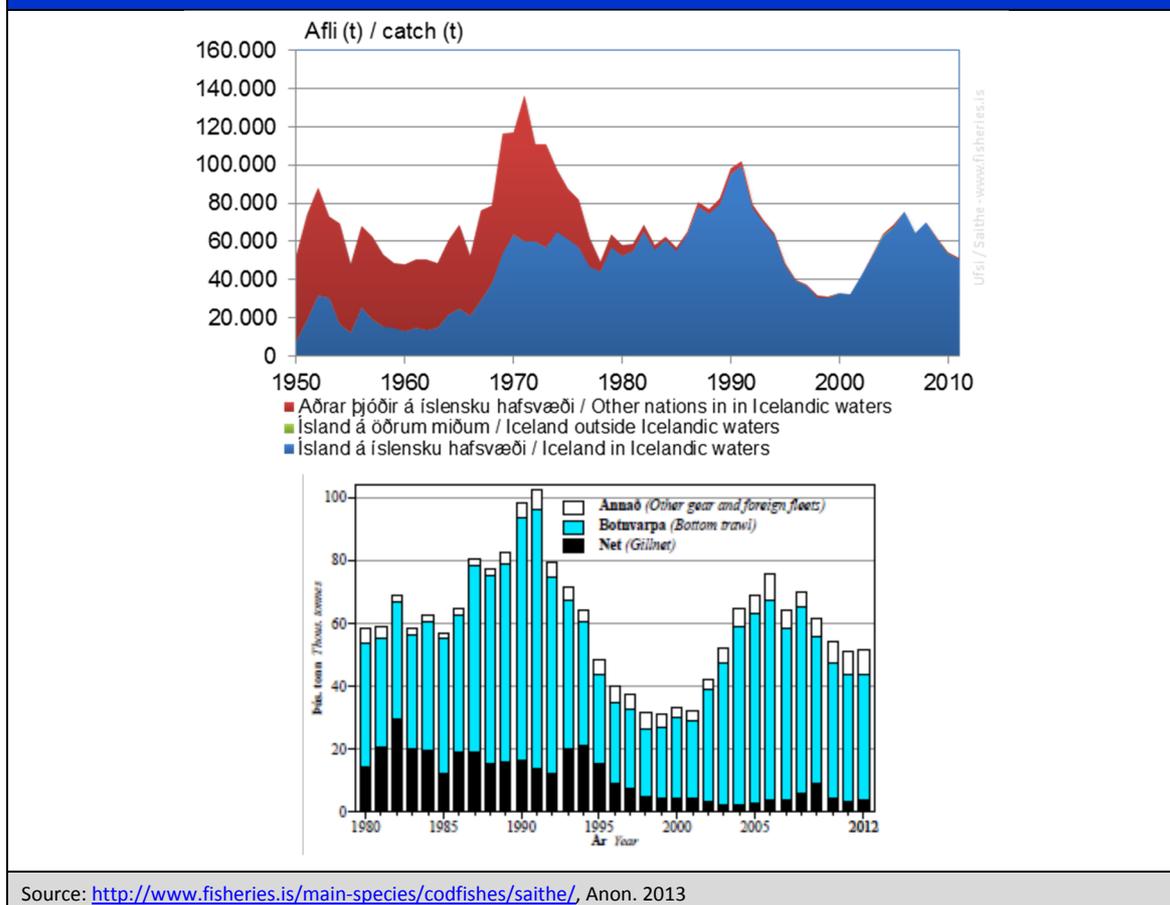
* Not complete –catches up to July 2013

Source: DF database, Anon 2013

² <http://www.fishbase.org/summary/1343>

From 2003/04 to 2006/07 the national TAC was in line with MRI advice. However, the national TAC has almost always exceeded recommended advice. After the 2004/05 fishing season the total catch did not reach the national TAC, except for 2009/10 – 2010/11.

Figure 3.4:
Historical landings of saithe in Icelandic waters



Saithe advice has been provided by the MRI since 1978 and a national TAC has been set since 1984. According to Hjörleifsson & Björnsson (2013) management advice has been divided into the following periods:

- 1978-1997: Management advice during this period was based on estimates of F_{max} and biomass was estimated to be within safe (unspecified) biological limits. Reference age fluctuated and a high proportion of catches came from gillnets which is more favourable than current exploitation patterns.
- 1998-2001: The aim during this period was to reverse a decline in biomass and TAC advice was based on a reduction of fishing mortality by an ad-hoc amount.
- 2002-2013: Management advice centred on precautionary considerations.
- 2011-2013: Management advice focused on MSY framework.

ICES advice for saithe has been given since 1987 and domestic advice has generally been in line with this. Fishing mortalities in the earlier time period were higher than at present, but this is based on different age ranges and a more favourable selection pattern than at present (Hjörleifsson & Björnsson, 2013).

In April 2013, the Icelandic government formally adopted a management plan for saithe which is consistent with the precautionary approach according to ICES, and the Icelandic policy of maximum sustainable yield in the long term (Anon. 2013).

3.4 Principle Two: Ecosystem Background

3.4.1 Ecosystem

Long term variability of hydrography and production (primary and secondary) in Icelandic waters is well documented (Astthorsson et al. 2007; Valdimarsson & Jónsson 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 (Marine Research Institute 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).

Climate variability during the 20th century has affected the marine ecosystem in Icelandic waters. This was evident during the warm period of 1920-1940, the cold period starting in the late 1960s, and again the warming of the climate observed during the last decade and more. These 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. In the waters to the north and east of Iceland, available information suggests the existence of a simple bottom-up controlled food chain, from phytoplankton (mainly *Calanus*), to capelin, to cod (Astthorsson *et al.* 2007). Seasonal migration of the capelin spawning stock from the Iceland Sea to the south and southwest coasts of Iceland transfers zooplankton production to the southern part of the Icelandic marine ecosystem. It has been shown that changes in the capelin biomass cause changes in weight-at-age of cod – demonstrating the key role of capelin in the Icelandic marine ecosystem.

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: phytoplankton, zooplankton, pelagic fish species, demersal fish species, baleen, seabirds and seals (Astthorsson et al. 2007).

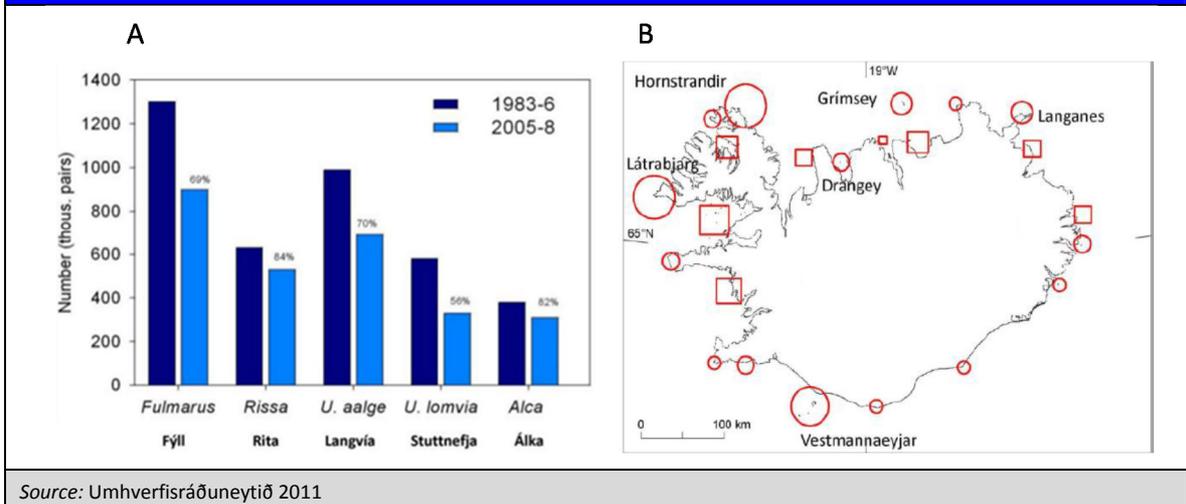
Information on feeding habits has been used in studies on predator-prey interactions and multi-species and ecosystem modeling (Pálsson 1997, Stefánsson 2003, Barbaro *et al.* 2008). The multi-species programme BORMICON (Stefánsson and Pálsson 1998) is a model for an ecosystem approach to fisheries and was developed in the 90'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 (Globally applicable Area-Disaggregated General EcosystemToolbox).³

Icelandic waters are an important habitat for some of the largest seabird populations in the Northeast Atlantic, such as razorbills and puffins. Since the early eighties the populations of seabirds have in general reduced in size by 18-43% (Umhverfissráðuneytið 2011). During the period from 1983-6 until 2005-2008, the population of thick-billed murre dropped from 580,000 to 330,000 pairs; common murre from 990,000 to 690,000 pairs and razorbill from 380,000 to 310,000 pairs (Figure 3.5A). Puffin is the most abundant bird in Iceland, with a population estimated at 8-13 million individuals and a breeding population of 3-4 million pairs (www.puffin.is). Furthermore, in the Látrabjarg seacliff which is inhabited by the largest breeding colony of seabirds in Iceland (Figure 3.5), the number of nesting birds declined annually by 7-24% (depending on species) from 2006 to

³See <http://www.hafro.is/gadget/>.

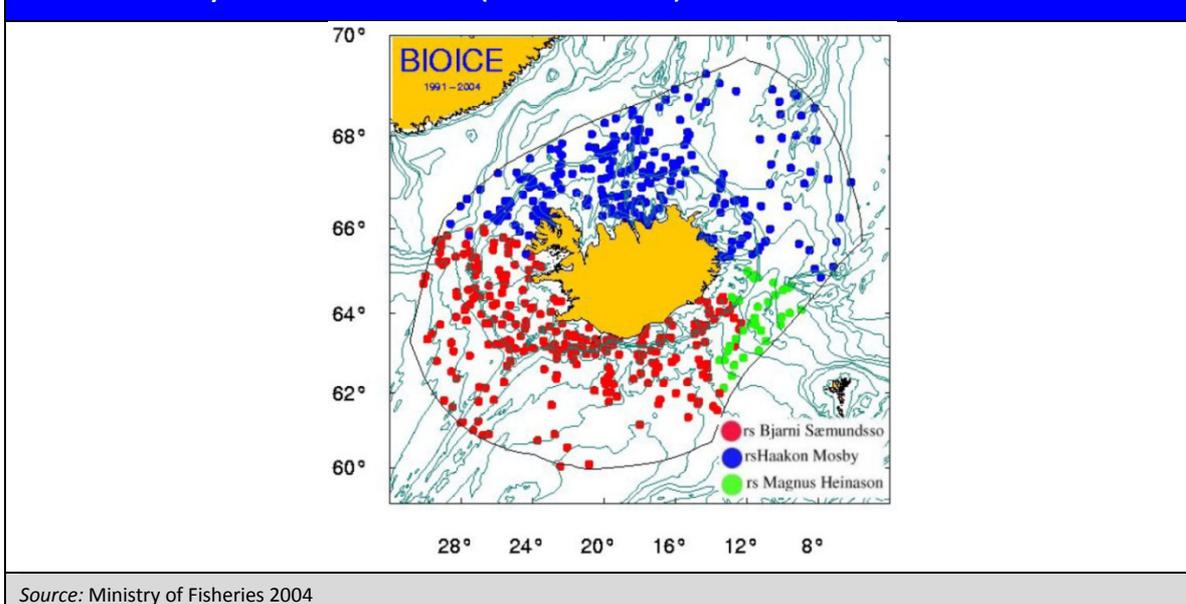
2009. The main reason for dwindling populations is believed to be caused by changes in food availability, e.g. altered distribution patterns of prey.

Figure 3.5:
A: Changes in population size of fulmar (*Fulmarus*), black-legged kittiwake (*Rissa tridactyla*), common murre (*Uria aalge*), thick-billed murre (*Uria lomvia*) and razorbill (*Alca torda*) from 1983-6 til 2005-2008.
B: The distribution of seabird colonies in sea cliffs around Iceland.



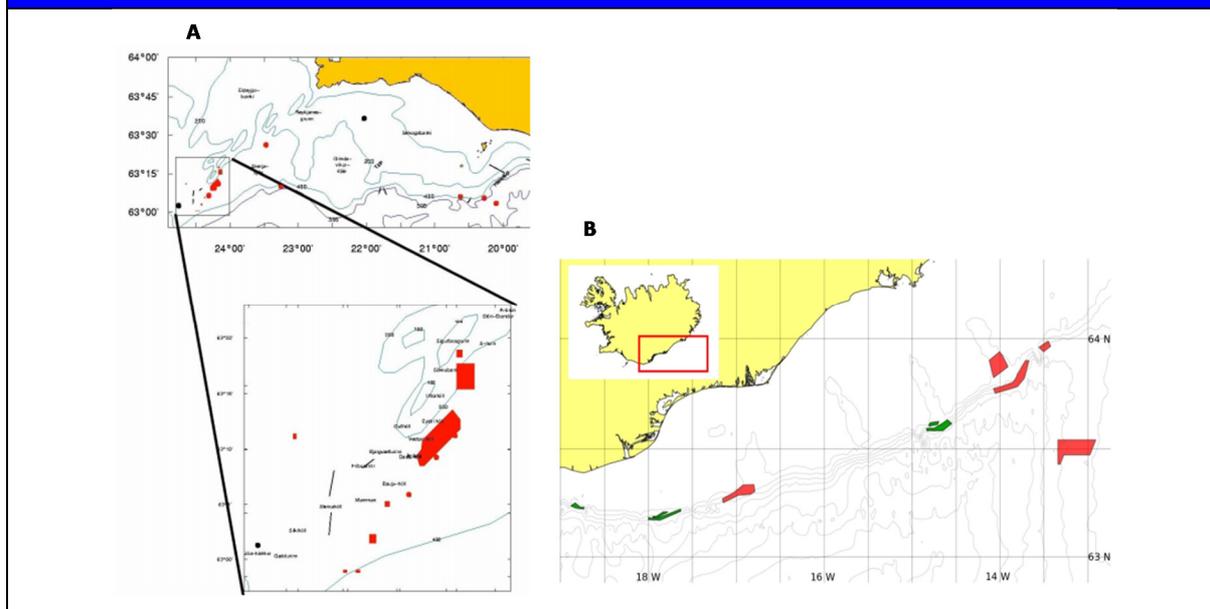
The BIOICE program has been in operation since 1992 with the aim of producing a basic inventory of benthic fauna within Icelandic territorial waters (Figure 3.6). Benthic samples have been collected from a variety of habitats, ranging widely in depth (<100 to 3100 m) and in temperature conditions (12° to -0.9°C). The Marine Research Institute (MRI) has also identified areas of vulnerable benthic habitats in Icelandic waters (cold water corals, areas with aggregation of large sponge, and maerl beds) in relation to bottom trawl fishing activities (Ministry of Fisheries 2004). The MRI is currently carrying out research programs in order to map benthic habitats in Icelandic waters (biology and geology, using multibeam echo sounder), including the mapping of cold water corals (*Lophelia pertusa*).

Figure 3.6:
The research programme BIOICE (Benthic Invertebrates of Icelandic Waters): Distribution of sampling stations visited by three research vessels (different colours).



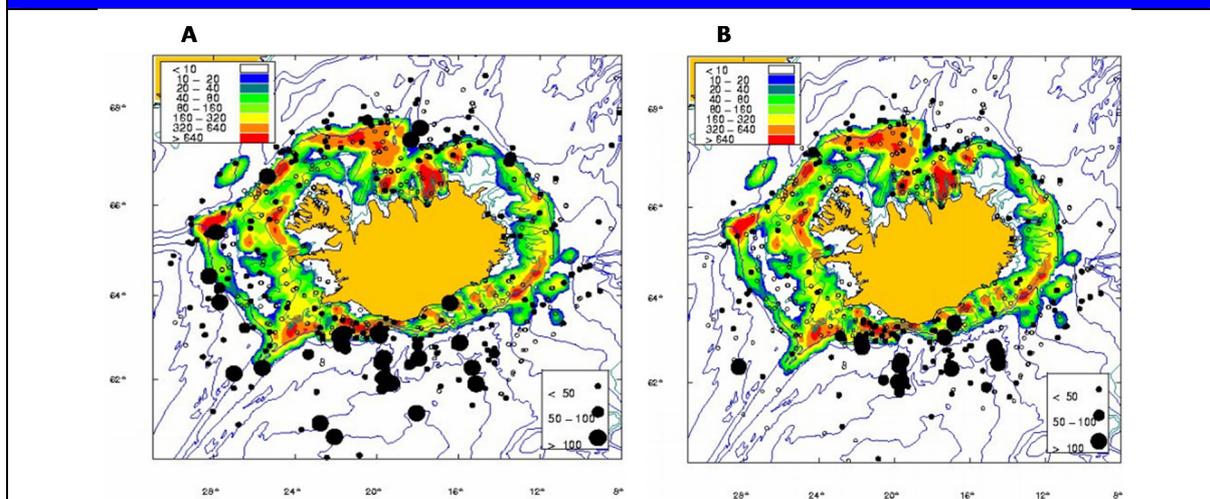
Coral areas in Icelandic waters occur close to the shelf break off the south and west coast of Iceland. Following a scientific mapping, ten coral areas with *Lophelia pertusa* have been closed for all fisheries using bottom contact gear (Figure 3.7). Other vulnerable habitats around Iceland have been identified (Garcia et.al. 2006), such as Gorgonacea and Pennatulacea corals (Figure 3.8) and sponges (Figure 3.9). In general vulnerable habitats around Iceland occur in deep waters and are commonly close to the continental shelf break or deeper. However, maerl beds and hydrothermal vents in the Eyjafjörður fjord are examples of vulnerable habitats that occur in coastal waters (Figure 3.10).

Figure 3.7:
A: Coral areas off the SW coast of. **B:** Coral areas off SE Iceland where fishing operations have been banned since 2005 (green) and 2011 (red)



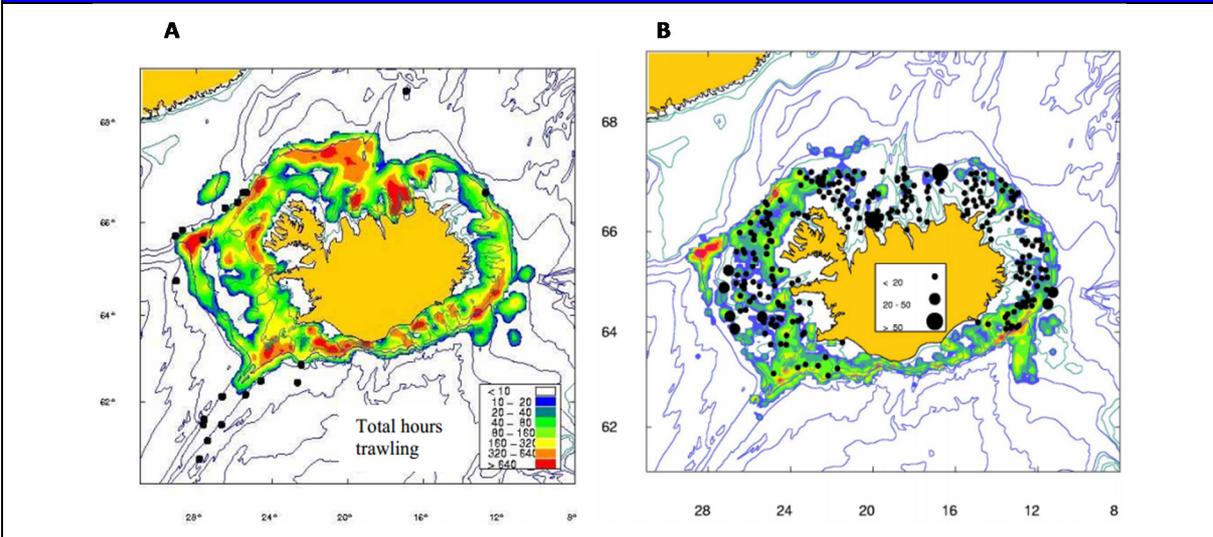
Source: Ministry of Fisheries 2004; Ólafsdóttir & Burgos 2012a

Figure 3.8:
 Distribution of (A) Gorgonacea corals and (B) Pennatulacea corals (nr. of colonies/sample) off Iceland in relation to bottom trawling effort (total trawling hours in 2003 of groundfish, shrimp and *Nephrops* fisheries).



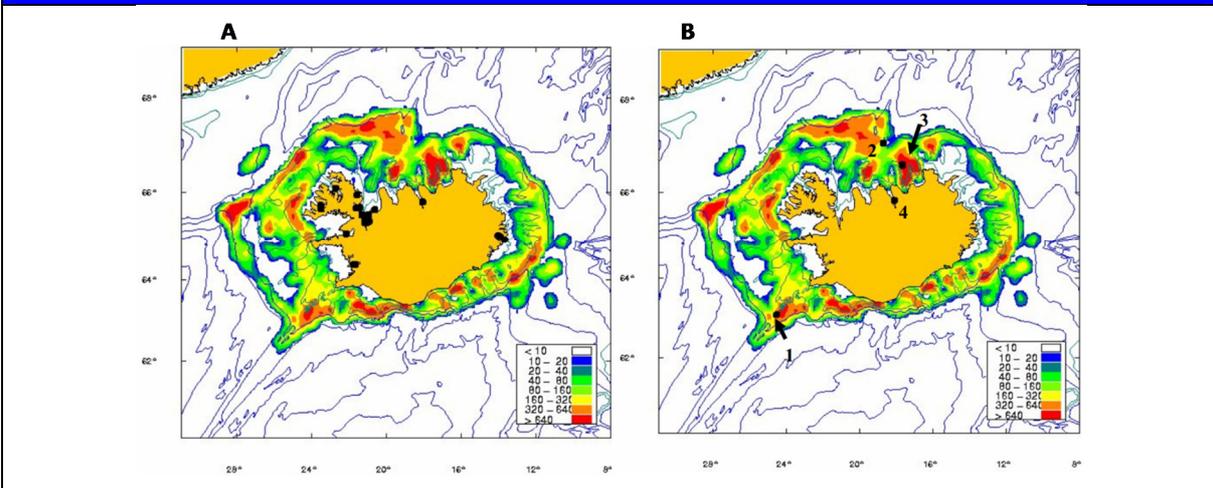
Source: Data from BIOICE database; Garcia et.al. 2006

Figure 3.9:
A: Geographic distribution of “ostur” (mass occurrence of large-sized demosponges) around Iceland in relation to bottom trawling (total trawling hours in 2003 for groundfish, shrimp and *Nephrops* fisheries).
B: Geographic distribution of biomass (kg/hour) of sponges during the MRI groundfish survey in relation to trawling effort in 2002.



Source: Data from BIOICE database; Garcia et.al. 2006

Figure 3.10:
A: Known distribution of maerl beds (A) and location of hydrothermal activity (B) in Icelandic waters in relation to bottom trawling effort (total trawling hours in 2003 of groundfish, shrimp and *Nephrops* fisheries). (1) Steinahóll on the Reykjanes Ridge (2) Kolbeinsey vent fields, (3) Grímsey vent fields and (4) in Eyjafjörður.



Source: Garcia et.al. 2006

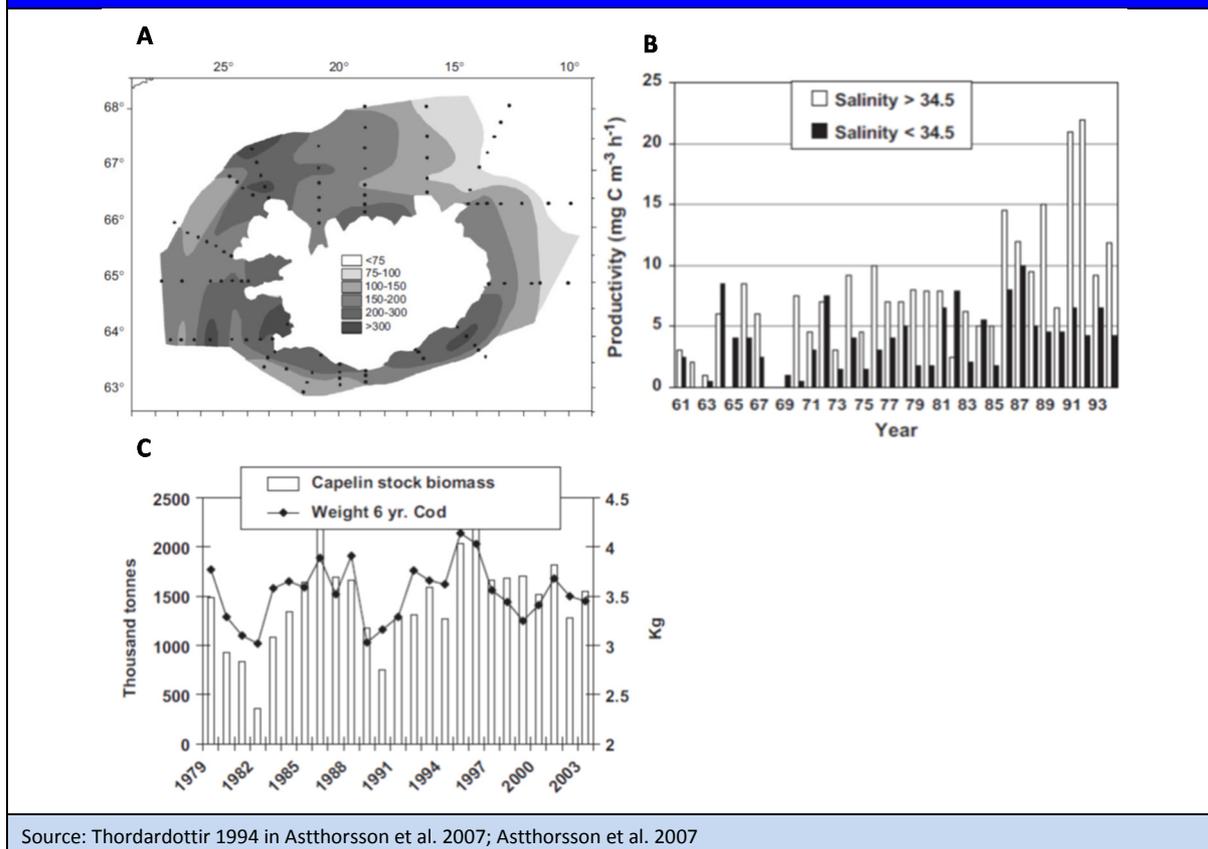
Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Some of the key strategies are to:

- protect threatened species in Icelandic waters;
- develop fishing methods with less impact on marine ecosystems and
- protect vulnerable benthic ecosystems.

The total annual primary production in Icelandic waters has been estimated to be 1,220 million tonnes or $160\text{gCm}^{-2}\text{ yr}^{-1}$ (Thordardottir 1994; Figure 3.12A) and the annual production of *Calanus* (mainly *C. finmarchicus*) has been estimated to be about $7\text{gCm}^{-2}\text{ yr}^{-1}$ (other zooplankton $6\text{gCm}^{-2}\text{ yr}^{-1}$) (Figure 3.12B). The combined annual production of pelagic fish has been estimated to be about $1.5\text{Cm}^{-2}\text{ yr}^{-1}$, and of cod about $0.04\text{gCm}^{-2}\text{ yr}^{-1}$. In comparison, the production of whales and seabirds is small while their food consumption is large (Astthorsson *et al.* 2007).

Figure 3.12:

A: Average annual primary production ($\text{g Cm}^{-2}\text{ yr}^{-1}$) in Icelandic waters based on data from 1958 to 1982. **B:** Comparison of mean productivity ($\text{mg Cm}^{-3}\text{ h}^{-1}$) in the shelf region northeast of Iceland during spring 1961–1993. **C:** Changes in capelin biomass and mean weight of Icelandic cod at the age of 6 years.

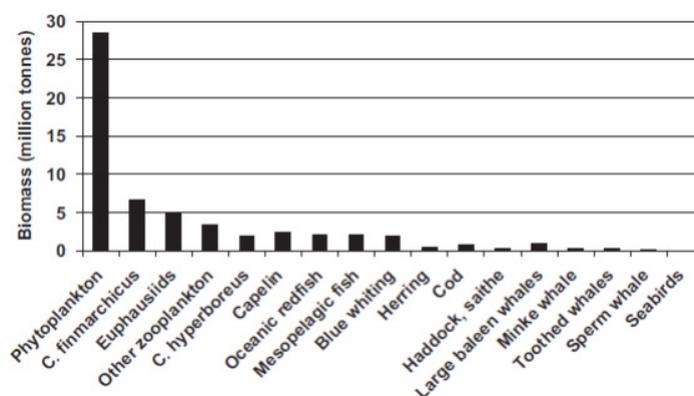


Climate variability during the 20th century has affected the marine ecosystem in Icelandic waters. This was evident during the warm period of 1920-1940, the cold period starting in the late 1960s, and again the warming of the climate observed during the last decade and more. These variations of environmental conditions have caused changes in the abundance and distribution of many fish stocks as well as other components of the Icelandic marine ecosystem. In the waters to the north and east of Iceland, available information suggests the existence of a simple bottom-up controlled food chain, from phytoplankton (mainly *Calanus*), to capelin, to cod (Astthorsson *et al.* 2007). Seasonal migration of the capelin spawning stock from the Iceland Sea to the south and southwest coasts of Iceland transfers zooplankton production to the southern part of the Icelandic marine ecosystem. It has been shown that changes in the capelin biomass causes changes in weight-at-age of cod demonstrating the key role of capelin in the Icelandic marine ecosystem (Figure 3.12C).

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) (Figure 3.13).

Figure 3.13:
Estimated wet biomass of the main components in the Icelandic marine ecosystem.



Source: Astthorsson et al. 2007

3.4.2 Retained species

Retained species were identified as species that are landed. The landings are separated by fishing gear. Statistics on these landings were obtained from the Directorate of Fisheries database (DF). The average catch for each fishing gear for the 2007/08 to 2001/12 fishing seasons was used to calculate the proportion of each species in the catch.

The number of main retained species which was >5% of the catch varied between gear type; bottom trawl, longline and Nephrops trawl with 5 species, Danish seine with 3 species and gillnet and handline with 2 species (see Tables 3.3-3.9). Atlantic cod was a main retained species in all the six fishing gears, haddock in 3 out of 6, ling and golden redfish in 2 out of 6 and the remaining eight main retained species occurred in only 1 out of 6 fishing gears: anglerfish/monkfish, deep water redfish, gray sole, Greenland halibut, Norway lobster, plaice, tusk and wolffish.

In addition, 9 vulnerable species were identified in the various fishing gears; bottom trawl and longline with 6 species, handline with 5 species, Danish seine and Nephrops trawls with 4 species and gillnets with 3 species (see Tables 3.3-3.9). Vulnerable species are those that were listed by IUCN or OSPAR as vulnerable. Grey skate and dogfish occurred in all fishing gear, mackerel shark in all fishing gear except Nephrops trawl, European common eel was found in 3 of 6, orange roughy in 2 of 6, and leafscale gulper shark and Atlantic salmon occurred in 1 of the 6 fishing gear (see Table 3.9).

Table 3.3:
Retained species: Bottom trawl (average catch for 2007/08 to 2011/12)

| Main retained species (>5%) | Average (t) | % catch |
|---|--------------------|----------------|
| Atlantic cod (<i>Gadus morhua</i>) | 82319.44 | 30.28% |
| Golden redfish (<i>Sebastes norvegicus</i>) | 39588.26 | 14.56% |
| Haddock (<i>Melanogrammus aeglefinus</i>) | 35781.30 | 13.16% |
| Greenland Halibut (<i>Reinhardtius hippoglossoides</i>) | 19441.53 | 7.15% |
| Deepwater redfish (<i>Sebastes mentella</i> , Icelandic slope stock) | 14134.69 | 5.20% |
| Main retained species: Vulnerable species | Average (t) | % catch |
| Wolffish (<i>Anarhichas lupus</i>) | 5328.92 | 1.96% |
| Grey Skate (<i>Raja Dipturus batis</i>) | 25.65 | 0.01% |
| Dogfish (<i>Squalus acanthias</i>) | 4.25 | <0.002% |
| Orange roughy (<i>Hoplostethus atlanticus</i>) | 5.08 | <0.002% |
| Mackerel shark (<i>Lamna nasus</i>) | 0.14 | <0.001% |
| Leafscale gulper shark (<i>Centrophorus squamosus</i>) | 0.06 | <0.001% |
| Species between 0.1-5% | | |
| Smelt (<i>Argentina silus</i>) | 9771.61 | 3.59% |
| Oceanic redfish (<i>Sebastes mentella</i>) | 7055.42 | 2.60% |
| Plaice (<i>Pleuronectes platessa</i>) | 2037.10 | 0.75% |
| Blue Ling (<i>Molva dypterygia</i>) | 1763.75 | 0.65% |
| Ling (<i>Molva molva</i>) | 1560.13 | 0.57% |
| Whiting (<i>Merlangius merlangus</i>) | 1551.58 | 0.57% |
| Spotted Wolffish (<i>Anarhichas minor</i>) | 976.78 | 0.36% |
| Lemon sole (<i>Microstomus kitt</i>) | 933.27 | 0.34% |
| Redfish (<i>Sebastes viviparus</i>) | 804.16 | 0.30% |
| Squid (<i>Todarodes sagittatus</i>) | 668.16 | 0.25% |
| Deep water shrimp (<i>Pandalus borealis</i>) | 437.22 | 0.16% |
| Anglerfish (<i>Lophius piscatorius</i>) | 415.33 | 0.15% |
| Species between 0.001-0.01% | | |
| <u>In order of abundance in landings:</u> Atlantic mackerel (<i>Scomber scombrus</i>), Tusk (<i>Brosme brosme</i>), Rock grenadier (<i>Coryphaenoides rupestris</i>), Gray Sole (<i>Glyptocephalus cynoglossus</i>), Starry ray (<i>Raja Amblyraja radiata</i>), Black scabbard-fish (<i>Aphanopus carbo</i>), Atlantic Herring (<i>Clupea harengus</i>), Whiff (<i>Lepidorhombus whiffiagonis</i>), Blue whiting (<i>Micromesistius poutassou</i>), Long Rough Dab (<i>Hippoglossoides platessoides</i>), Greenland Shark (<i>Somniosus microcephalus</i>), Dab (<i>Limanda limanda</i>), Roughhead grenadier (<i>Macrourus berglax</i>), Arctic wolffish (<i>Anarhichas denticulatus</i>), Lumpfish (<i>Cyclopterus lumpus</i>), Baird's smooth-head (<i>Alepocephalus bairdii</i>) | | |
| Species <0.001% | | |
| <u>In order of abundance in landings:</u> European lobster/Norway lobster (<i>Nephrops norvegicus</i>), Black dogfish (<i>Centroscyllium fabricii</i>), Portuguese dogfish (<i>Centroscymnus coelolepis</i>), Ratfish (<i>Chimaera monstrosa</i>), Common whelk (<i>Buccinum undatum</i>), Bluefin tuna (<i>Thunnus thynnus</i>), Shagreen Skate (<i>Raja Leucoraja fullonica</i>), Sailray (<i>Raja lintea</i>), Common spider crab (<i>Hyas araneus</i>), Sandeel (<i>Ammodytes tobianus</i>), Gurnard (<i>Eutrigla gurnardus</i>), Black sea bream (<i>Brama brama</i>), Turbot (<i>Psetta maxima</i>), Pollack (<i>Pollachius pollachius</i>), Ribbonfish (<i>Trachipterus arcticus</i>), Norway pout (<i>Trisopterus esmarki</i>), White hake (<i>Urophycis tenuis</i>), Greater forkbeard (<i>Phycis blennoides</i>) | | |
| Unsorted catch | 5.44 | <0.003% |
| Other flatfish | 0.02 | <0.001% |
| Total landed catch | 271,841.98 | |
| Source: Directorate of Fisheries | | |

Table 3.4:
Retained species: Nephrops trawl (average catch for 2007/08 to 2011/12)

| Main retained species (>5%) | Average (t) | % catch |
|--|--------------------|----------------|
| European lobster/Norway lobster (<i>Nephrops norvegicus</i>) | 2165.89 | 32.39% |
| Atlantic cod (<i>Gadus morhua</i>) | 1223.02 | 18.29% |
| Ling (<i>Molva molva</i>) | 760.34 | 11.37% |
| Golden redfish (<i>Sebastes norvegicus</i>) | 721.64 | 10.79% |
| Gray Sole (<i>Glyptocephalus cynoglossus</i>) | 424.99 | 6.35% |
| Anglerfish (<i>Lophius piscatorius</i>) | 414.06 | 6.19% |
| Main retained species: Vulnerable species | Average (t) | % catch |
| Grey Skate (<i>Raja Dipturus batis</i>) | 9.01 | 0.13% |
| Dogfish (<i>Squalus acanthias</i>) | 0.04 | <0.001% |
| Atlantic salmon (<i>Salmo salar</i>) | <0.01 | <0.001% |
| Common eel (<i>Anguilla anguilla</i>) | <0.01 | <0.001% |
| Species between 0.1-5% | | |
| Haddock (<i>Melanogrammus aeglefinus</i>) | 163.74 | 2.45% |
| Blue Ling (<i>Molva dypterygia</i>) | 155.20 | 2.32% |
| Whiff (<i>Lepidorhombus whiffiagonis</i>) | 110.34 | 1.65% |
| Whiting (<i>Merlangius merlangus</i>) | 92.97 | 1.39% |
| Lemon sole (<i>Microstomus kitt</i>) | 68.88 | 1.03% |
| Wolffish (<i>Anarhichas lupus</i>) | 64.11 | 0.96% |
| Species between 0.001-0.01% | | |
| <u>In order of abundance in landings:</u> Tusk (<i>Brosme brosme</i>), Starry ray (<i>Raja Amblyraja radiata</i>), Plaice (<i>Pleuronectes platessa</i>), Spotted Wolffish (<i>Anarhichas minor</i>), Long Rough Dab (<i>Hippoglossoides platessoides</i>), Deepwater redfish (<i>Sebastes mentella</i>), Deep water shrimp (<i>Pandalus borealis</i>), Smelt (<i>Argentina silus</i>), Common spider crab (<i>Hyas araneus</i>), Dab (<i>Limanda limanda</i>) | | |
| Species <0.001% | | |
| <u>In order of abundance in landings:</u> Atlantic mackerel (<i>Scomber scombrus</i>), White hake (<i>Urophycis tenuis</i>), Squid (<i>Todarodes sagittatus</i>), Shagreen Skate (<i>Raja Leucoraja fullonica</i>), Arctic wolffish (<i>Anarhichas denticulatus</i>), Sailray (<i>Raja lintea</i>), Greenland Halibut (<i>Reinhardtius hippoglossoides</i>), Turbot (<i>Psetta maxima</i>), Lumpfish (<i>Cyclopterus lumpus</i>), Gurnard (<i>Eutrigla gurnardus</i>), Greater forkbeard (<i>Phycis blennoides</i>), Red crab (<i>Geryon affinis</i>) | | |
| Unsorted catch | 0.05 | <0.001% |
| Other flatfish | <0.01 | <0.001% |
| Total landed catch | 6687.74 | |
| Source: Directorate of Fisheries | | |

Table 3.5:
Retained species: Long line(average catch for 2007/08 to 2011/12)

| Main retained species (>5%) | Average (t) | % catch |
|---|-------------------|---------|
| Atlantic cod (<i>Gadus morhua</i>) | 56447.50 | 51.71% |
| Haddock (<i>Melanogrammus aeglefinus</i>) | 26344.01 | 24.13% |
| Wolffish (<i>Anarhichas lupus</i>) | 6670.61 | 6.11% |
| Tusk (<i>Brosme brosme</i>) | 6358.51 | 5.82% |
| Ling (<i>Molva molva</i>) | 5941.28 | 5.44% |
| Main retained species: Vulnerable species | | |
| Grey Skate (<i>Raja Dipturus batis</i>) | 37.21 | 0.03% |
| Dogfish (<i>Squalus acanthias</i>) | 20.55 | 0.02% |
| Common dolphin (<i>Delphinus delphis</i>) | 0.09 | <0.001% |
| Common eel (<i>Anguilla anguilla</i>) | 0.05 | <0.001% |
| Mackerel shark (<i>Lamna nasus</i>) | 0.04 | <0.001% |
| Orange roughy (<i>Hoplostethus atlanticus</i>) | <0.01 | <0.001% |
| Species between 0.1-5% | | |
| Blue Ling (<i>Molva dypterygia</i>) | 2708.24 | 2.48% |
| Golden redfish (<i>Sebastes norvegicus</i>) | 1125.45 | 1.03% |
| Spotted Wolffish (<i>Anarhichas minor</i>) | 1070.33 | 0.98% |
| Starry ray (<i>Raja Amblyraja radiata</i>) | 726.21 | 0.67% |
| Whiting (<i>Merlangius merlangus</i>) | 441.04 | 0.40% |
| Plaice (<i>Pleuronectes platessa</i>) | 125.50 | 0.11% |
| Species between 0.001-0.01% | | |
| <u>In order of abundance in landings:</u> Greenland Halibut (<i>Reinhardtius hippoglossoides</i>), Anglerfish (<i>Lophius piscatorius</i>), White hake (<i>Urophycis tenuis</i>), Deepwater redfish (<i>Sebastes mentella</i>), Shagreen Skate (<i>RajaLeucoraja fullonica</i>), Sailray (<i>Raja lintea</i>), Long Rough Dab (<i>Hippoglossoides platessoides</i>), Dab (<i>Limanda limanda</i>), Greenland Shark (<i>Somniosus microcephalus</i>), Greater forkbeard (<i>Phycis blennoides</i>), Redfish (<i>Sebastes viviparus</i>) | | |
| Species <0.001% | | |
| <u>In order of abundance in landings:</u> Rock grenadier (<i>Coryphaenoides rupestris</i>), Arctic wolffish (<i>Anarhichas denticulatus</i>), Black sea bream (<i>Brama brama</i>), Black scabbard-fish (<i>Aphanopus carbo</i>), Ratfish (<i>Chimaera monstrosa</i>), Atlantic mackerel (<i>Scomber scombrus</i>), Atlantic Herring (<i>Clupea harengus</i>), Lemon sole (<i>Microstomus kitt</i>), Black dogfish (<i>Centroscyllium fabricii</i>), Lumpfish (<i>Cyclopterus lumpus</i>), Gray Sole (<i>Glyptocephalus cynoglossus</i>), Sea urchin (Echinoidea), Pollack (<i>Pollachius pollachius</i>), Roughhead grenadier (<i>Macrourus berglax</i>), Whiff (<i>Lepidorhombus whiffiagonis</i>), Blackbelly rosefish (<i>Helicolenus dactylopterus</i>), Smelt (<i>Argentina silus</i>), Moonfish (<i>Mola mola</i>), Eelpout (<i>Lycodes esmarki</i>), Common spider crab (<i>Hyas araneus</i>), Baird's smooth-head (<i>Alepocephalus bairdii</i>), Sea cucumber (Holothuroidea), Gurnard (<i>Eutrigla gurnardus</i>), Turbot (<i>Psetta maxima</i>), Spiny-eel (<i>Notacanthus chemnitzii</i>), Blue mussel (<i>Mytilus edulis</i>), Flounder (<i>Platichthys flesus</i>), Ribbonfish (<i>Trachipterus arcticus</i>), Atlantic rock crab (<i>Cancer irroratus</i>) | | |
| Unsorted catch | 1.57 | <0.002% |
| Total landed catch | 109,172.21 | |
| Source: Directorate of Fisheries | | |

Table 3.6:
Retained species: Handline (average catch for 2007/08 to 2011/12)

| Main retained species (>5%) | Average (t) | % catch |
|--|--------------------|----------------|
| Atlantic cod (<i>Gadus morhua</i>) | 8842.07 | 70.10% |
| Main retained species: Vulnerable species | | |
| Dogfish (<i>Squalus acanthias</i>) | 0.13 | <0.002% |
| Grey Skate (<i>Raja Dipturus batis</i>) | 0.12 | <0.001% |
| Mackerel shark (<i>Lamna nasus</i>) | 0.02 | <0.001% |
| Common eel (<i>Anguilla anguilla</i>) | <0.01 | <0.001% |
| Species between 0.1-5% | | |
| Atlantic mackerel (<i>Scomber scombrus</i>) | 312.64 | 2.48% |
| Golden redfish (<i>Sebastes norvegicus</i>) | 119.56 | 0.95% |
| Haddock (<i>Melanogrammus aeglefinus</i>) | 50.51 | 0.40% |
| Ling (<i>Molva molva</i>) | 12.93 | 0.10% |
| Wolffish (<i>Anarhichas lupus</i>) | 8.51 | 0.07% |
| Whiting (<i>Merlangius merlangus</i>) | 7.91 | 0.06% |
| Tusk (<i>Brosme brosme</i>) | 6.69 | 0.05% |
| Anglerfish (<i>Lophius piscatorius</i>) | 2.79 | 0.02% |
| Lumpfish (<i>Cyclopterus lumpus</i>) | 0.70 | 0.01% |
| Species between 0.001-0.01% | | |
| <u>In order of abundance in landings:</u> Plaice (<i>Pleuronectes platessa</i>), Lumpfish roe (<i>Cyclopterus lumpus</i>), Black sea bream (<i>Brama brama</i>), Spotted Wolffish (<i>Anarhichas minor</i>) | | |
| Species <0.001% | | |
| <u>In order of abundance in landings:</u> Gray Sole (<i>Glyptocephalus cynoglossus</i>), Lemon sole (<i>Microstomus kitt</i>), Deepwater redfish (<i>Sebastes mentella</i>), Pollack (<i>Pollachius pollachius</i>), Starry ray (<i>Raja Amblyraja radiata</i>), Redfish (<i>Sebastes viviparus</i>), Whiff (<i>Lepidorhombus whiffiagonis</i>), Blue Ling (<i>Molva dypterygia</i>), Greenland Halibut (<i>Reinhardtius hippoglossoides</i>), Ratfish (<i>Chimaera monstrosa</i>), Dab (<i>Limanda limanda</i>), White hake (<i>Urophycis tenuis</i>), Spiny stone-crab (<i>Lithodes maia</i>), Roughhead grenadier (<i>Macrourus berglax</i>), Turbot (<i>Psetta maxima</i>), Long Rough Dab (<i>Hippoglossoides platessoides</i>), Smelt (<i>Argentina silus</i>), Squid (<i>Todarodes sagittatus</i>) | | |
| Total Landed Catch | 12,612.76 | |
| Source: Directorate of Fisheries | | |

Table 3.7:
Retained species: Gillnet (average catch for 2007/08 to 2011/12)

| Main retained species (>5%) | Average (t) | % catch |
|--|--------------------|----------------|
| Atlantic cod (<i>Gadus morhua</i>) | 18041.01 | 69.84% |
| Main retained species: Vulnerable species | | |
| Dogfish (<i>Squalus acanthias</i>) | 36.01 | 0.14% |
| Grey Skate (<i>Raja Dipturus batis</i>) | 2.94 | 0.01% |
| Mackerel shark (<i>Lamna nasus</i>) | 0.24 | <0.001% |
| Common dolphin (<i>Delphinus delphis</i>) | 0.05 | <0.001% |
| Species between 0.1-5% | | |
| Greenland Halibut (<i>Reinhardtius hippoglossoides</i>) | 592.02 | 2.29% |
| Haddock (<i>Melanogrammus aeglefinus</i>) | 543.88 | 2.11% |
| Ling (<i>Molva molva</i>) | 412.99 | 1.60% |
| Golden redfish (<i>Sebastes norvegicus</i>) | 179.22 | 0.69% |
| Anglerfish (<i>Lophius piscatorius</i>) | 168.10 | 0.65% |
| Plaice (<i>Pleuronectes platessa</i>) | 125.88 | 0.49% |
| Blue Ling (<i>Molva dypterygia</i>) | 123.35 | 0.48% |
| Atlantic Herring (<i>Clupea harengus</i>) | 43.00 | 0.17% |
| Tusk (<i>Brosme brosme</i>) | 42.49 | 0.16% |
| Species between 0.001-0.01% | | |
| <u>In order of abundance in landings:</u> Whiting (<i>Merlangius merlangus</i>), Wolffish (<i>Anarhichas lupus</i>), Lumpfish (<i>Cyclopterus lumpus</i>), Starry ray (<i>Raja Amblyraja radiata</i>), Spotted Wolffish (<i>Anarhichas minor</i>), Dab (<i>Limanda limanda</i>), Lemon sole (<i>Microstomus kitt</i>), Atlantic mackerel (<i>Scomber scombrus</i>), Long Rough Dab (<i>Hippoglossoides platessoides</i>), Deepwater redfish (<i>Sebastes mentella</i>), Black dogfish (<i>Centroscyllium fabricii</i>), Gray Sole (<i>Glyptocephalus cynoglossus</i>), Whiff (<i>Lepidorhombus whiffiagonis</i>) | | |
| Species <0.001% | | |
| <u>In order of abundance in landings:</u> Greenland Shark (<i>Somniosus microcephalus</i>), Pollack (<i>Pollachius pollachius</i>), Common spider crab (<i>Hyas araneus</i>), Ratfish (<i>Chimaera monstrosa</i>), Rock grenadier (<i>Coryphaenoides rupestris</i>), Black sea bream (<i>Brama brama</i>), Shagreen Skate (<i>Raja Leucoraja fullonica</i>), Turbot (<i>Psetta maxima</i>), Flounder (<i>Platichthys flesus</i>), White hake (<i>Urophycis tenuis</i>), Redfish (<i>Sebastes viviparus</i>), Ribbonfish (<i>Trachipterus arcticus</i>), Greater forkbeard (<i>Phycis blennoides</i>), Spiny-eel (<i>Notacanthus chemnitzii</i>), Red crab (<i>Geryon affinis</i>), Blue mussel (<i>Mytilus edulis</i>), Gurnard (<i>Eutrigla gurnardus</i>) | | |
| Unsorted catch | 0.12 | <0.001% |
| Other flatfish | <0.01 | <0.001% |
| Total Landed Catch | 25833.12 | |
| Source: Directorate of Fisheries | | |

Table 3.8:
Retained species: Danish seine (average catch for 2007/08 to 2011/12)

| Main retained species (>5%) | Average (t) | % catch |
|--|--------------------|----------------|
| Haddock (<i>Melanogrammus aeglefinus</i>) | 11557.77 | 36.63% |
| Atlantic cod (<i>Gadus morhua</i>) | 8951.25 | 28.37% |
| Plaice (<i>Pleuronectes platessa</i>) | 3653.43 | 11.58% |
| Main retained species: Vulnerable species | | |
| Wolffish (<i>Anarhichas lupus</i>) | 1275.85 | 4.04% |
| Grey Skate (<i>Raja Dipturusbatis</i>) | 32.45 | 0.10% |
| Dogfish (<i>Squalus acanthias</i>) | 6.37 | 0.02% |
| Mackerel shark (<i>Lamna nasus</i>) | 0.10 | <0.001% |
| Species between 0.1-5% | | |
| Lemon sole (<i>Microstomus kitt</i>) | 1157.77 | 3.67% |
| Gray Sole (<i>Glyptocephalus cynoglossus</i>) | 921.57 | 2.92% |
| Dab (<i>Limanda limanda</i>) | 753.60 | 2.39% |
| Golden redfish (<i>Sebastes norvegicus</i>) | 460.51 | 1.46% |
| Anglerfish (<i>Lophius piscatorius</i>) | 426.49 | 1.35% |
| Ling (<i>Molva molva</i>) | 357.62 | 1.13% |
| Long Rough Dab (<i>Hippoglossoides platessoides</i>) | 173.33 | 0.55% |
| Whiting (<i>Merlangius merlangus</i>) | 172.31 | 0.55% |
| Starry ray (<i>Raja Amblyraja radiata</i>) | 151.19 | 0.48% |
| Whiff (<i>Lepidorhombus whiffiagonis</i>) | 121.21 | 0.38% |
| Blue Ling (<i>Molva dypterygia</i>) | 61.56 | 0.20% |
| Species between 0.001-0.01% | | |
| <u>In order of abundance in landings:</u> Spotted Wolffish (<i>Anarhichas minor</i>), Ratfish (<i>Chimaera monstrosa</i>), Gurnard (<i>Eutrigla gurnardus</i>), Lumpfish (<i>Cyclopterus lumpus</i>), Atlantic mackerel (<i>Scomber scombrus</i>), Tusk (<i>Brosme brosme</i>) | | |
| Species <0.001% | | |
| <u>In order of abundance in landings:</u> Shagreen Skate (<i>Rajaleucoraja fullonica</i>), Sailray (<i>Raja lintea</i>), Deepwater redfish (<i>Sebastes mentella</i>), Turbot (<i>Psetta maxima</i>), Greenland Halibut (<i>Reinhardtius hippoglossoides</i>), Smelt (<i>Argentina silus</i>), Sea cucumber (Holothuroidea), Flounder (<i>Platichthys flesus</i>), Redfish (<i>Sebastes viviparus</i>), Ribbonfish (<i>Trachipterus arcticus</i>), Greater forkbeard (<i>Phycis blennoides</i>), Pollack (<i>Pollachius pollachius</i>), Arctic wolffish (<i>Anarhichas denticulatus</i>), Common spider crab (<i>Hyas araneus</i>), Squid (<i>Todarodes sagittatus</i>), Bluefin tuna (<i>Thunnus thynnus</i>), Black sea bream (<i>Brama brama</i>), Red crab (<i>Geryon affinis</i>), Common whelk (<i>Buccinum undatum</i>) | | |
| Unsorted catch | 0.49 | <0.002% |
| Total Landed Catch | 31,556.90 | |
| Source: Directorate of Fisheries | | |

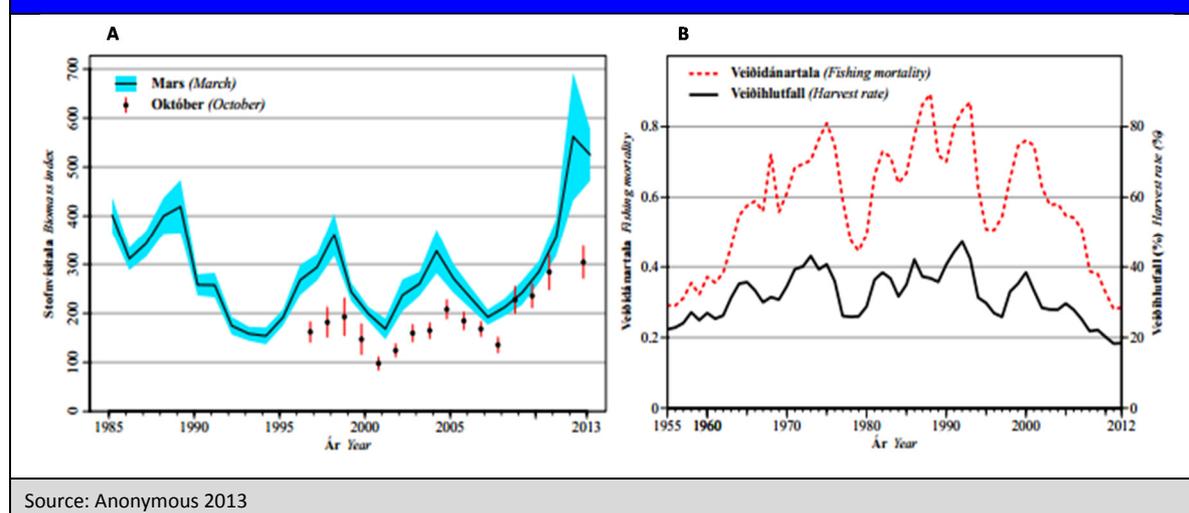
Table 3.9:
Summary of main retained species by fishing gear in the ISF Iceland saithe fishery. (V = vulnerable/valuable species)

| Species | Bottom trawl | Danish seine | Gillnet | Handline | Long line | Nephrops trawl |
|---|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Atlantic cod (<i>Gadus morhua</i>) | X | X | X | X | X | X |
| Haddock (<i>Melanogrammus aeglefinus</i>) | X | X | | | X | |
| Golden redfish (<i>Sebastes norvegicus</i>) | X | | | | | X |
| Greenland Halibut (<i>Reinhardtius hippoglossoides</i>) | X | | | | | |
| Deepwater redfish (<i>Sebastes mentella</i>) | X | | | | | |
| Plaice (<i>Pleuronectes platessa</i>) | | X | | | | |
| Wolffish (<i>Anarhichas lupus</i>) | X(V) | X(V) | | | X | |
| Ling (<i>Molva molva</i>) | | | | | X | X |
| Tusk (<i>Brosme brosme</i>) | | | | | X | |
| European/Norway lobster (<i>Nephrops norvegicus</i>) | | | | | | X |
| Gray Sole (<i>Glyptocephalus cynoglossus</i>) | | | | | | X |
| Anglerfish (<i>Lophius piscatorius</i>) | | | | | | X |
| Grey Skate (<i>Raja Dipturus batis</i>) | X(V) | X(V) | X(V) | X(V) | X(V) | X(V) |
| Dogfish (<i>Squalus acanthias</i>) | X(V) | X(V) | X(V) | X(V) | X(V) | X(V) |
| European/common eel (<i>Anguilla anguilla</i>) | | | | X(V) | X(V) | X(V) |
| Mackerel shark or porbeagle (<i>Lamna nasus</i>) | X(V) | X(V) | X(V) | X(V) | X(V) | |
| Leafscale gulper shark (<i>Centrophorus squamosus</i>) | X(V) | | | | | |
| Orange roughy (<i>Hoplostethus atlanticus</i>) | X(V) | | | | X(V) | |
| Atlantic salmon (<i>Salmo salar</i>) | | | | | | X(V) |
| Common dolphin (<i>Delphinus delphis</i>) | | | | X(V) | X(V) | |
| Number of main retained species | 5 + 6(v) | 3 + 4(v) | 2 + 3(v) | 2 + 5(v) | 5 + 6(v) | 5 + 4(v) |

Atlantic cod (*Gadus morhua*)

Cod is a main retained species in all of the fishing gear assessed. Cod comprised 70.1% of the catch by handline over the period 2007/08 to 2011/12 (Table 3.6) but the lowest catch proportion of cod was in the Nephrops trawl, 18.3% (Table 3.4). The reference biomass for cod in 2013 was estimated at 1,170,000 tonnes (t) and the spawning stock as 480,000t, compared to Blim=125,000t and Btrigger=220,000t. The stock biomass is now larger than observed in the last three decades (Figure 3.14A). During the last 10 years, the harvest rate declined from 34–40% to around 20% and the fishing mortality from above 0.7 in 2000 to 0.26 in 2012 (Figure 3.14B). Recruitment during this period has been around 2/3 of the long-term average. The decrease in harvest rate is believed to be the main reason for the increase in stock size (Anon 2013). A management plan (harvest control rule, HCR) for cod is in operation. The HCR has been evaluated by ICES and the conclusion was that the proposed HCR for Icelandic cod is precautionary (low probability of the stock declining to a level where future productivity of the stock may be impaired) and in accordance with the ICES maximum sustainable yield (MSY) approach (high long-term average yield, Fmax) (ICES 2010 and 2013b).

Figure 3.14:
Atlantic cod. A: Biomass indices from MRI spring and autumn groundfish surveys (standard deviation = shaded area and vertical lines). B: Harvest rate and fishing mortality (F5–10) since 1955.



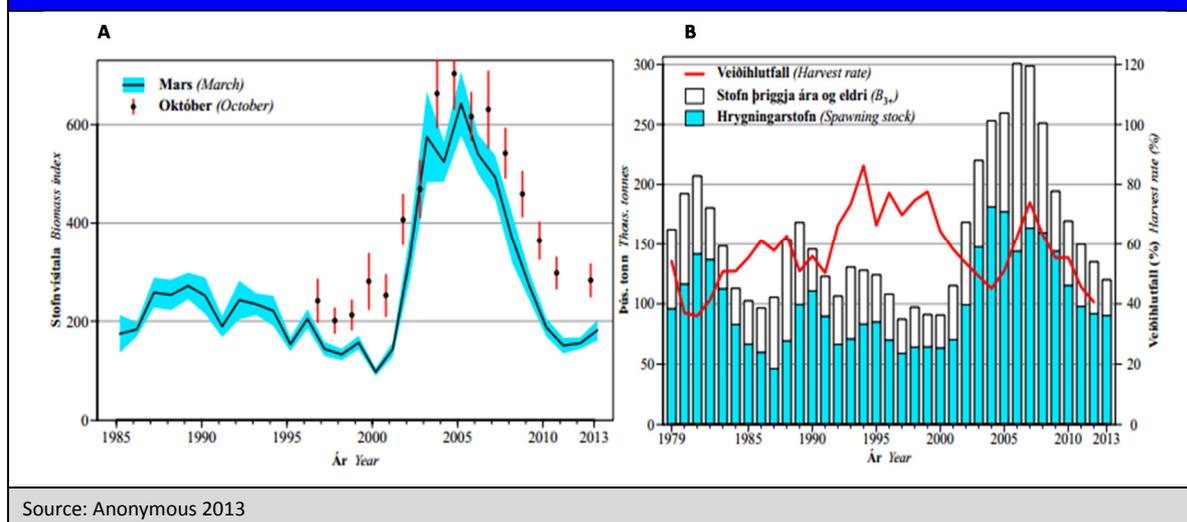
Source: Anonymous 2013

Haddock (*Melanogrammus aeglefinus*)

Haddock is a main retained species in bottom trawl, Danish seine and longline. The spawning stock biomass of haddock was estimated 90,000t and the fishable stock (+3 years) 120,000t and the harvest rate in 2012 as 41%, compared to 40% according to HCR. The MRI predicts that the stock size of haddock will decrease in coming years and there is some risk of the spawning stock will falling below the historical minimum ($B_{lim}=45,000t$) in 2014–2015 (Figure 3.15B). The MRI recommended a TAC for the quota year 2012/2013 which would lead to a low probability that the spawning stock will go below B_{lim} . The MRI has been developing a harvest control rule (HCR, $SSB_{trigger}=45,000t$) for haddock, as a response to a request by the MII. The Government of Iceland has requested ICES to evaluate the management plan and the conclusion was that the proposed HCR for Icelandic haddock is precautionary and in accordance with the ICES MSY approach (ICES 2013 d&e). The HCR was officially implemented by the Icelandic government by April 2013. According to the HCR, the harvest rate will be reduced to below 40% if the spawning stock is estimated to be below 45,000t.

Figure 3.15:

Haddock. A: Total biomass indices in the Icelandic groundfish surveys in March (line) and October (dots) (standard deviation = shaded area and vertical lines). B: Biomass of spawning stock and fishable stock (ages 3+) in 1979–2013 and fishing mortality (ages 4–7) in 1979–2012.



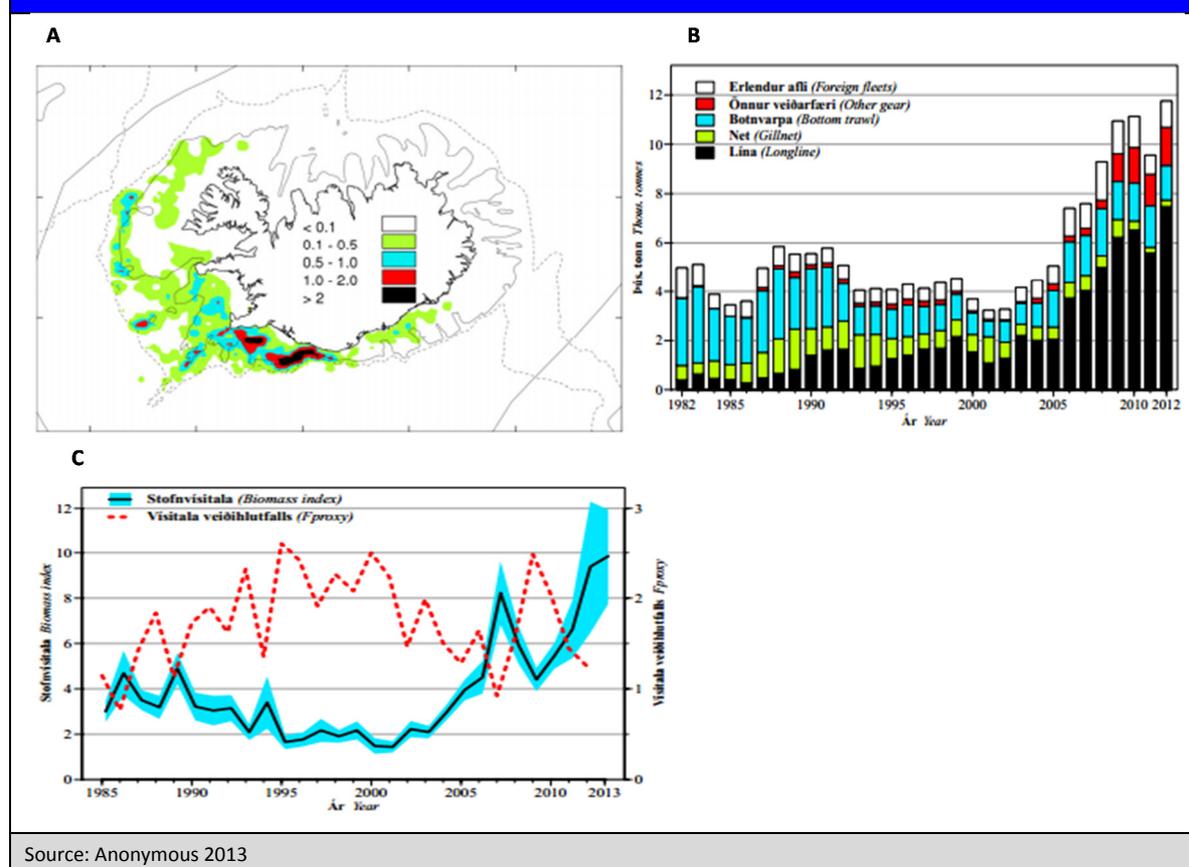
Source: Anonymous 2013

Ling (*Molva molva*)

Ling is mainly caught by longliners off the SW coast of Iceland (Figure 3.16 A & B). In 2007 the biomass index was the highest since 1985 and it has been rising ever since (Figure 3.16 C). During this period the exploitation level (Fproxy [catch/index]) has been fluctuating considerably, but the exploitation level decreased steadily during 2009-2012 and in 2012 it was at a similar level as in 2004-2008, when survey indices were increasing rapidly. The basis of the MRI advice is to keep exploitation at a similar level as observed in 2004-2008 as analytical assessment indicates that these catches would result in fishing mortality close to FMSY.

Figure 3.16:

Ling. A: Fishing grounds in 2012. All gears combined. Dark areas indicate highest catch (tonnes/nmi²). B: Landings from Icelandic waters during the period 1982-2012 (thous. tonnes) divided by gear. C: Biomass index (>40 cm) in the annual groundfish survey in March during 1985-2013 and Fproxy (catch/index).

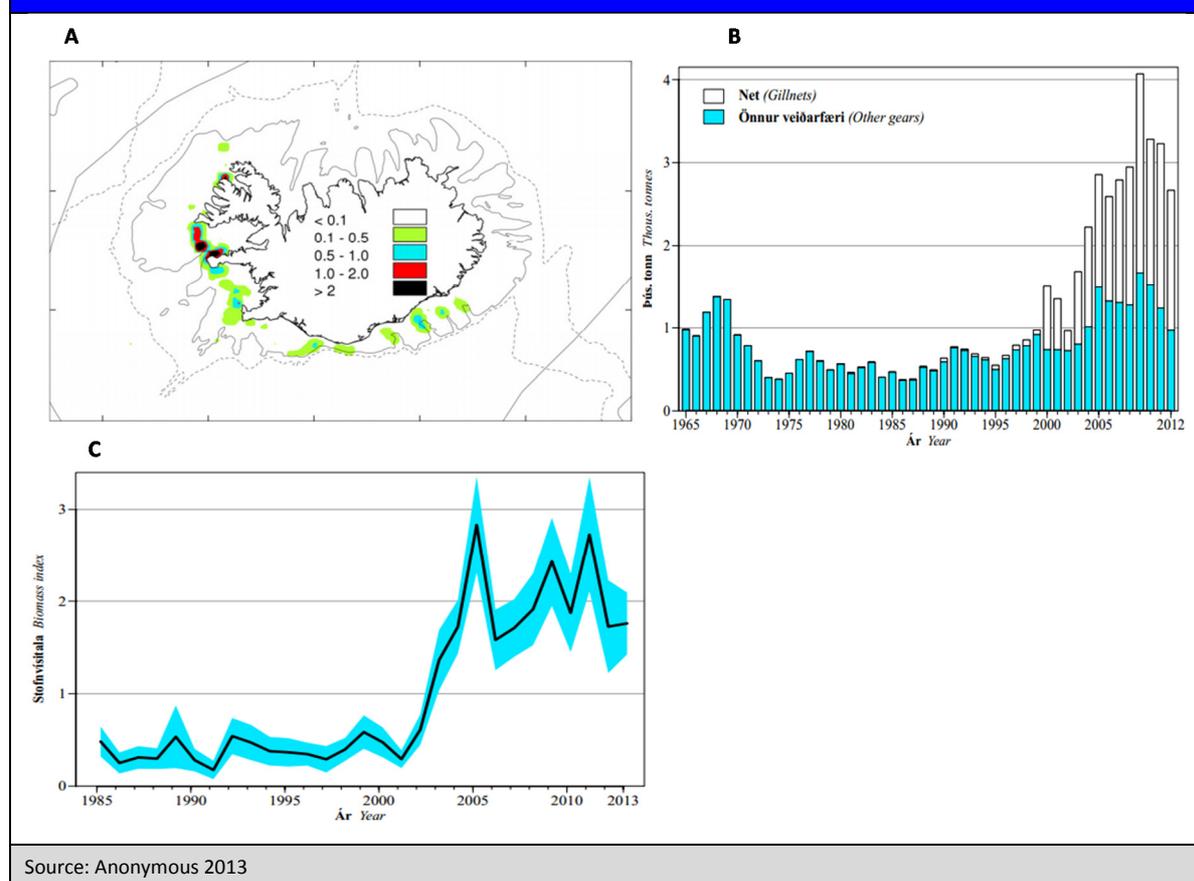


Source: Anonymous 2013

Anglerfish (*Lophius piscatorius*)

Anglerfish/monkfish is a main retained species Nephrops trawl. However, anglerfish is mainly caught by gillnets and in the outer part of the Faxaflói Bay and Breiðafjörður (Figure 3.17 A & B). The increased catch in recent years is likely to be the result of an expansion in the anglerfish population size for the last few years (Figure 3.17C) together with shifts in the main distribution of the anglerfish. It used to be most common in the waters south of Iceland but in recent years it is more common to the west of Iceland, coinciding with the warming of Icelandic waters (Anon 2012b, www.fisheries.is). Since around 2003 the fishable stock has remained large due to very good recruitment during the period 1998–2007, but the recruitment has been poor for the year classes 2008–2012. It is estimated that the fishable stock will decline considerably in the coming years and the MRI has recommended reduced TAC and the implementation of measures to reduce the bycatch of juvenile anglerfish in trawl fisheries.

Figure 3.17:
Anglerfish. A: Fishing grounds in 2012. Dark areas indicate highest catch (tonnes/nmi²). B: Total landings (tonnes) during the period 1965-2012. C: Biomass indices for fishable stock (>60 cm) in annual groundfish surveys in March 1985–2012. (Shaded area shows one standard deviation).

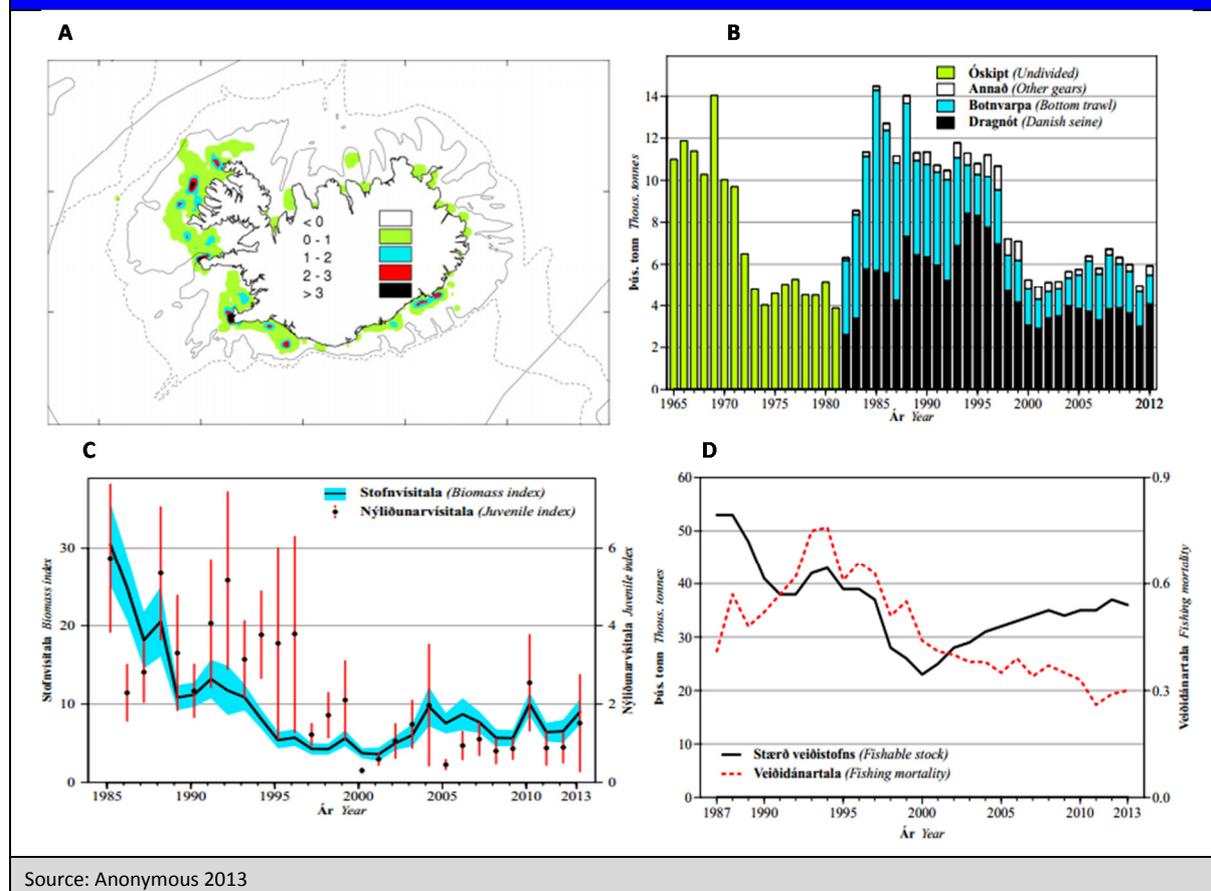


Plaice (*Pleuronectes platessa*)

Plaice is mainly caught by Danish seine in relatively shallow waters and close to shore off W and SW Iceland (Figure 3.18 A & B). The stock assessment for plaice indicates that since 2000 the biomass has been increasing and in general the fishing mortality has decreased steadily since 1993 (Figure 3.18 C & D). The size of the fishable population has been increasing since 2000 and is now at 35,000t. The MRI has recommended that the existing fishing ban on spawning grounds of plaices should remain in effect. The species is managed by TAC and given that recruitment remains at current levels, fishing mortality will be close to FMSY (Anon 2013).

Figure 3.18:

Plaice. A: Fishing grounds in 2012. Dark areas = highest catch (t/nmi²). B: Total landings (tonnes) during the period 1965–2012. C: Indices for fishable stock and juveniles (nr. of fish) in the spring groundfish survey 1985–2012. B: Fishable stock (>30 cm) 1987–2011 and fishing mortality 1987–2011, based on CAEGIAN model

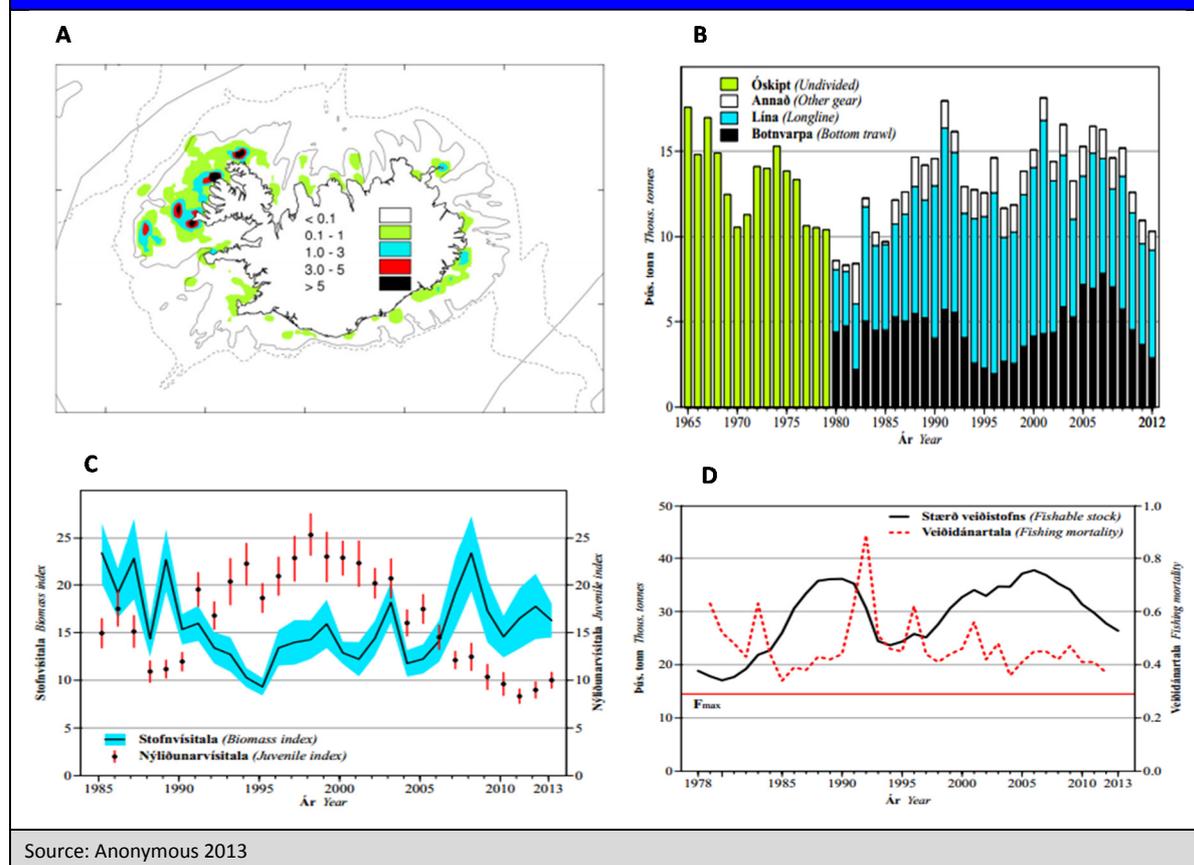


Source: Anonymous 2013

Atlantic wolffish (*Anarhichas lupus*)

Atlantic wolffish comprises more than 5% of the catch in longlines, and is also caught by bottom trawls and Danish seine where it is defined as a valuable and vulnerable species. Atlantic wolffish is caught by longline and bottom trawl off NW Iceland (Vestfirðir) (Figure 3.19 A & B). The index of fishable biomass in 2013 was close to the longterm average. However, recruitment indices have been at historically low levels in recent years (Figure 3.19 C). The fishable part of the stock has been decreasing since 2006 and MRI assumes that it will decline further, as recruitment to the fishable stock will be low in the coming years. The MRI recommended a TAC according to the management strategy of $F_{max} = 0.29$ or 7,500t for the quota year 2013/2014. The MRI also recommends a continued closure of the major spawning area off West Iceland during the spawning and incubation season.

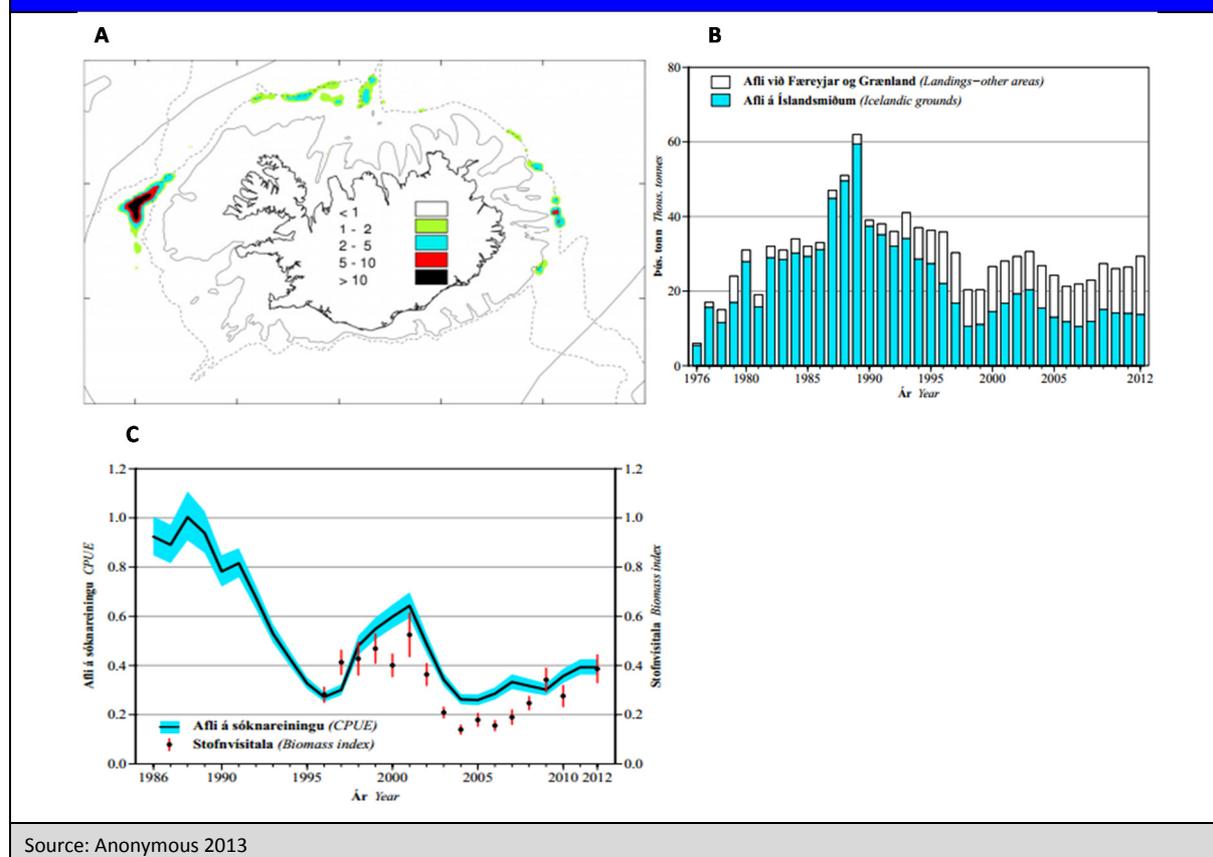
Figure 3.19:
Atlantic wolffish. A: Fishing grounds in 2012. Dark areas = highest catch (t/nmi²). B: Total landings (tonnes) during the period 1965-2012. C: Stock index and recruitment index (nr of fish 20-40 cm) in annual March groundfish survey 1985–2012. B: Fishable stock size (thous. tonnes) 1981–2012 and F 1981–2011.



Greenland Halibut (*Reinhardtius hippoglossoides*)

Greenland halibut is a main retained species in bottom trawls. The Greenland halibut stock is utilized by the Faroe Islands, Greenland and Iceland. The main fishing grounds of Greenland Halibut off Iceland are deep WNW of the Vestfirðir peninsula, in the Denmark Strait (Figure 3.20A). In recent years approximately half of the catch is from Icelandic waters (Figure 3.20B). The assessment by MRI indicates that the increase in CPUE of the Icelandic trawler fleet coincides with growing biomass indices from a historical low around 2005. ICES and MRI recommend that fishing effort should be reduced to a level corresponding to the long-term maximum sustainable yield.

Figure 3.20:
Greenland halibut. A: Fishing grounds in 2012. All gears combined. Dark areas = highest catch (t/nmi²). B: Landings (thous. tonnes) from Iceland and total landings from East Greenland, Iceland and Faroes Islands 1976-2012. C: CPUE of the Icelandic fishing fleet 1985-2012 and biomass index (>40cm) from the Icelandic autumn survey 1996-2012.



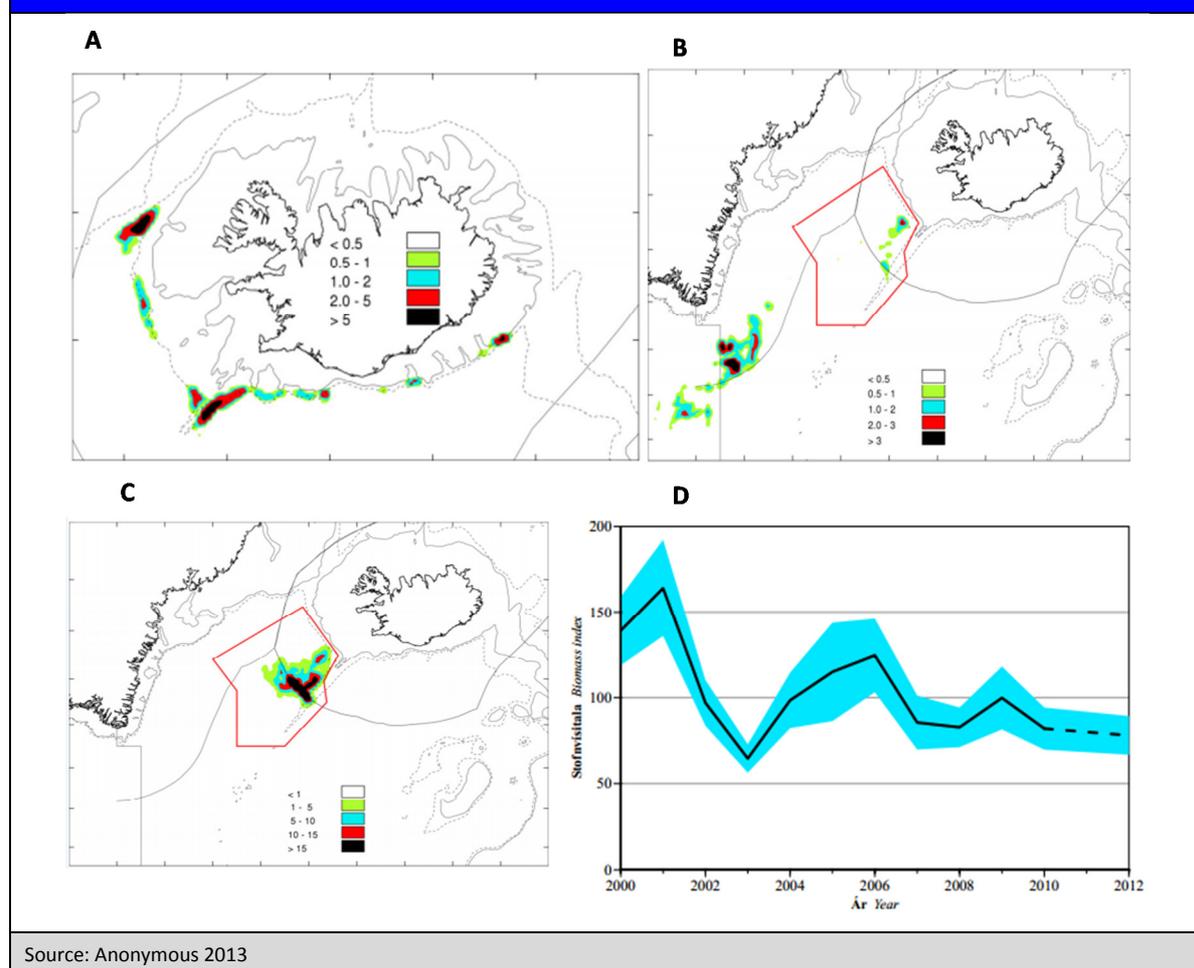
Source: Anonymous 2013

Deepwater redfish (*Sebastes mentella*)

Deepwater redfish is a main retained species only in bottom trawls. Deepwater redfish is a species with late maturation (matures between 10 and 14 years old), slow growth (older than 50 years), and a schooling behaviour. Hence it is considered to be vulnerable to overexploitation and will only sustain low exploitation rates (ICES 2013f). ICES concluded in February 2009 that the *S. mentella* on the continental shelf and slope of Iceland should be treated as separate biological stock and management unit. Only the fishable stock of Icelandic slope *S. mentella* is found in Icelandic waters, i.e. mainly fish larger than 30 cm. Most of the fishery for the species is by bottom trawlers along the shelf and slope west, southwest, and southeast of Iceland at depths between 500 and 800 m (Figure 3.21A). In 2012, 12,000 tonnes of demersal deepwater redfish were landed, similar to 2011. The lack of long-term indices of abundance prevents analytical assessment, but survey indices from the

autumn survey since 2000 are used as a basis for advice. The index of fishable biomass decreased between 2000 and 2003 and has been stable since. The state of the stock is at a low level and stable, but current exploitation rates cannot be evaluated. The biomass index for 2002-2012 has been relatively stable, but lower than in earlier years, and there is an indication that the stock is slowly recovering. Good recruitment has been observed on the East Greenland shelf during 2000-2008, which is assumed to contribute to both the Icelandic slope and pelagic stock at unknown proportions (ICES 2013g). There is no explicit management for Icelandic slope *S. mentella*, but the species is within the Icelandic TAC system. Up to the fishing year 2010/2011 Icelandic authorities gave a joint quota for golden redfish and Icelandic slope *S. mentella*, but now give separate quotas for each species. The quota for the 2011/2012 fishing year was set to 12,000 tonnes; 2,000 tonnes higher than advised by ICES (ICES 2013c). The MRI and ICES recommend that fishing effort should be kept low and that the TAC in Icelandic waters should not exceed 10,000 tonnes for the quota year 2013/2014 (Anon. 2013).

Figure 3.21:
Deepwater redfish. A: Fishing grounds of demersal deep sea redfish in 2012. Dark areas = highest catch (t/nmi²). B: Total survey biomass indices 2000-2012 for demersal deep sea redfish. (Shaded area shows one standard deviation). The survey was not conducted in 2011.



Source: Anonymous 2013

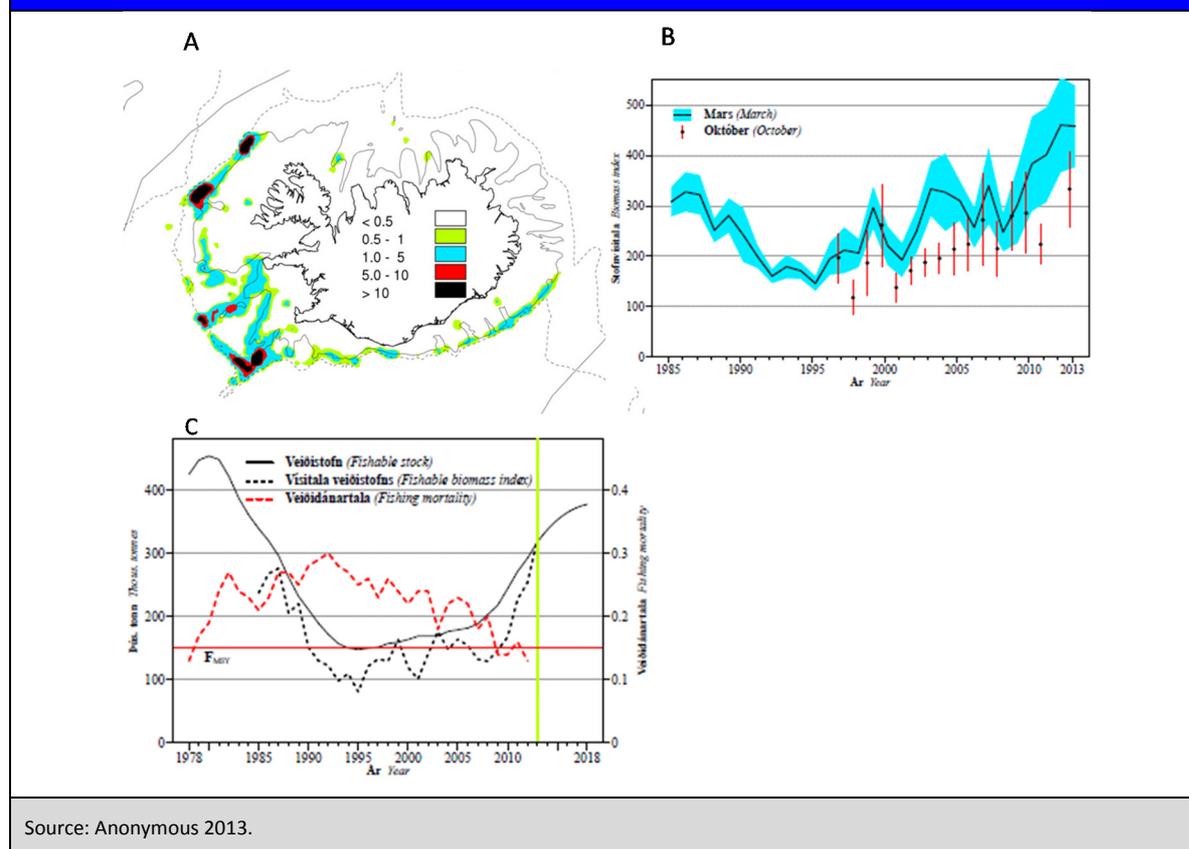
Golden redfish (*Sebastes norvegicus*)

Golden redfish is a main retained species in bottom- and Nephrops trawl fisheries. The stock is a straddling stock, shared between East Greenland, Iceland, and the Faroe Islands. However, more than 95% of all catches have been in Iceland for the last two decades. In 2012, catches of golden redfish in Iceland amounted to ~43,000 tonnes. Survey indices from the MRI indicate that the stock is at its highest since 1985 and that the 1997-2003 yearclasses are above average (Figure 3.22B). The recommended TAC for golden redfish has increased from 25,000t in 1994/5 to 45,000t for the 2012/13 fishing season. However, the TAC issued by the MII up to 2009/10 was substantially higher, but this included *S. mentella* as well as *S. norvegicus*. After 2010, the TAC has been in line with the MRI recommendation and only included golden redfish. For the 2013/14 fishing year, the MRI's advice is in line with ICES; i.e. 52,000 tonnes, and the GADGET model applied indicate that this is close to FMSY (Figure 3.22C).

The MRI has initiated work on a management plan and Harvest Control Rules (HCR) for golden redfish. This work is ongoing and it is expected the findings will be evaluated by ICES in early 2014.

Figure 3.22:

Golden redfish. A: Fishing grounds in 2012. Dark areas = highest catch (t/nm²). B: Biomass index in the groundfish surveys. C: Fishable stock, fishable biomass index and fishing mortality based on the GADGET model.

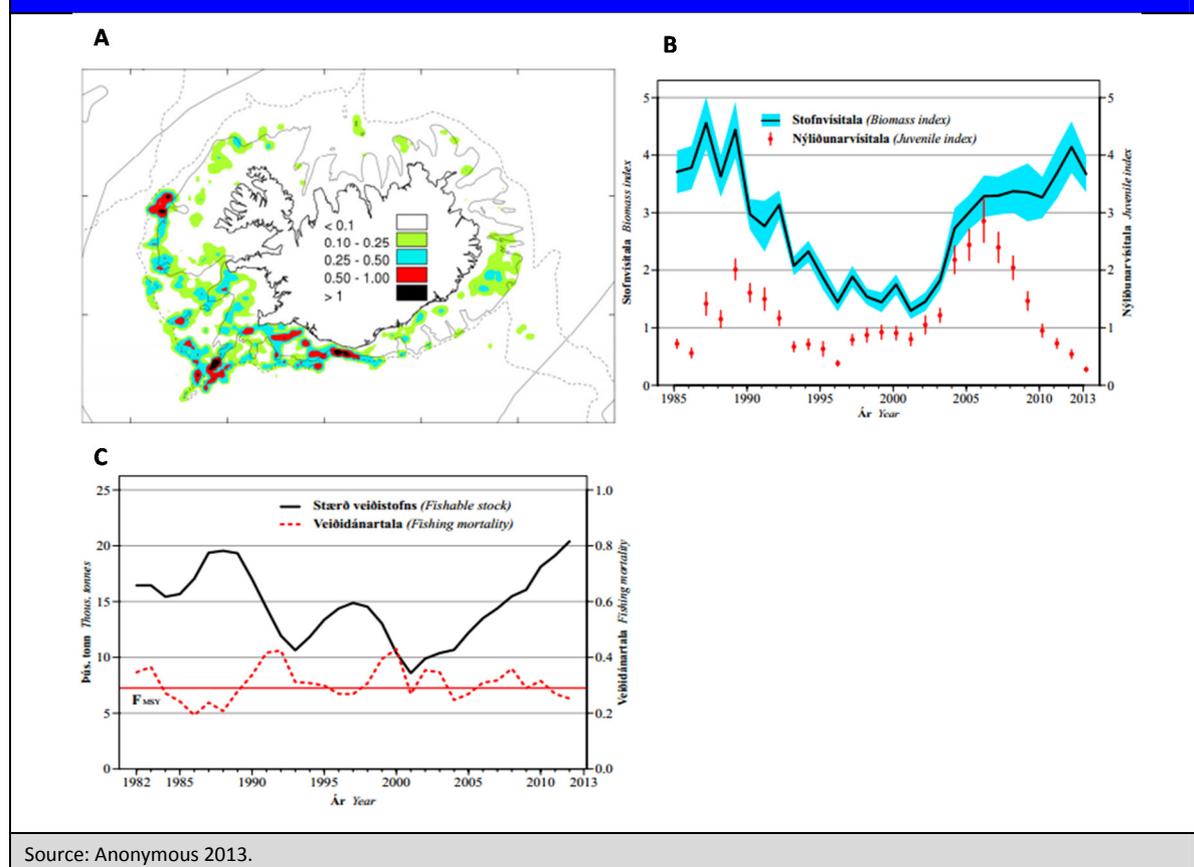


Source: Anonymous 2013.

Tusk (*Brosme brosme*)

The tusk stock is utilized by Icelandic and foreign fleets. Tusk is commonly caught close to the continental shelf break from NW Iceland south to the Reykjanes ridge and east of the ridge along the shelf break off SW Iceland (Figure 3.23A). The index of fishable biomass has increased considerably since 2001. On the other hand, recruitment indices have decreased since 2006, when it was the highest on record, to the lowest observed value in 2013 (Figure 3.23B). The MRI advice on catch quota is based on the assumption that $F_{max}=F_{MSY}=0.24$ and it recommends that the closure of nursery areas off the southeast and south coast should be extended.

Figure 3.23:
Tusk. A: Fishing grounds in 2012. All gears combined. Dark areas = highest catch (t/nm2). B: Biomass index for fishable stock (>40cm) and abundance index for juveniles (< 40 cm) in annual groundfish surveys 1985-2013. C: Fishable stock size (thous. tonnes) 1982-2013 and F 1982-2012.



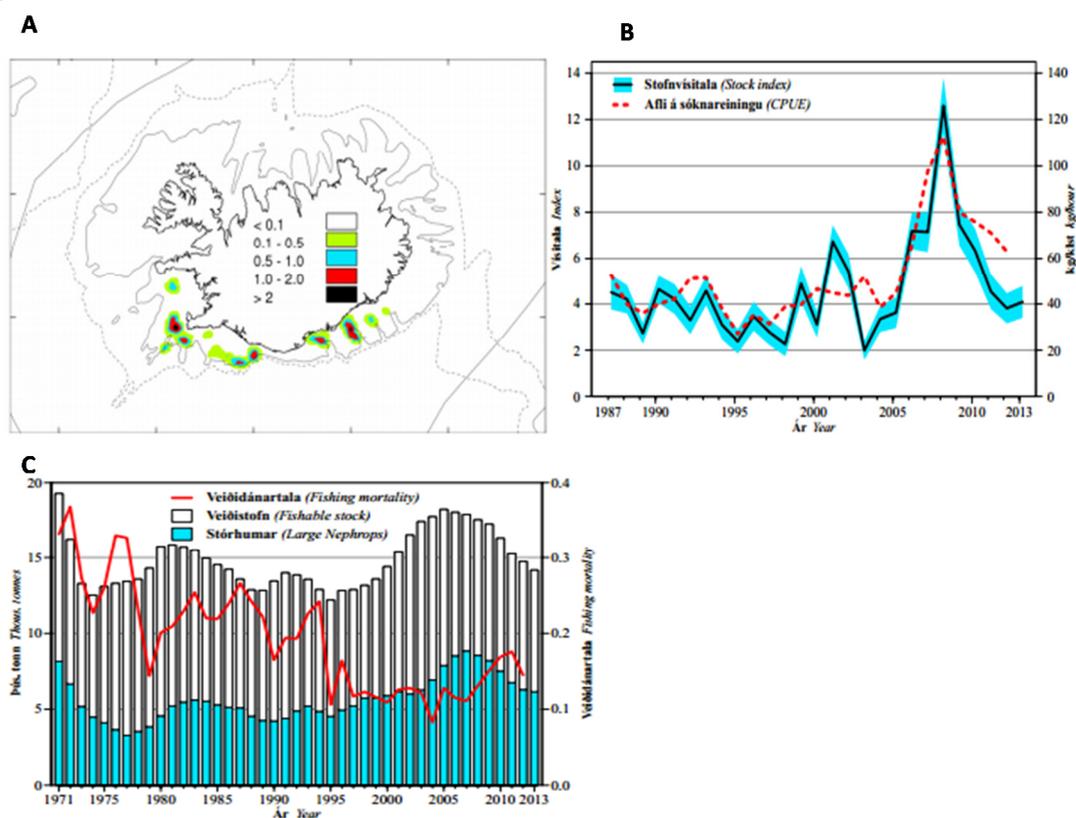
Source: Anonymous 2013.

Norway lobster (*Nephrops norvegicus*)

Norway lobster is a main retained species only in Nephrops trawls, where it is the target species. The fishing grounds of lobster are on soft bottoms off the South coast of Iceland and west of the Reykjanes peninsula (Figure 3.24A). The highest recorded biomass index was in 2008 but has been dropping ever since and is currently under the long-term average (Figure 3.24B). The increasing stock biomass in the period 2003-2009 is considered to be a combined result of large year classes and a sustainable management strategy (Figure 3.24C). However, new year-classes are estimated to be small and consequently the fishable stock has decreased in recent years.

Figure 3.24:

Norwegian lobster. A: Fishing grounds in 2012. Dark areas = highest catch (t/nmi²). B: Survey stock biomass indices in 1987-2013 and standardized CPUE during 1987-2012. D: Fishable stock (age 6+) and large category (10+) biomass during the period 1971-2013 (thous. tonnes), with average fishing mortality of ages 6-13.



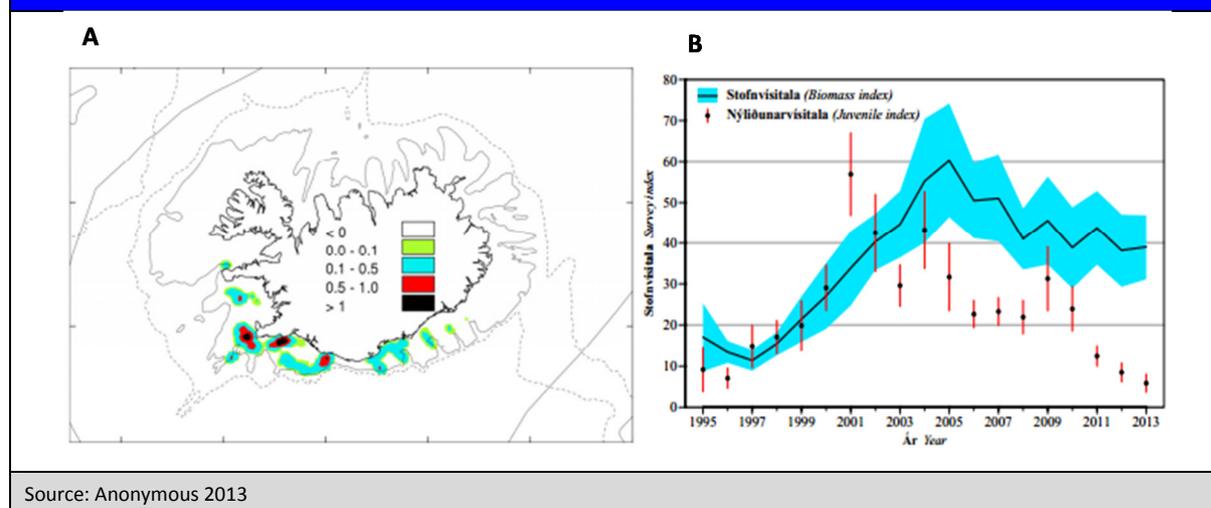
Source: Anonymous 2013.

Gray Sole (Witch) (*Glyptocephalus cynoglossus*)

Gray sole is a main retained species in Nephrops trawls. The gray sole is mainly caught by Danish seine in shallow waters off the SW coast of Iceland (Figure 3.25A). However, in the last three years the contribution of the Nephrops trawl catch has gone from one quarter to a half of the total catch. Comparisons on the length distribution of the catch by the Nephrops trawl fishery and the MRI Nephrops survey indicate that small gray sole is discarded by the fishery. The biomass index tripled during the period 1995-2005 but in the six years since then it has declined to a fairly constant level (Figure 3.25B). The juvenile index has been declining for a long time and was below average for the last three years (Figure 3.25C). Recent surveys indicate that recruitment to the fishable stock will be low in the years to come.

Figure 3.25:

Gray sole. A: Fishing grounds in 2012. All gears combined. Dark areas indicate highest catch (tonnes/nmi²). B: Abundance indices of fishable stock (> 30 cm) and juveniles (<= 30 cm) in Nephrops surveys 1995-2013.



Source: Anonymous 2013

Vulnerable species

Grey Skate (*Raja Dipturus batis*): The highest average annual catch of grey skate during 2007-2012 was in the assessed longline fishery (37 tonnes, Table 3.5), but in the other fisheries the catch ranged from no catch (handline) to 33 tonnes for Danish seine. In every case grey skate was 0.13 % of the total catch in all the gears and much lower than the MSC criteria for main retained species, i.e. >5% of the total catch by weight in Icelandic waters (see tables 3.3-3.8). The grey skate used to be fairly common in Icelandic waters, but has been overfished as catches are now only about 10% of catches 50 years ago. There is no TAC on the grey skate as it is primarily a bycatch in a variety of fisheries. (<http://www.fisheries.is/main-species/cartilaginous-fishes/grey-skate/>; Jónsson & Pálsson 2013). The current catch of less than 40 tonnes in any of the assessed fishing gear can be considered negligible compared to the highest historical catch of around 2,500 tonnes in 1951 (Jónsson & Pálsson 2013). Scientific evidence indicates that discarding is, overall, a minor portion of total landings (Pálsson *et al.* 2005, Pálsson *et al.* 2013). Therefore, it is unlikely that large scale discarding of grey skate is taking place and the landed catch is approximating the total fishing mortality by the individual fishery under the current assessment.

Dogfish (*Squalus acanthias*): The reported average catch for last five years was 67.4tonnes, for all gear, the majority of which came from gillnet and longline. Although the abundance of spiny dogfish is low in Icelandic waters compared to many bony fishes, it is still the most common shark species (Gunnarsson *et al.* 1998). However, no information is available on the stock status of this species. (<http://www.fisheries.is/main-species/cartilaginous-fishes/spiny-dogfish/>).

European/common eel (*Anguilla anguilla*): The species is catadromous, living in fresh water but migrates to marine waters to breed. European eel is considered to be fairly common in fresh water in Iceland especially in the southern lowlands (<http://www.fisheries.is/main-species/diadromous-fish/>). Reported average catch for last five years for all fishing gear was 0.05 tonnes with 99% of catches from longline. Impact of the fishery to the eel stock is considered to be negligible and purely incidental as the species completes the majority of its lifecycle in freshwater.

Mackerel shark or porbeagle (*Lamna nasus*): Reported average catch for last five years for all fishing gear was 0.54 tonnes, the majority coming from gillnet, bottom trawl and Danish seine. In the past porbeagle was harvested in low amounts and was targeted between 1959 and 1962. Nowadays it is considered to be an occasional bycatch (<http://www.fisheries.is/main-species/cartilaginous-fishes/>).

Leafscale gulper shark (*Centrophorus squamosus*): Reported average catch for last five years was 0.06 tonnes, all from bottom trawl.

Orange roughy (*Hoplostethus atlanticus*): Reported average catch for last five years was 5.1 tonnes, all from bottom trawl. Orange roughy is a very valuable species and has a global distribution. Around Iceland it is found in some deep waters W, SW, S, and SE off Iceland. Concentrations of orange roughy were found in 1991, but catches virtually ceased after a peak of 715 tonnes in 1993. Orange roughy is considered a bycatch in deepwater fisheries (<http://www.fisheries.is/main-species/other-demersal-fishes/>).

Atlantic salmon (*Salmo salar*): Catches of salmon is considered to be incidental and the reported average catch for last five years was 0.008 tonnes all from Nephrops trawl.

Common dolphin (*Delphinus delphis*): Common dolphin is reported as a retained species in handline and longline, with an average catch of 0.05 tonnes and 0.09 tonnes, respectively. Common dolphin is generally not found around Iceland. The northern boundary of the species distribution is deep south of Iceland (Vikingsson 2004). During regular and extensive aerial surveys on marine mammals during 1987-2001 the common dolphin was only observed three times, west of Iceland (Vikingsson 2004). The catch of common dolphin is most likely a misidentification.

Minor retained species

Most of the remaining retained species (<0.1 % of landed catch, Tables 3.3-3.8) are included in the MRI groundfish surveys which have been carried out annually in March (since 1985) and October to November (since 1996) (Björnsson et al. 2007). The survey results provide information on changes in survey stock indices, length frequency distributions and spatial distribution of more than 70 species of demersal fish (Anon 2010).

Bait species used

ISF reports mainly three types of baits used by longliners; squid, Pacific saury and Icelandic herring. Artificial bait is also reported in the Sæmark and ISF cod/haddock certifications.⁴ It is difficult to obtain exact amounts of bait used, since bait is supplied from various sources either directly to vessels or through companies. Two of the larger longline operators supplied the assessment team with their bait usage for 2012. Since longlines mostly catch cod (>50% of catch; see Table 3.5), it was assumed that total bait used in the Icelandic longline fleet was proportional to the two companies' cod quota compared to the Icelandic cod quota for longlines. The two companies hold 9.1% of the Icelandic longline cod quota, or 6,480 tonnes, and used 1,455 tonnes of bait in 2012. The two companies used 987t of saury (68%), 451t of squid (31%), and 18t of herring (1%). Total bait used by Icelandic fisheries in 2012 was estimated to be 15,777 tonnes, which is less than the estimate for 2010 of 21,000t in the ISF cod/haddock certifications. However, the proportions for each type of bait are quite different. Estimates for each individual species used the same proportions as the two companies and were 10,699-; 4,667- and 191 tonnes for saury, squid and herring, respectively.

⁴http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/isf_icelandic_cod/assessment-downloads-1/20120423_PCR.pdf

Pacific saury (*Cololabis saira*): Pacific saury is widely distributed in the North Pacific Ocean, between the coasts of America (Alaska) and Asia (Japan). The species is generally found offshore, usually near the surface in schools and migrates seasonally.⁵ Stock abundance has been subject to large inter-annual variations. The largest annual global catches are from Japan which have fluctuated greatly from ~575,000 tonnes in 1958 down to only 63,000 tonnes in 1969. The average annual catch over the last half century has been 258,000 tonnes (Huang et al. 2007) and the most recent catches reported by the FAO for 2009 and 2010 were >450,000 tonnes.⁶ The amount of bait estimated to be used by the fishery amounts to ~2% of international catches.

Squid (mostly *Illex argentinus*): ISF reports that mostly Argentine shortfin squid (*Illex argentinus*) is used as bait. However, given the great variability in bait usage it is likely that other squid species can also be used. Squid are short-lived ecological opportunists with short lifespans and population sizes are, to a large degree, driven by environmental factors (Rodhouse 2001).

I. argentinus is an oceanic species found in the Western South Atlantic, occurring from the surface to a depth of 800m. Growth is very fast and the species lives only 1-2 years. The species is mainly taken as bycatch in hake trawlers or alternating with the hake fishery off Argentina and Uruguay. Catches are highly variable and for the last 5 years ranged from ~703,00t in 2006 to ~204,000t in 2011.⁷ The amount of bait estimated to be used by the fishery amounts to ~2% of international catches. However, this assumes that all bait is *I. argentinus*, which is probably not the case.

Herring (*Clupea harengus*): Herring used as bait comes from the local market in Iceland. There are two herring stocks in Iceland, the Icelandic summer-spawning herring; managed by Icelandic authorities and the Norwegian spring-spawning or Atlanto-Scandian herring; managed by NEAFC.

The Icelandic summer spawning herring has suffered from an *Ichthyophonus hoferi* infection since 2008. The prevalence of infection was still high in the 2012/13 fishing season, but analysis indicated that highest mortalities occurred during the first two years (Anon 2013). The infection is monitored by the MRI and an increase in natural mortality is accounted for in stock assessment (Óskarsson & Pálsson 2011). Landings for the 2012/13 fishing season were 72,000t and the spawning stock at the beginning of the 2013/14 fishing season was estimated to be 495,000t. The MRI recommended a TAC of 87,000t for 2013/14.

The landings of Scando-Atlantic herring by Icelandic vessels were 121,000t in 2012, and the estimated international landings were 833,000t. ICES recommended a TAC of 619,000t for 2013 and according to an international agreement reached in January 2007, Iceland's share of the quota for 2013 is 90,000t (Anon. 2013).

The amount of herring estimated to be used by the fishery amounts to ~0.09% of Icelandic combined herring catches.

3.4.3 Bycatch species

The Icelandic Fisheries Management Act requires that all catches shall be landed. Therefore, no discarding should take place. All catches landed in Iceland by the Icelandic fishing fleet 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

⁵<http://www.fao.org/fishery/species/3001/en>

⁶http://www.fishbase.org/report/FAO/FAOCatchList.php?c_code=&areacode=&scientific=Cololabis+saira&english=&yc=00

⁷<http://www.fao.org/fishery/species/3565/en>

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.

Various measures are taken to ensure the protection of small 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 by-catch exceeds guideline limits, the MRI 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. Furthermore, various long-term area closures are in effect which may apply to specific fishing gear, fishing-vessel size or all fishing for certain periods of time. This includes a ban on bottom fishing in ten areas off S-Iceland where coral aggregates. All these measures are aimed at reducing discarding (MSC uses the term bycatch).

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) and they receive less than full price for the catch.
- When landing, up to 5% of the total catch can be classified as being of a low commercial value and should not be subtracted from the quota allocated to the vessel.
- There is strict surveillance of fishing vessels (including observers on board) and stiff penalties imposed for violations of Individual Transferable Quotas (ITQ) rules and regulations.
- Flexibility in quota management allows fairly unrestricted trade in quotas and some transfer of quotas between fishing years and between different species. In Iceland it is mandatory to land all by-catch and discarding is illegal.

Table 3.10A:
Landings ("Afli"), discards("Brottkast") in numbers (thousand fish) and weight (tonnes) and as a proportion (%) of landings, by species and gear. Species: ("þorskur" = cod, "ýsa" = haddock, "ufsi" = saithe, "gullkarfi" = redfish, "skarkoli" = plaice). Gear: ("lína" = long line, "net" = gill net, "dragnót" = Danish seine, "botnvarpa" = demersal trawl).

| Fisktegund | Veiðarfæri | Afli (tonn) | Brottkast (þús. fiskar) | Brottkast (tonn) | Brottkasts- hlutfall (%) |
|----------------|----------------|----------------|----------------------------|---------------------|-----------------------------|
| Þorskur | Lína | 57479 | 682 | 389 | 0,68 |
| Þorskur | Net | 37297 | 211 | 402 | 1,08 |
| Þorskur | Dragnót | 14253 | 11 | 6 | 0,04 |
| Þorskur | Botnvarpa | 94041 | 554 | 430 | 0,46 |
| Þorskur | Samtals | 203070 | 1458 | 1227 | 0,60 |
| Ýsa | Lína | 23185 | 668 | 417 | 1,80 |
| Ýsa | Dragnót | 8152 | 395 | 344 | 4,22 |
| Ýsa | Botnvarpa | 49858 | 2834 | 1783 | 3,58 |
| Ýsa | Samtals | 81195 | 3897 | 2544 | 3,13 |
| Ufsi | Botnvarpa | 54578 | 0 | 0 | 0 |
| Gullkarfi | Botnvarpa | 33283 | 0 | 0 | 0 |
| Skarkoli | Dragnót | 4013 | 911 | 341 | 7,11 |

Source: Pálsson et.al. 2005 & 2013

Fish bycatch: There is no systematic monitoring of discard in place. However, research by the MRI and measurements by the DF indicate that the main discards in the Icelandic fisheries are of cod and haddock (Table 3.10A). The MRI has, on a regular basis, estimated cod and haddock discards since 2001. In 2011 the discards of cod amounted to 0.04% of total cod landings (by longline: 0.01%, by Gillnet: 0.14%) and haddock discards were 0.04% of total haddock landings (by longline: 0.01%, by Danish seine: 0.06%) (Pálsson et al. 2013). Estimated discards of cod and haddock have declined in

recent years and were at a minimum in 2011 in all gears. Total discard rates (weight discarded/weight landed) for cod and haddock were lower than recorded over the period 2001-2011 or 0.04% (Pálsson et al. 2013) (Table 3.10B & 3.10C).

Table 3.10B:

Cod discards 2001-2011 by numbers of fish and weight. Numbers of fish are given in thousand and weight in tonnes.

| Ár (Year) | Lina (Long line) | | | | | | Net (Gill net) | | | | | |
|--------------|---------------------------|-------------------------|-----------------------|--------------------|-------------------------|-----------------------|----------------------------|-------------------------|-----------------------|--------------------|-------------------------|-----------------------|
| | Fjöldi (Numbers) | | | Þyngd (Weight) | | | Fjöldi (Numbers) | | | Þyngd (Weight) | | |
| | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) |
| 2001 | 18626 | 1304 | 7.00 | 47169 | 854 | 1.81 | 7764 | 1023 | 13.18 | 53653 | 2810 | 5.24 |
| 2002 | 15103 | 190 | 1.26 | 42404 | 97 | 0.23 | 6139 | 173 | 2.82 | 44052 | 350 | 0.79 |
| 2003 | 16066 | 25 | 0.16 | 44654 | 13 | 0.03 | 5846 | 206 | 3.52 | 37420 | 318 | 0.85 |
| 2004 | 22624 | 389 | 1.72 | 57382 | 199 | 0.35 | 5807 | 192 | 3.31 | 37251 | 302 | 0.81 |
| 2005 | 24986 | 256 | 1.02 | 69443 | 152 | 0.22 | 4780 | 396 | 8.28 | 31500 | 711 | 2.26 |
| 2006 | 26699 | 395 | 1.48 | 71036 | 194 | 0.27 | 3358 | 155 | 4.62 | 23315 | 345 | 1.48 |
| 2007 | 21978 | 98 | 0.45 | 58942 | 43 | 0.07 | 3180 | 159 | 5.00 | 23338 | 362 | 1.55 |
| 2008 | 18204 | 343 | 1.88 | 53843 | 195 | 0.36 | 2645 | 15 | 0.57 | 19109 | 19 | 0.10 |
| 2009 | 20412 | 39 | 0.19 | 61008 | 16 | 0.03 | 2887 | 23 | 0.80 | 21859 | 36 | 0.16 |
| 2010 | 15626 | 433 | 2.77 | 57492 | 253 | 0.44 | 2015 | 19 | 0.94 | 16552 | 26 | 0.16 |
| 2011 | 15000 | 15 | 0.10 | 57730 | 6 | 0.01 | 2054 | 23 | 1.12 | 16062 | 22 | 0.14 |
| Meðaltal | 19575 | 317 | 1.79 | 56464 | 184 | 0.35 | 4225 | 217 | 4.30 | 29465 | 482 | 1.23 |
| Ár (Year) | Dragnót (Danish seine) | | | | | | Botnvarpa (Demersal trawl) | | | | | |
| | Fjöldi (Numbers) | | | Þyngd (Weight) | | | Fjöldi (Numbers) | | | Þyngd (Weight) | | |
| | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) |
| 2001 | 4274 | 1056 | 24.71 | 16958 | 1366 | 8.06 | 34096 | 250 | 0.73 | 97033 | 138 | 0.14 |
| 2002 | 3868 | 706 | 18.25 | 13486 | 938 | 6.96 | 30600 | 303 | 0.99 | 85586 | 179 | 0.21 |
| 2003 | 4283 | 56 | 1.31 | 13209 | 39 | 0.30 | 33752 | 47 | 0.14 | 86999 | 28 | 0.03 |
| 2004 | 4859 | 397 | 8.17 | 14132 | 630 | 4.46 | 31624 | 575 | 1.82 | 94045 | 466 | 0.50 |
| 2005 | 3958 | 64 | 1.62 | 12690 | 61 | 0.48 | 25520 | 1135 | 4.45 | 82798 | 1140 | 1.38 |
| 2006 | 2785 | 47 | 1.69 | 10354 | 47 | 0.45 | 25888 | 1146 | 4.43 | 80096 | 1075 | 1.34 |
| 2007 | 2468 | 116 | 4.70 | 8637 | 104 | 1.20 | 20981 | 1433 | 6.83 | 69798 | 1734 | 2.48 |
| 2008 | 2660 | 195 | 7.33 | 8426 | 137 | 1.63 | 16333 | 457 | 2.80 | 56857 | 357 | 0.63 |
| 2009 | 2524 | 23 | 0.91 | 10363 | 15 | 0.14 | 21279 | 741 | 3.48 | 77172 | 670 | 0.87 |
| 2010 | 1859 | 203 | 10.92 | 8287 | 277 | 3.34 | 17628 | 148 | 0.84 | 72094 | 103 | 0.14 |
| 2011 | | | | 9097 | | | 16779 | 46 | 0.27 | 71236 | 34 | 0.05 |
| Meðaltal | 3354 | 286 | 7.96 | 11422 | 361 | 2.70 | 24953 | 571 | 2.65 | 79429 | 539 | 0.71 |
| Ár (Year) | Öll veiðarfæri (All gear) | | | | | | | | | | | |
| | Fjöldi (Numbers) | | | Þyngd (Weight) | | | | | | | | |
| | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | | | | | | |
| 2001 | 64760 | 3633 | 5.61 | 214813 | 5168 | 2.41 | | | | | | |
| 2002 | 55710 | 1372 | 2.46 | 185528 | 1564 | 0.84 | | | | | | |
| 2003 | 59947 | 334 | 0.56 | 182282 | 398 | 0.22 | | | | | | |
| 2004 | 64914 | 1553 | 2.39 | 202810 | 1597 | 0.79 | | | | | | |
| 2005 | 59244 | 1851 | 3.12 | 196431 | 2064 | 1.05 | | | | | | |
| 2006 | 58730 | 1743 | 2.97 | 184801 | 1661 | 0.90 | | | | | | |
| 2007 | 48607 | 1806 | 3.72 | 160715 | 2243 | 1.40 | | | | | | |
| 2008 | 39842 | 1010 | 2.54 | 138235 | 708 | 0.51 | | | | | | |
| 2009 | 47102 | 826 | 1.75 | 170402 | 737 | 0.43 | | | | | | |
| 2010 | 37128 | 803 | 2.16 | 154425 | 659 | 0.43 | | | | | | |
| 2011 | 33833 | 84 | 0.25 | 154125 | 62 | 0.04 | | | | | | |
| Meðaltal | 53598 | 1493 | 2.73 | 179044 | 1680 | 0.82 | | | | | | |

Source: Pálsson et.al 2005 & 2013

Table 3.10C. Haddock discards 2001-2011 by numbers of fish and weight. Numbers of fish are given in thousand and weight in tonnes.

| Ár (Year) | Lina (Long line) | | | | | | Net (Gill net) | | | | | |
|--------------|---------------------------|-------------------------|-----------------------|--------------------|-------------------------|-----------------------|----------------------------|-------------------------|-----------------------|--------------------|-------------------------|-----------------------|
| | Fjöldi (Numbers) | | | Þyngd (Weight) | | | Fjöldi (Numbers) | | | Þyngd (Weight) | | |
| | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) |
| 2001 | 18626 | 1304 | 7.00 | 47169 | 854 | 1.81 | 7764 | 1023 | 13.18 | 53653 | 2810 | 5.24 |
| 2002 | 15103 | 190 | 1.26 | 42404 | 97 | 0.23 | 6139 | 173 | 2.82 | 44052 | 350 | 0.79 |
| 2003 | 16066 | 25 | 0.16 | 44654 | 13 | 0.03 | 5846 | 206 | 3.52 | 37420 | 318 | 0.85 |
| 2004 | 22624 | 389 | 1.72 | 57382 | 199 | 0.35 | 5807 | 192 | 3.31 | 37251 | 302 | 0.81 |
| 2005 | 24986 | 256 | 1.02 | 69443 | 152 | 0.22 | 4780 | 396 | 8.28 | 31500 | 711 | 2.26 |
| 2006 | 26699 | 395 | 1.48 | 71036 | 194 | 0.27 | 3358 | 155 | 4.62 | 23315 | 345 | 1.48 |
| 2007 | 21978 | 98 | 0.45 | 58942 | 43 | 0.07 | 3180 | 159 | 5.00 | 23338 | 362 | 1.55 |
| 2008 | 18204 | 343 | 1.88 | 53843 | 195 | 0.36 | 2645 | 15 | 0.57 | 19109 | 19 | 0.10 |
| 2009 | 20412 | 39 | 0.19 | 61008 | 16 | 0.03 | 2887 | 23 | 0.80 | 21859 | 36 | 0.16 |
| 2010 | 15626 | 433 | 2.77 | 57492 | 253 | 0.44 | 2015 | 19 | 0.94 | 16552 | 26 | 0.16 |
| 2011 | 15000 | 15 | 0.10 | 57730 | 6 | 0.01 | 2054 | 23 | 1.12 | 16062 | 22 | 0.14 |
| Meðaltal | 19575 | 317 | 1.79 | 56464 | 184 | 0.35 | 4225 | 217 | 4.30 | 29465 | 482 | 1.23 |
| Ár (Year) | Dragnot (Danish seine) | | | | | | Botnvarpa (Demersal trawl) | | | | | |
| | Fjöldi (Numbers) | | | Þyngd (Weight) | | | Fjöldi (Numbers) | | | Þyngd (Weight) | | |
| | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) |
| 2001 | 4274 | 1056 | 24.71 | 16958 | 1366 | 8.06 | 34096 | 250 | 0.73 | 97033 | 138 | 0.14 |
| 2002 | 3868 | 706 | 18.25 | 13486 | 938 | 6.96 | 30600 | 303 | 0.99 | 85586 | 179 | 0.21 |
| 2003 | 4283 | 56 | 1.31 | 13209 | 39 | 0.30 | 33752 | 47 | 0.14 | 86999 | 28 | 0.03 |
| 2004 | 4859 | 397 | 8.17 | 14132 | 630 | 4.46 | 31624 | 575 | 1.82 | 94045 | 466 | 0.50 |
| 2005 | 3958 | 64 | 1.62 | 12690 | 61 | 0.48 | 25520 | 1135 | 4.45 | 82798 | 1140 | 1.38 |
| 2006 | 2785 | 47 | 1.69 | 10354 | 47 | 0.45 | 25888 | 1146 | 4.43 | 80096 | 1075 | 1.34 |
| 2007 | 2468 | 116 | 4.70 | 8637 | 104 | 1.20 | 20981 | 1433 | 6.83 | 69798 | 1734 | 2.48 |
| 2008 | 2660 | 195 | 7.33 | 8426 | 137 | 1.63 | 16333 | 457 | 2.80 | 56857 | 357 | 0.63 |
| 2009 | 2524 | 23 | 0.91 | 10363 | 15 | 0.14 | 21279 | 741 | 3.48 | 77172 | 670 | 0.87 |
| 2010 | 1859 | 203 | 10.92 | 8287 | 277 | 3.34 | 17628 | 148 | 0.84 | 72094 | 103 | 0.14 |
| 2011 | | | | 9097 | | | 16779 | 46 | 0.27 | 71236 | 34 | 0.05 |
| Meðaltal | 3354 | 286 | 7.96 | 11422 | 361 | 2.70 | 24953 | 571 | 2.65 | 79429 | 539 | 0.71 |
| Ár (Year) | Öll veiðarfæri (All gear) | | | | | | | | | | | |
| | Fjöldi (Numbers) | | | Þyngd (Weight) | | | | | | | | |
| | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | Afli (Landings) | Brottkast (Discards) | % brottk. (%disc.) | | | | | | |
| 2001 | 64760 | 3633 | 5.61 | 214813 | 5168 | 2.41 | | | | | | |
| 2002 | 55710 | 1372 | 2.46 | 185528 | 1564 | 0.84 | | | | | | |
| 2003 | 59947 | 334 | 0.56 | 182282 | 398 | 0.22 | | | | | | |
| 2004 | 64914 | 1553 | 2.39 | 202810 | 1597 | 0.79 | | | | | | |
| 2005 | 59244 | 1851 | 3.12 | 196431 | 2064 | 1.05 | | | | | | |
| 2006 | 58730 | 1743 | 2.97 | 184801 | 1661 | 0.90 | | | | | | |
| 2007 | 48607 | 1806 | 3.72 | 160715 | 2243 | 1.40 | | | | | | |
| 2008 | 39842 | 1010 | 2.54 | 138235 | 708 | 0.51 | | | | | | |
| 2009 | 47102 | 826 | 1.75 | 170402 | 737 | 0.43 | | | | | | |
| 2010 | 37128 | 803 | 2.16 | 154425 | 659 | 0.43 | | | | | | |
| 2011 | 33833 | 84 | 0.25 | 154125 | 62 | 0.04 | | | | | | |
| Meðaltal | 53598 | 1493 | 2.73 | 179044 | 1680 | 0.82 | | | | | | |

Source: Pálsson et.al 2005 & 2013

Over the period 2001-2010 cod mean discards were highest in the Danish seine fishery (2.70%) and in the gill net fishery (1.34%) in terms of percentage of landings but lower in the demersal trawl fishery (0.77%), and in the long line fishery (0.38%) (Pálsson et al. 2012). Haddock mean discards were highest in the Danish seine, (4.30%), and the demersal trawl (2.47%) fisheries, and lowest in the long line fishery (0.40%). Cod discards in all gear combined were 0.90% of landed catch (1680 tonnes), and haddock discards 2.02% (1488 tonnes).

Because cod and haddock are the main discard in Icelandic fisheries the results on discard studies by MRI can be used to infer the scale of discarding of other species that are subject to the assessed fishery. Therefore, it can be concluded that it is highly unlikely that discarding in the assessed fisheries is higher than the estimated average discard of cod or haddock (0.82% and 1.84% of total landings, respectively, for the period 2001-2011).

The problem of ghost fishing is mainly caused by lost pots and set nets (Jennings et al. 2001), but ghost fishing by lost longline, Danish seine or bottom trawl is not considered to be a problem. Longlines are highly selective and bycatches of invertebrates are virtually non-existent (Jennings et al. 2001) and consequently discarding is limited.

Seabird bycatch: A study on seabird bycatch indicates that lumpfish gillnets in Iceland are by far the most significant source of fishing mortality to seabirds (Table 3.11A). Black Guillemot (*Cephus*

grylle) and Common Eider (*Somateria mollissima*) are most commonly caught by the lumpfish fishery (Table 3.11B). Information on catches of seabirds in gillnets targeting cod indicate that the fishing mortality is low in late summer but increases during the winter months with a peak in April to May (Figure 3.26), at the time when capelin (*Mallotus villosus*) is spawning in shallow waters off the coast of Iceland. Based on this observation, more than 12.000 seabirds (more than one species) are drowned in gillnets each year. This is not a significant number compared to the estimated population size of seabirds around Iceland (see section 3.4.1, p. 19).

The assessed longline fishery uses 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.

Table 3.11A:

Seabird mortality by fishing gear, based on recoveries of ringed birds during the years 1932-1994.

| Type of fishing gear | Nos | Type of fishing gear | Nos |
|-----------------------------|-----|--------------------------|-----|
| Salmon net | 11 | Unspecified fishing net | 16 |
| Salmon trap leader | 3 | Troll | 1 |
| Trout net | 1 | Scallop plough | 1 |
| Cod net | 8 | Fishing hook | 1 |
| Flounder net | 4 | Long line | 18 |
| Unspecified Lump sucker net | 2 | Fishing gear on land | 9 |
| Male Lump sucker net | 3 | Unspecified fishing gear | 16 |
| Female Lump sucker net | 509 | | |

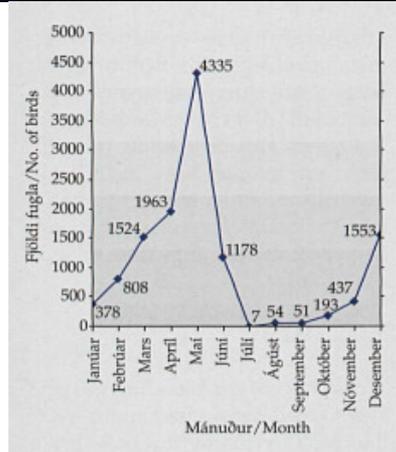
Source: Peterson 2002

Table 3.11B. The numbers of seabird specimens in the collection of the Icelandic Institute Natural History and the proportion of them registered as killed in fishing gear. Teista = Black Guillemot, Æðarfugl = Common eider.

| Tegund/Species | Nos. | % | Tegund/Species | Nos. | % |
|--|------|------|----------------------------------|------|------|
| Lómur <i>Gavia stellata</i> | 3 | 0,8 | Æðarkóngur <i>S. spectabilis</i> | 6 | 1,7 |
| Himbrimi <i>G. immer</i> | 10 | 2,7 | Hávella <i>Clangula hyemalis</i> | 1 | 0,3 |
| Fýll <i>Fulmarus glacialis</i> | 1 | 0,3 | Hrafnsönd <i>Melanitta nigra</i> | 1 | 0,3 |
| Gráskrofa <i>Puffinus griseus</i> | 1 | 0,3 | Langvía <i>Uria aalge</i> | 9 | 2,5 |
| Súla <i>Sula bassana</i> | 5 | 1,4 | Stuttnefja <i>U. lomvia</i> | 1 | 0,3 |
| Dílaskarfur <i>Phalacrocorax carbo</i> | | 0,3 | Teista <i>Cephus grylle</i> | 219 | 60,7 |
| Toppskarfur <i>P. aristotelis</i> | 7 | 1,9 | Lundi <i>Fratercula arctica</i> | 1 | 0,3 |
| Æðarfugl <i>Somateria mollissima</i> | 92 | 25,5 | | | |

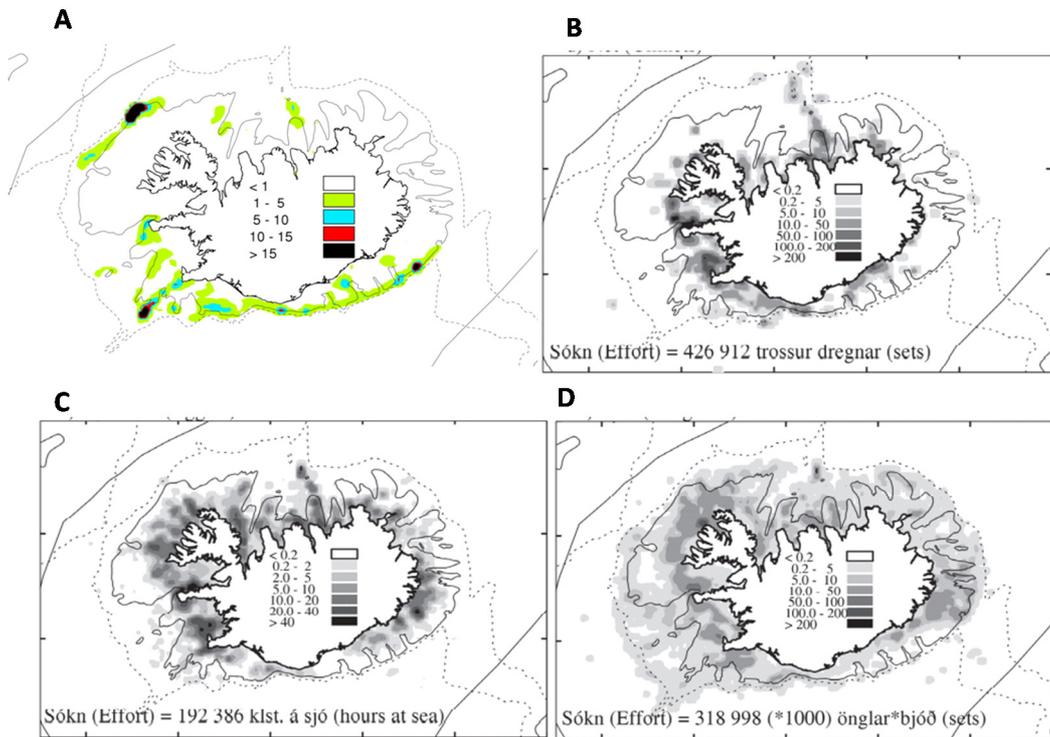
Source: Peterson 2002

Figure 3.26:
Temporal variation in numbers of seabirds drowned in cod nets during the years 1993-1994; based on information from fish market sales.



Source: Peterson 2002

Figure 3.27:
A: Fishing grounds of saithe in 2012. All gears combined. Dark areas indicate highest catch (tonnes/nmi²). Effort in Icelandic fisheries in 2012: (B) Gillnet (nr. of sets); (C) Handline (hours at sea); and (D) Longline (nr. of hooks).



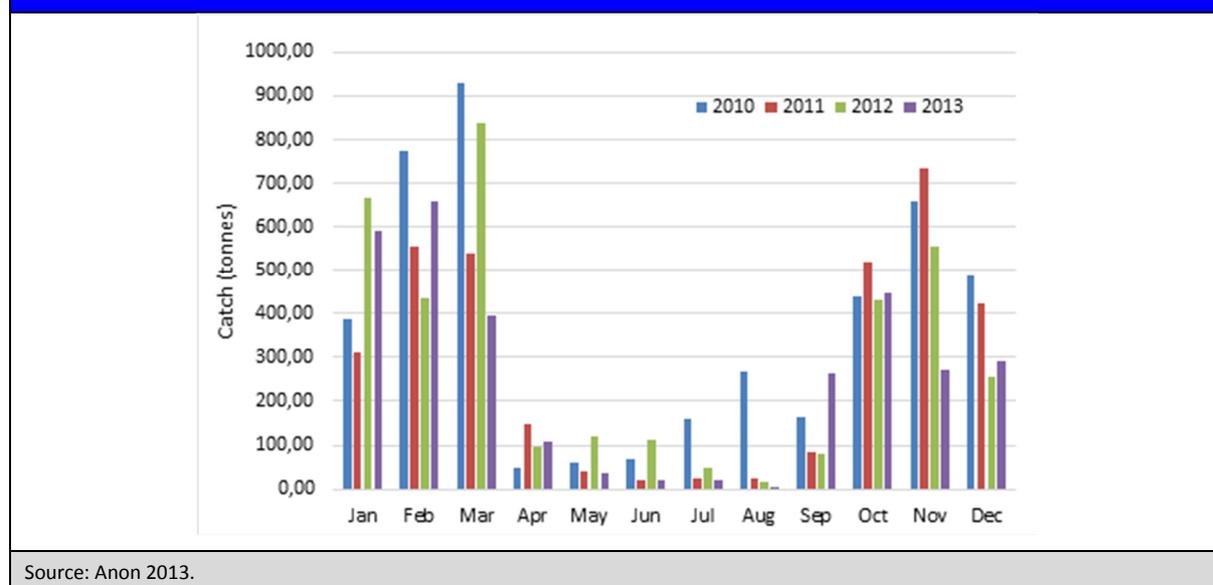
Source: Anon 2013.

Seabirds use seacliffs as nesting sites and breeding colonies of seabirds are found all around Iceland (Figure 3.5). Since the early eighties the populations of seabirds have in general reduced significantly which most likely has been driven by changes in food availability (Umhverfisstofnun 2011). Seabirds are most vulnerable to be caught by fishing gear while feeding relatively close to the shore.

Saithe fishing is commonly carried out close to the continental shelf break off Iceland, especially on the Reykjanes ridge and off NW Iceland (Figure 3.27). Saithe catches made closest to land are west of the Snæfellsnes- and Reykjanes peninsula, W Iceland where the fishing effort by the gillnet-, handline- and longline fisheries is concentrated (Figure 3.27B-D).

Marine mammal bycatch: In Iceland the majority of the marine mammal bycatch occurs in fisheries using the bottom-set gillnets. Harbor porpoise (*Phocoena phocoena*) is the most commonly caught mammal species and the annual bycatch is estimated at around 1,000 animals (ICES 2011b). Harbour porpoise is common in shallow waters all around Iceland in spring to autumn, but less during the winter months (Ólafsdóttir & Víkingsson 2005). Abundance estimates of harbour porpoise, based on the North Atlantic Sightings Surveys programme, conducted in 1987, 1989 and 1995, indicate a minimum population size of around 27.000 animals (Sigurjónsson & Víkingsson 1997). However, these estimates are minimum population estimates in summer and were derived from a survey primarily designed for large baleen whales (Víkingsson et al. 2003). No estimates are available since 1995. Gillnets are used all around Iceland (Figure 3.27B) and most extensively during January to May (www.fisheries.is); targeting cod when it is migrating to the spawning grounds. This demonstrates that the assessed gillnet fishery is not operating in full during the season when harbor porpoise occurs in Icelandic waters. Furthermore, during April through September gillnet catches of saithe were small (85.2 tonnes on average) compared to the winter months (524.5 tonnes) (Figure 3.28).

Figure 3.28:
Saithe catch (tonnes) by month in the Icelandic gillnet fishery.



3.4.4 ETP 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. 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. 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 and/or declining in different regions of the OSPAR area. This information has been published as OSPAR List of Threatened and/or Declining Species and Habitats (OSPAR Commission 2008a&b). In the introduction to the list, paragraph 4, the following is stated:

Fish species affected by fishing in this list are marked with an asterisk (). These species are subject to management by an international or national fisheries authority or body. The OSPAR Commission has no competence to adopt programmes or measures on questions relating to the management of fisheries. Where the OSPAR Commission considers that action is desirable in relation to such a question, it is to draw that question to the attention of the authority or international body competent for that question. The inclusion of species affected by fishing in this list must be read in this context.*

Therefore, in the context of fishing management the species on the OSPAR List cannot be considered as ETP species under MSC protocols. This also applies to the IUCN Red List. However, following the agreement on the OSPAR list, issues related to vulnerable deep water habitats have been taken up by individual member states, including Iceland (e.g. closures of coral areas) and competent international fisheries management bodies (e.g. NEAFC).

The cold water coral *Lophelia pertusa* and grey skate (*Raja Dipturus batis*) are on the OSPAR List of Threatened and/or Declining Species and Habitats and grey skate is also listed as critically endangered by the IUCN Red List. However, neither of the lists is a part of binding international agreements regarding fisheries management and, therefore, should not be considered as ETP under MSC protocols. The grey skate is, therefore, incorporated in the list of retained species affected by the assessed fisheries.

One species, Atlantic halibut (*Hippoglossus hippoglossus*), can be classified as ETP species under MSC protocols. In recent years, the biomass indices of halibut have declined sharply (Figure 3.29C), coinciding with the development in the Icelandic longline fishery. The stock of Atlantic halibut in Icelandic waters is severely depleted and there are no signs of recovery (Anon 2013). Since 1996, annual landings of Atlantic halibut have been less than 1000t, the lowest observed since 1905. In recent years, 2009–2011, the landed catch of halibut was around 550t. By 1st January 2012 the Ministry of Fisheries issued regulation stipulating a ban on targeting halibut and requiring fishers to release all viable halibut back to the sea if by-caught (Regulation 1164/2011⁸). Historically, halibut has mainly been taken as bycatch (retained species) in the bottom trawl and longline fisheries (Figure 3.29B). Prior to the ban on targeting the halibut these fisheries accounted for 70–90% of the total catch in Icelandic waters. The total landed catch in 2012 was 35t, thereof 30t by bottom trawlers. The MRI recommends that the ban on targeting halibut should remain in operation until clear indications of significant improvement in the stock occur (Anon 2013).

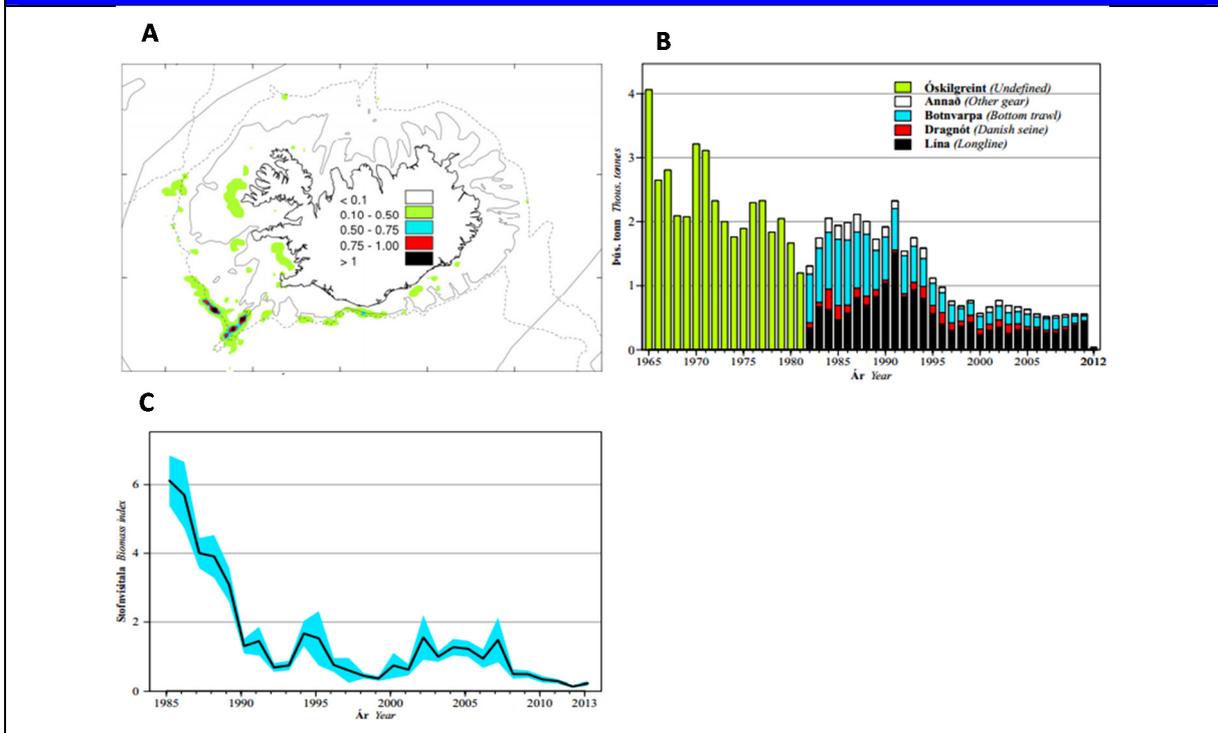
Table 3.12:
Landed Atlantic halibut catch by fishing gear in Icelandic waters

| Fishing gear | 2007/08 | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13* |
|--------------------|---------------|---------------|---------------|---------------|---------------|--------------|
| Bottom trawl | 164.04 | 187.80 | 134.95 | 100.44 | 68.53 | 38.61 |
| Danish seine | 40.93 | 46.60 | 37.36 | 33.44 | 13.31 | 0.20 |
| Gillnet | 6.88 | 6.30 | 7.94 | 2.94 | 1.49 | 0.28 |
| Handline | 1.19 | 2.20 | 0.85 | 1.23 | 0.16 | 0.00 |
| Longline | 263.70 | 248.70 | 352.20 | 448.83 | 111.74 | 4.01 |
| Nephrops trawl | 12.82 | 12.99 | 14.58 | 10.12 | 5.54 | 1.75 |
| Grand Total | 489.56 | 504.60 | 547.89 | 597.00 | 200.76 | 44.86 |

Source: Data from DF database; *2012/13 until May

⁸ <http://stjornartidindi.is/Advert.aspx?ID=40837c4b-b17b-4f9b-85d0-7ed3c16d8272>

Figure 3.29: Atlantic halibut. A) Fishing grounds for in 2000-2012. All gears combined. Dark areas = highest catch (t/nmi²). B) Total landings during the period 1965-2012 (thous. tonnes) divided by gear. C) Biomass index in the Icelandic groundfish survey in spring 1985-2013. The shaded area shows one standard deviation.



Source: Anon 2013

The average landed Atlantic halibut catch by the assessed fisheries ranged from 1 tonne (handline) to 328 tonnes (longline) per year during the period 2007-2011. The second highest annual catch was 147 tonnes by the assessed bottom trawl fishery (Table 3.12). In 2011/12 fishing season the landed catch was 112 and 69 tonnes in the longline- and bottom trawl fisheries, respectively. The ban on targeting Atlantic halibut was in operation by 1st January 2012. During the period 1st September 2012 to 31st May 2013, the landed catch was 39 tonnes (bottom trawl) and 4 tonnes (longline).

3.5 Principle Three: Management System Background

3.5.1 Area of operation and jurisdiction

The Icelandic authorities manage all fishing of saithe within its jurisdiction, i.e. the Icelandic EEZ. The management is based on the assumption that the saithe stock in Icelandic waters is one stock.

3.5.2 Interest groups

The interest in the saithe fishery is mainly economic, held by those that directly participate in the fishery; i.e. fishers and owners of fishing vessels, buyers of the catch, processors in Iceland, the workers in the processing plants and the customers/consumers. Most (over 90%) of the saithe catch is exported. The saithe fishery in Iceland is an important part of the fisheries in Iceland, which, in turn, is the single largest contributor to the country's net foreign exchange earnings.

Most saithe is caught by large vessels using bottom trawl, but saithe is also important in mixed fisheries by smaller fishing vessels using longline or handline.

Fisheries used to be the main economic foundation of local communities outside of the Reykjavik area. While the relative importance of the fisheries sector in the Icelandic economy has declined and the sector is no longer the backbone of as many towns and villages as it used to be in earlier times, it

is still very important to the national economy as well as to the economic health of many communities outside of the Reykjavik area.

3.5.3 Objectives of the fishery

The Ministry of Industries and Innovation (MII) is responsible for the management of fisheries in Iceland as well as for the implementation of fisheries legislation, including the issuing of relevant regulations. The Ministry's duties include general administration, long-term planning and relations with other fisheries institutions at the international level. The Minister is responsible for deciding the annual TAC. Before making the decision the Minister must consider the MRI's advice for the stock.

The Icelandic Fisheries Management Act (no. 116/2006) states (Art. 1) that the authorities should "contribute to the protection of (exploitable stock in Icelandic waters) and their economic exploitation and thereby ensure secure employment and settlement in the country."⁹ The Act on the utilization of exploitable marine stocks (no. 57/1996) states (Art. 1) that its aim is to contribute to "sustainable utilization which ensures maximum benefits to the Icelandic nation in the long-run."¹⁰ These Acts make no references to the precautionary principle. The principle is embedded in some of the international conventions to which Iceland is a signatory (e.g. the OSPAR convention and the United Nations Agreement on the implementation of the provisions of the United Nations convention on the Law of the Sea, 10 December 1982, which relates to the conservation and management of straddling fish stocks and highly migratory fish stocks (in force as of 11 December 2001). The precautionary principle is also mentioned in the preface of the European Economic Area (EEA) agreement and is now firmly embedded in EEA law and regulations.¹¹

3.5.4 Fishing rights and regulations

The Fisheries Management Act of 1990 established the present system of Individual Transferable Quotas (ITQ) for the Icelandic fisheries. The Act stipulates that each year fish quotas shall be allocated to eligible fishing vessels according to their quota shares. The Act does not define a terminal date for the system. In that sense the shares can be considered permanent. On the other hand the shares do not form a property right and can be altered or abolished by the Icelandic legislative assembly, the Althing. The quota shares can be traded and so can the annual quota allocation. There are some restrictions on this trade, e.g. each vessel must catch at least half of its quota allocation each fishing year and there are specified upper limits for the quota holdings of any one company.

This legislation on fishing rights has been tested in courts on many occasions. Two court cases in 1998 and 2000 settled basic disagreements on the foundations of the present system. On December 3^d 1998, the High Court in Iceland ruled that the provision in the Fisheries Management Act allowing the authorities to limit the entry of fishing vessels was unconstitutional as it treated those that had originally got licensing of their fishing vessels (in 1984) differently from later applicants. The High Court ruled that such unequal treatment of Icelandic citizens could only be accepted as a temporary measure justified by some extraordinary conditions. Subsequently, the Act was amended in accordance with this ruling. The amendment opened up the possibility that anyone, who applies for the licensing of a fishing vessel which conforms to a particular standard, can obtain a fishing license. However, a fishing license is not a sufficient condition for commercial fishing of a species which is subject to quota restrictions; for such fishing to be legal some quota must also be registered to the vessel and/or – as currently is possible – the vessel may have a license for Coastal fishing.

⁹ No. 116/2006, accessible (in Icelandic) at <http://www.atvinnuvegaraduneyti.is/media/Skyrslur/Stjorn-fiskveida-2010-endanlegt.pdf>. An English translation is accessible at <http://www.fisheries.is/management/fisheries-management/the-fisheries-management-act/>.

¹⁰ No. 57, June 3 1996, accessible (in Icelandic) at <http://www.atvinnuvegaraduneyti.is/media/Skyrslur/Stjorn-fiskveida-2010-endanlegt.pdf>.

¹¹ See discussion on the precautionary principle in the proposal for law on main principles of environmental law (Frumvarp til laga um meginreglur umhverfisréttar, þskj. 842 – 566. mál, put forward during the 133. Session of the Althing 2006-2007, <http://www.althingi.is/altxt/133/s/0842.html>). This proposal was not passed.

The limitations of “the right to catch” set by the Fisheries Management Act were tested in court on the 6th of April 2000 when the High Court ruled that limitations of fish catch is constitutional.¹²

The rights of different fishers to access the resource are clearly codified in the legislation. As with all other legislation in Iceland, the legislation on fisheries management has been developed through legally based, democratic processes where various stakeholder groups were consulted. Between plenary debates (readings) on draft legislation in the Althing, extensive hearings with experts and stakeholders have been conducted by permanent committees of the assembly.

Gradually the rights of different fishers to access the resource have become more homogenous and the total catch has become more predictable. The introduction of Coastal fishing (*strandveiðar*) in 2009, where small vessels using only hand-line can take part and where there is a common total quota for all vessels in the fishery, introduced some heterogeneity into the system. However, so far the catch allocated to Coastal fishing is small, i.e. 6,000 tonnes in total. Before deciding the total quota for the present fishing year the estimated catch in Coastal fishing was subtracted from the TACs for the relevant species.

Most of the fishing rights for saithe are in the form of catch quotas that are allocated to (owners’ of) fishing vessels. Some 1,000 tonnes (1,134 tonnes in 2013) or 2% of the total catch is caught by small vessels operating in the coastal fishery (*strandveiðar*).

3.5.5 Fishing regulations

Three public institutions are at the heart of Icelandic fisheries management: the Marine Research Institute (MRI), the Directorate of Fisheries (DF) and the Ministry of Industries and Innovation (MII, formerly the Ministry of Fisheries and Agriculture). The Coast Guard also has a role in monitoring fishing activities, gears, fishing locations and discarding. Many areas in the waters around Iceland are closed for fishing, mostly because they contain large quantities of juvenile fish, but also for ecological reasons (e.g. to prevent the destruction of corals). Some areas are closed permanently for some fishing while other area closures are temporary. All discarding of catches is explicitly banned by Icelandic law.

The MRI is responsible for biological research and stock assessments and provides advice on Total Allowable Catches (TACs) to the Ministry. Its stock assessments are based on data from extensive research fishing as well as data on catches, length and age composition and sexual maturity of the fish. The MRI presents its advice at the end of May/beginning of June each year. The MRI’s stock assessments and advice for many important species are reviewed each year by ICES.

The MRI plays an important role in communicating scientific advice to the fishing industry. This communication takes place through the web, newspapers and meetings with people from the industry, including public meetings. Most of the funding of the MRI comes from the state budget, but the institute also obtains funds from domestic and international research funds, among them the fund “Verkefnasjóður”. This body receives income from the tax on low value catch and from some fines for illegal fishing collected by the Directorate of Fisheries. The estimated funding of the MRI in 2011 amounts to 2,112 million ISK (13.7 million EUR). Of that sum 60% is estimated to come from the state budget¹³. The number of employees is 170.

The MII is responsible for the management of living marine resources in Icelandic waters. The minister is constitutionally responsible to the Althing (Parliament). As fisheries are so important for the economy of Iceland the Althing has a permanent committee on matters related to fisheries and fish processing¹⁴. This committee discusses all proposed legislation on these matters and can decide

¹² This ruling is available in Icelandic at <http://www.haestirettur.is/domar?nr=767>.

¹³ Additional 115 million ISK (0.74 m EUR) is allocated for international co-operation and research within international institutions like North Atlantic Marine Mammal Commission (NAMMCO), International Council for the Exploration of the Sea (ICES), Northwest Atlantic Fisheries Organization (NAFO), North-East Atlantic Fisheries Commission (NEAFC), and International Commission for the Conservation of the Atlantic Tunas (ICCAT) and International Whaling Commission (IWC).

¹⁴ In 2009 its remit was extended to agriculture and its name was changed to the Althing’s Fisheries and Agriculture Committee.

to discuss any aspect of the industry's behaviour or any concern that some people may have. It can require that information on the relevant matters be supplied by the MII or the public institutions serving the fishing industry.

There is legislation ("Upplýsingalög" or Freedom of Information Act) in Iceland which requires ministers and public institutions to reveal existing information. Members of the Althing can obtain detailed information from the Ministry and public institutions by putting questions to the appropriate minister in the Althing.

Before making decisions, the minister consults extensively with stakeholder organisations including the Federation of Icelandic Fishing Vessel Owners (Landssamband íslenskra útvegsmanna, LÍÚ), The Federation of Owners of Small Fishing Vessels (Landssamband smábátæigenda), the Federation of Captains and Mates (Farmanna- og fiskimannasamband Íslands, FFSÍ), the Icelandic Union of Marine Engineers and Metal Technicians (Félag vélstjóra og málmæknimanna, VM) and the Federation of Seamen (Sjómannasamband Íslands) as well as organisations of those working in fish processing (in Iceland both fishing and fish processing are frequently carried out within the same company).

All laws and regulations are published in real time as they come into effect on the Ministry's website.

The Directorate of Fisheries (DF) has many important roles in fisheries management in Iceland. The DF licenses fishing vessels, fish processing plants and authorizes harbor scales which are used for weighing all landings of fish. It also monitors the operators of those facilities to ensure that they follow relevant regulations. The DF gathers information on both catches (including logbook information) from the vessels at sea and information on catches from the authorized harbor scales. This information is sent electronically to the DF at least once every day and published on the Directorate's website. The website makes available information on the quota positions of every vessel in Iceland, such as its quota allocations for each species and how much it has caught¹⁵. All trade in quotas and quota shares has to be reported to the DF.

The DF monitors fish processing as well as fishing. All sellers of fish must report the name of the purchaser to whom they sold fish as well as the quantity and price of fish they sold to them. Similarly all purchasers of fish must report the name of their supplier, the quantity they purchased and the price paid. The DF regularly checks if the output of fish products from a fish processing unit is consistent with the reported input of raw fish. Monitoring of the quota system in Iceland is strengthened by the traceability measures required for exports in a country where over 90% of all fish caught is eventually exported in some form.

There is no illegal, unreported and unregulated (IUU) fishing in Icelandic waters. All landing of fish from vessels that engage in IUU fishing and the servicing of such vessels is forbidden in Iceland.

In summary, the institutions, their roles and interactions are clearly defined within the three core areas of resource management: (1) The development of the knowledge base, (2) preparation and implementation of regulations, and (3) the enforcing of the regulations. The interactions between the MII, the DF, the Coast Guard and the MRI function well. The role of each institution is well defined, with the Ministry taking political responsibility for decisions, and the Directorate performing the technical work at the behest of the Ministry. Decision-making procedures are well established and allow for expeditious and effective interactions. There is an established, tested and proven annual decision-making process, which ultimately results in the setting of regulations for the following year. The compliance with regulations is subject to a rigorous and efficient enforcement system.

Subsidies were abolished in the Icelandic fishing industry in the early 1990s and since 2004 the industry has been paying an annual fee based on estimated profitability of the sector and on the

¹⁵ See DF's website www.fiskistofa.is. Some of the information on this website is also available in English.

weighted volume of landings.¹⁶ This fee has been increasing in recent years and now amounts to some 10% of the value of all landings.

3.5.6 Monitoring and surveillance controls

The Directorate of Fisheries (DF) is entrusted with the day-to-day administration of fisheries. The DF is responsible for implementing legislation on fisheries management and it collects and publishes numerical data and other information on fisheries. The DF issues fishing permits to vessels and licenses scales for weighing landings. It keeps records of quota shares and quotas, including all transfers of quotas and quota shares between vessels. It also checks that vessels do not fish in excess of their quotas.

The DF is responsible for ensuring that fishers follow regulations on gears, fishing locations and discarding. It also ensures that vessels, provided they are in the quota system, have quotas for the probable catch before leaving harbor. The DF gets some assistance in monitoring of gear, discarding and fishing locations from the Coast Guard, which also monitors fishing activities of foreign vessels near the Icelandic fisheries zone.

The DF collects data on fishing and fish catches landed by the Icelandic fleet and monitors compliance with rules on the weighting and recording of catches. Other duties include imposing penalties for illegal catches.

The DF provides supervision on board fishing vessels and in ports of landing, which involves inspecting the composition of catches, fishing equipment and handling methods. The DF also issues licenses to processing plants and supervises their production. Processors have to meet specific requirements concerning hygiene, equipment and quality control. Approved inspection bodies are responsible for inspection of hygiene, facilities and in-plant monitoring of production, both in processing establishments on land and on board vessels. Formal accreditation of inspection bodies is required.

The DF has the right to demand that inspectors are allowed onboard fishing vessels as observers. These observers can demand that the vessel goes to a certain fishing location and that certain gear should be used. Requiring repetition of the fishing procedures of the last fishing trip enables inspectors to compare the catches from the two trips. Comparing the catches of different vessels fishing in the same location and using the same gear is also used for monitoring.

A vessel owner which is found to have acted in breach of regulations gets a warning and a fine. Repeated offenses lead to heavy fines, revocation of the vessel's license to fish and possibly to prison sentences. In 2010 the DF meted out fines to the sum of 18.2 million ISK (112,000 EUR). In 2009 the fines totaled 13.2 million ISK (76,000 EUR) and in 2008 the fines totaled 24.6 million ISK (193,000 EUR).¹⁷

The DF co-operates with a number of other institutions, including the Icelandic Coast Guard and the Harbor Authorities regarding daily recording of landed catches throughout the country. 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.

All discarding is explicitly banned by Icelandic laws. However some discarding is known to take place. Discarding in Icelandic fisheries has been estimated on several occasions through co-operative

¹⁶ The weights are average landing prices during a recent 12-month period before the start of the fishing year.

¹⁷ Directorate of Fisheries' Annual Report 2009 (see http://www.fiskistofa.is/media/utgefid_efni/starfsskyrsla_2009.pdf), p. 31 and the Annual Report 2010 (see http://www.fiskistofa.is/media/utgefid_efni/starfsskyrsla_2010.pdf) p. 27. In 2010 9 offences were sent to the police 2009 (13 in 2009 and 7 in 2008), 9 warnings were issued in 2010 that would lead to withdrawals of licences to fish if repeated (7 in 2009, 3 in 2008), in 2010 there were 9 cases of withdrawals of fishing licences (8 in 2009 and 8 in 2008), in 2010 5 warnings were meted out for licences to weight landings (0 in 2009, 1 in 2008) and in 2010 there was 1 case of withdrawal of such licences (0 in 2009, 1 in 2008). In 2010 there were 2,044 cases where warnings were sent out for catches in excess of quotas but only 19 of those led to withdrawals of fishing licences (in 2009 these numbers were 2,090 and 17 and in 2008 they were 1,706 and 8, respectively). In the rest of those cases the fishers were able to obtain quotas for the excess catch within the time limit of three days after the warning was sent. In 2010 there were 51 cases of withdrawals of fishing licences for negligence in reporting logbook information (13 cases in 2009 and 18 in 2008). (DF's Annual Report 2010, p. 27 and DF's annual report 2009, p. 32).

studies by the Marine Research Institute and the Directorate of Fisheries. Data collection is mainly related to cod, haddock, saithe (*Pollachius virens*) and golden redfish (*Sebastes marinus*) in demersal trawl fisheries, and plaice (*Pleuronectes platessa*) in the Danish seine fishery. Sampling for other species, such as wolffish, was not sufficient to warrant a satisfactory estimation of discarding. For each species the discard was estimated by comparing data on length distributions of fish measured at sea and landed catch from the same fishing ground.

In 2010 the estimate for cod discards was 659 tonnes, or 0.43 % of landings; the second lowest estimate for annual discards during the period 2001-2010. In 2009, cod discard amounted to 961 tonnes or 0.56% of landings. The estimate for haddock discards in 2010 was 727 tonnes, or 1.17 %; the second lowest proportion recorded during 2001-2010. Mean estimated annual discard of cod over the period 2001-2010 was 1,680 tonnes, or 0.90 % of landings. Mean estimated annual discard of haddock was 1,488 tonnes, or 2.02% of landings. In 2009 the estimated discard of haddock was down to 553 tonnes or 0.69% of landings. Discarding of other species was, according to the same source, considered negligible (Pálsson et al. 2012).

The monitoring and policing of Icelandic fishing is enhanced and strengthened by the traceability measures required for exports, since over 90% of the catch ends up being exported in some form.

3.5.7 Management and research plans

There have been several external reviews of the methods that the Marine Research Institute uses in its stock assessments and of the recommendations and advice it gives. The ICES reviews most of the advice annually, including the advice on saithe. There have also been special reviews made by internationally respected experts. There has not been comparable external review of the work of the Directorate of Fisheries or of the Ministry of Industries and Innovation. However, these institutions are subject to regular reviews by the Althingi's committees, especially the permanent committee on fisheries issues. Like other public bodies, these institutions are subjected to scrutiny by The Icelandic National Audit Office (Ríkisendurskoðun). The performance of the institutions involved in fisheries management is scrutinized and intensively debated in Iceland, especially in the many fishing communities.

The MRI staff publishes its research in peer-reviewed scientific journals. The system of fisheries management is under regular review by the Althingi as well as by local authorities, the fisheries sector and the general public. The management of the Icelandic fisheries and the level of fees paid for fishing rights (quotas) are presently important issues in Icelandic politics. The external review processes have been beneficial to the work of the MRI. It seems probable that other parts of the fisheries management system in Iceland would also benefit from more external reviews.

The MRI has recently presented its research plan for 2012-2016¹⁸. In the plan, the importance of biological, ecological and environmental research is stressed. The need to evaluate longterm exploitation of important species is recognised as well as the formulation of harvest rules for as many species as possible. The plan stresses research on the effects of neighbouring waters (Greenland and Faroese) on the fish stocks in Iceland and on the stock structure.

¹⁸ Rannsókn- og starfsáætlun árin 2012-2016, <http://www.hafro.is/images/langtima12-16.pdf>

4. Evaluation Procedure

4.1 Harmonised Fishery Assessment

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

4.1.1 Principle 2 Harmonisation

The fishery involves the same fleet as was assessed in the ISF Icelandic cod and haddock fisheries that were certified in April 2012.¹⁹ The fishing fleet includes the same gear, except for pelagic trawls which are not included here, and Nephrops trawl that was not included in the ISF cod/haddock certifications. Therefore harmonization needs to be considered for P2 in the case of bottom trawl, Danish seine, gillnet, handline and longline.

| Table 4.1: Summary of P2 scores for the ISF saithe (S)- and the ISF cod/haddock (C/H) certifications | | | | | | | | | | | |
|---|-------------|--------------|-----|--------------|-----|----------|-----|----------|-----|---------|-----|
| | | Bottom trawl | | Danish seine | | Longline | | Handline | | Gillnet | |
| | | S | C/H | S | C/H | S | C/H | S | C/H | S | C/H |
| Retained species | | | | | | | | | | | |
| 2.1.1 | Outcome | 80 | 80 | 80 | 80 | 80 | 80 | 80 | 95 | 80 | 80 |
| 2.1.2 | Management | 85 | 90 | 85 | 90 | 85 | 80 | 85 | 95 | 85 | 90 |
| 2.1.3 | Information | 85 | 85 | 85 | 85 | 85 | 85 | 85 | 95 | 85 | 85 |
| Bycatch species | | | | | | | | | | | |
| 2.2.1 | Outcome | 80 | 85 | 80 | 85 | 80 | 80 | 80 | 80 | 80 | 95 |
| 2.2.2 | Management | 100 | 90 | 100 | 90 | 100 | 90 | 85 | 95 | 100 | 90 |
| 2.2.3 | Information | 80 | 100 | 80 | 100 | 80 | 95 | 80 | 100 | 80 | 100 |
| ETP species | | | | | | | | | | | |
| 2.3.1 | Outcome | 80 | 100 | 80 | 100 | 80 | 95 | 80 | 100 | 80 | 90 |
| 2.3.2 | Management | 80 | 85 | 80 | 85 | 80 | 85 | 80 | 100 | 80 | 85 |
| 2.3.3 | Information | 85 | 80 | 85 | 80 | 85 | 80 | 85 | 100 | 85 | 80 |
| Habitat | | | | | | | | | | | |
| 2.4.1 | Outcome | 60 | 90 | 100 | 100 | 100 | 90 | 100 | 95 | 100 | 90 |
| 2.4.2 | Management | 95 | 100 | 95 | 100 | 95 | 100 | 95 | 100 | 95 | 100 |
| 2.4.3 | Information | 85 | 80 | 85 | 85 | 85 | 80 | 85 | 95 | 85 | 80 |
| Ecosystem | | | | | | | | | | | |
| 2.5.1 | Outcome | 100 | 90 | 100 | 90 | 100 | 90 | 100 | 90 | 100 | 90 |
| 2.5.2 | Management | 100 | 90 | 100 | 95 | 100 | 90 | 100 | 100 | 100 | 90 |
| 2.5.3 | Information | 100 | 90 | 100 | 90 | 95 | 90 | 95 | 100 | 95 | 90 |

Source: Current assessment and (for cod and haddock assessments) www.msc.org.

For the two assessments there are some differences in how retained species were calculated. In the case of the ISF cod/haddock certifications, the annual catch of individual species caught by the various fishing gears was divided by the total catch of the entire fleet assessed in order to calculate the proportional catch of retained species. In the current assessment, however, catch per species was divided into the total catch for the gear in question. In addition, for this assessment the data

¹⁹ http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/isf_icelandic_cod and http://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/north-east-atlantic/isf_icelandic_haddock

used for the fishery was directly obtained from the DF database and the average catch for last five years was used, instead of only one year used for the ISF cod/haddock certifications. The assessment team believes that the methodology used here is in line with definitions of UoC and that a five year average gives a more complete overview of catches by the various gears. This might explain the higher number of vulnerable species that was identified in the current certification compared with the ISF cod/haddock certifications. Despite these differences between assessments, in working out the proportional catch of retained species, the resulting scores are compatible with the ISF cod/haddock certifications, although not exactly the same. The largest difference of 15 points was for handline PI2.1.1 and the difference is explained in the relevant scoring table in Appendix 1.

Other P2 components were also harmonised to the ISF cod/haddock certifications. The majority of scores were compatible, despite minor differences of 5 to 10 points which did not affect the overall outcome of the certification. However, there were a number of differences of 15 points or more and these were mostly observed in the Bycatch and ETP components of P2 (see Table 4.1). These differences are accounted for in the relevant PI's scoring rationale. The highest difference was observed for bottom trawl in PI2.4.1 Habitat Outcome, which scored 60 in the current assessment and thus resulted in a condition.

4.1.2 Principle 3 Harmonisation

There are 4 other fisheries that have been certified or are in assessment in the Icelandic EEZ and they need to be harmonised for Principle 3. These are cod and haddock, which was certified in 2012 and herring and lumpfish, which are in assessment. Harmonisation is appropriate for PI's 3.1.1 to 3.1.4, but not for other Principle 3 PI's, since these are species specific. The scoring for this fishery is largely in line with the cod and haddock assessments, although slightly lower. There was some difference in PI 3.1.3 (Long term objectives) for haddock which scored 80, and the saithe fishery scores 100. In this case, the cod and haddock scoring seem to refer to species specific management, whereas in the scoring for the current certification the team considered the management policy at a higher level than the fishery-specific management system (*CR CB4.4.1*).

The herring and lumpfish fisheries are still under assessment. In the herring assessment, there are two stocks being evaluated; Icelandic summer spawning herring and Atlanto-Scandian herring. It is only the former that falls entirely under Icelandic jurisdiction and harmonisation would thus only apply to Icelandic summer spawning herring. The P3 expert for the herring assessment is the same as for this fishery, and the scoring is expected to be compatible. P3 scoring for the saithe and lumpfish are compatible. The P3 expert and the CAB are same for both certifications.

Table 4.2:
Summary of P3 Governance and policy scores for the ISF Iceland Saithe (under assessment), Icelandic Gillnet Lumpfish (under assessment), ISF Icelandic Cod (certified) and ISF Icelandic Haddock fisheries (certified)

| Governance and policy | | Saithe | Lumpfish* | Cod | Haddock |
|--|--|--------|-----------|-----|---------|
| 3.1.1 | Legal & customary framework | 100 | 100 | 100 | 100 |
| 3.1.2 | Consultation, roles & responsibilities | 95 | 95 | 100 | 100 |
| 3.1.3 | Long term objectives | 100 | 100 | 100 | 80 |
| 3.1.4 | Incentives for sustainable fishing | 100 | 95 | 100 | 100 |
| *) Under assessment (at the time of this report, 31.1.2014); scoring is from Final Report. | | | | | |

4.2 Previous assessments

Neither the Icelandic saithe stock nor the ISF Iceland Saithe fishery have been subject to full MSC assessment before.

4.3 Assessment Methodologies

The assessment was made against the MSC Principles and Criteria for Sustainable Fishing v. 1.1. The methodology applied is specified in the MSC Certification Requirements, Version 1.3 (14 January 2013). The setup of the report follows the “MSC Full Assessment Reporting Template v1.3”.

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

| Table 4.3: Itinerary of field activities during site visits of the ISF Iceland saithe fishery | | | |
|--|---|--|---|
| Date | Activity | Location | Attendees |
| 15.8.2013 | Site visit : Senior management of ISF | ISF Headquarters, Reykjavik | Assessment Team and representatives of the Client |
| 15.8.2013 | Stakeholder consultation Marine Research Institute | Marine Research Institute, Reykjavik | Assessment Team, MRI scientists and director |
| 15.8.2013 | Stakeholder consultation Fisheries management and surveillance | Ministry of Industries & Innovation, Reykjavik | Assessment Team, MII and DF representatives |
| 16.8.2013 | Scoring session 1 | Tún Headquarters, Reykjavik | Assessment Team |
| 17.8.2013 | Scoring session 2 | Tún Headquarters, Reykjavik | Assessment Team |
| 18.8.2013 | Scoring session 3 | Tún Headquarters, Reykjavik | Assessment Team |
| 9.10.2013 | Scoring finalisation | Tún Headquarters, Reykjavik | Assessment Team |
| 8.01.2014 | Team meeting: Peer Review Response | Tún Headquarters, Reykjavik | Assessment Team |

4.4 Evaluation Processes and Techniques

4.4.1 Site Visits

The assessment team made visits to the headquarters of ISF in Iceland. Additional stakeholder visits were made to the Marine Research Institute, the Ministry of Industries and Innovation, and the Directorate of Fisheries.

| Table 4.4: Itinerary of site visits and stakeholder consultation in the ISF Iceland saithe fishery assessment | |
|---|--|
| Meetings with Client and other Stakeholders | Subjects of Consultation |
| 15.8.2013 Marine Research Institute Þorsteinn Sigurðsson, Kristján Kristinsson, and Björn Steingrímsson, scientists at MRI; Members of Assessment Team | Scientific research and data on the fishery, with special regard to stock assessment and ecosystem impact of fishery. |
| 15.8.2013 Ministry of Industries and Innovation and Directorate of Fisheries Jóhann Guðmundsson (MII); Arnor Sigurjónsson (MII); Hrefna Karlsdóttir (MII); Þorsteinn Hilmarsson (DF); Members of Assessment Team | Fisheries policy. Management practices and objectives. Enforcement of fishery policies and management decisions. Monitoring, surveillance and landing statistics. |
| 15.8.2013 ISF Senior management Gunnlaugur Eiríksson (MD ISF); Hans Einarsson (ISF chairman of board); Members of Assessment Team | Meeting with senior management of the Client; presentation of the assessment; the fishery practice and its management; relations of the fishery to research, management and control bodies; issues outstanding with regard to availability of data, research and policy. |

4.4.2 Consultations

The assessment team invited a range of organizations and individuals for consultation during the assessment process by means of public announcements, letters and meetings.

The team organized formal meetings with the representatives of the client (see above) as well as with representatives of the main research and management bodies. A summary outline of those formal consultations is provided in Table 4.4.

The Preliminary Draft Report was issued on 28 October 2013 for consideration of the client who submitted a plan of action to address the condition set for potential certification. A Peer Review Draft Report was issued on 14 November. Comments made by peer reviewers and the team's responses are published in Appendix 2.

For FR: Account of submission, comments received and CAB's response, with reference to appropriate Appendices.

| Table 4.5: Set of Scoring elements in the ISF Iceland Saithe fishery | | | |
|---|--|-----------------------|-----------------------------|
| Component | Scoring elements | Main /not main | Data deficient (Y/N) |
| P1: Outcome | Saithe | Target species | N |
| P2: Retained Species | >5% of catch: Anglerfish, Atlantic cod, Deepwater redfish, European, Norway lobster, Golden redfish, Gray Sole, Greenland Halibut, Haddock, Ling, Plaice, Tusk, Wolffish Vulnerable species: Leafscale gulper shark, Mackerel shark, Common eel, Common dolphin, Orange roughy, Atlantic salmon | Main | N |
| P2: Retained Species | Arctic wolfish, Atlantic Herring, Atlantic mackerel, Baird's smooth-head, Black dogfish, Blackbelly rosefish, Blue Ling, Bluefin tuna, Blue whiting, Common whelk, Dab, Deep water shrimp, Dogfish, Eelpout, Greater forkbeard, Greenland Shark, Grey Skate, Gurnard, Harbour seal, Lemon sole, Long Rough Dab, Lumpfish, Norway pout, Ratfish, Redfish, Ribbonfish, Rock grenadier, Roughhead grenadier, Sailray, Sandeel, Shagreen Skate, Smelt, Spiny-eel, Spotted Wolffish, Starry ray, Whiff, Whiting | Not main | N |
| P2: Retained Species | Atlantic rock crab, Black scabbard-fish, Black sea bream, Blue mussel, , Common spider crab, Flounder, Moonfish, Pollack, Portuguese dogfish, Red crab, Sea cucumber, Sea urchin, Spiny stone-crab, Squid, Turbot, White hake | Not main | Y |
| P2: Retained species | Bait species used in longline fishery: Pacific saury, Argentinian short-finned squid, Icelandic summer-spawning herring, Atlanto-Scandian herring | (Bait) | N |
| P2: Bycatch species | Cod, haddock, saithe, redfish, plaice, Harbour porpoise | Not main | N |
| P2: ETP species | Atlantic Halibut | Not main | N |
| P2: Habitats | Saithe habitat, deepwater coral, sponge aggregations | N/A | N |
| P2: Ecosystem | Icelandic Marine Ecosystem | N/A | N |

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. Notifications of site visit and stakeholder consultation were also published in Icelandic in the weekly newspaper “*Fiskifréttir*”.

A working knowledge of the saithe fishery was obtained by literature review and by interviews with key actors and stakeholders in the saithe fishery. Knowledge on retained-, bycatch- and ETP species was obtained from the Directorate of Fisheries data, stakeholder consultation, studies by the MRI and published literature and reports. Details on the various scoring elements (i.e. species) for Principle 1 and 2 in the saithe fishery can be found in Table 4.5.

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

Several meetings were held shortly after the completion of site visit and stakeholder meetings, where team members reviewed and scored the fishery. Relevant team members presented preliminary scoring to other team members for each PISG. Each PISG was subsequently discussed by all team members and a consensus reached either during the meeting or by e-mail.

For the fishery to meet the minimum requirements for MSC certification it must (a) achieve a weighted aggregate score of at least 80 for each of the three MSC Principles and (b) achieve a score of at least 60 for each Performance Indicator. The summary of the scoring for the ISF Iceland saithe fishery is presented in Section 6.

5 Traceability

5.1 Eligibility Date

Target Eligibility Date (TED) is expected date of eligibility for products from the fishery to enter Chain of Custody and thus be permitted to bear the MSC Ecolabel. TED for this fishery is 1 September 2013. The date marks the beginning of the fishing year (the 1st of September to the 31st of August). As outlined below there is already in force a robust system of traceability and segregation that gives confidence in the TED set. The catch is recorded at sea and again by official weighmasters at landing points.

(REQUIRED FOR PCR ONLY)

- | |
|---|
| <ol style="list-style-type: none">1. The report shall include:<ol style="list-style-type: none">a. The actual eligibility date.b. The rationale for any difference in this date from the target eligibility date |
|---|

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 VMS system, which is monitored 24hrs a day by the Coast guard. The DF collects data on fishing and catches landed by the Icelandic fleet and monitors compliance with rules on weighing and recording of catches.

All vessels are required to fill out log books to record details of fishing practices such as location, dates, gear and catch quantity. Vessels that process catch at sea fill out log books electronically and send them directly to the DF.

All catch landed in Iceland by the Icelandic fishing fleet must be weighed and 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. Recorded catch is entered directly in the DF database. 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 several times a day 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, while further processing and freezing (whole, headed/gutted, fillets) is typically done by the large vessels (trawlers).

The DF monitors, via the VMS, that trans-shipment of fish is not conducted. Some Icelandic fishery practices export fish direct 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. 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 opportunity of substituting certified fish with non-certified fish, are unlikely.

Several member companies of the ISF ehf. have already obtained CoC certification for the processing or trading in MSC certified fish from the ISF Icelandic Cod and Haddock fisheries.

5.3 Eligibility to Enter Further Chains of Custody

Potential certification will include all registered Icelandic vessels and fishery practices, as well as 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 as sub-contractors.

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 ecolabel, provided these are sold through a registered sharing partner of the fishery certificate, i.e. shareholder of the Iceland Sustainable Fisheries ehf.

Chain of custody will commence as of the first point of landing. 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.

Iceland Sustainable Fisheries ehf. has issued a statement outlining the general terms of a potential extension of the client group for wider sharing of a potential certificate.

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

At the time of assessment, the team is not aware of the presence of IPI (inseparable or practically inseparable) stocks in the catch.

6 Evaluation Results

6.1 Principle Level Scores

| Table 6.1: ISF Iceland Saithe Fishery – Final Principle Level Scores | | |
|---|--------------|------------------|
| Principle | Score | Pass/Fail |
| Principle 1 – Target Species | 89.4 | Pass |
| Principle 2 – Ecosystem: | | Pass |
| - Bottom Trawl | 86.3 | Pass |
| - Danish Seine | 89.0 | Pass |
| - Longline | 88.7 | Pass |
| - Handline | 87.7 | Pass |
| - Gillnet | 88.7 | Pass |
| - Nephrops trawl | 87.7 | Pass |
| Principle 3 – Management System | 97.4 | Pass |

6.2 Summary of Scores

| Table 6.2: ISF Iceland Saithe Fishery – Summary of Performance Indicator scores (BT = Bottom trawl, DS = Danish seine, LL = Longline, HL = Handline, GN = Gillnet, NT = Nephrops trawl) | | | | | | | | | |
|---|------------------------------------|--------|--|-------|-----|-----|-----|-----|-----|
| Principle | Component | PI No. | Performance Indicator (PI) | Score | | | | | |
| 1 | Outcome | 1.1.1 | Stock status | 80 | | | | | |
| | | 1.1.2 | Reference points | 90 | | | | | |
| | | 1.1.3 | Stock rebuilding | N/A | | | | | |
| | Management | 1.2.1 | Harvest strategy | 100 | | | | | |
| | | 1.2.2 | Harvest control rules & tools | 90 | | | | | |
| | | 1.2.3 | Information & monitoring | 90 | | | | | |
| | | 1.2.4 | Assessment of stock status | 95 | | | | | |
| | | | | BT | DS | LL | HL | GN | NT |
| 2 | Retained species | 2.1.1 | Outcome | 80 | 80 | 80 | 80 | 80 | 80 |
| | | 2.1.2 | Management | 85 | 85 | 85 | 85 | 85 | 85 |
| | | 2.1.3 | Information | 85 | 85 | 85 | 85 | 85 | 85 |
| | Bycatch species | 2.2.1 | Outcome | 80 | 80 | 80 | 80 | 80 | 80 |
| | | 2.2.2 | Management | 100 | 100 | 100 | 85 | 100 | 85 |
| | | 2.2.3 | Information | 80 | 80 | 80 | 80 | 80 | 80 |
| | ETP species | 2.3.1 | Outcome | 80 | 80 | 80 | 80 | 80 | 80 |
| | | 2.3.2 | Management | 80 | 80 | 80 | 80 | 80 | 80 |
| | | 2.3.3 | Information | 85 | 85 | 85 | 85 | 85 | 85 |
| | Habitats | 2.4.1 | Outcome | 60 | 100 | 100 | 100 | 100 | 100 |
| | | 2.4.2 | Management | 95 | 95 | 95 | 95 | 95 | 95 |
| | | 2.4.3 | Information | 85 | 85 | 85 | 85 | 85 | 85 |
| | Ecosystem | 2.5.1 | Outcome | 100 | 100 | 100 | 100 | 100 | 100 |
| | | 2.5.2 | Management | 100 | 100 | 100 | 100 | 100 | 100 |
| | | 2.5.3 | Information | 100 | 100 | 95 | 95 | 95 | 95 |
| | | | | | | | | | |
| 3 | Governance and policy | 3.1.1 | Legal & customary framework | 100 | | | | | |
| | | 3.1.2 | Consultation, roles & responsibilities | 95 | | | | | |
| | | 3.1.3 | Long term objectives | 100 | | | | | |
| | | 3.1.4 | Incentives for sustainable fishing | 100 | | | | | |
| | Fishery specific management system | 3.2.1 | Fishery specific objectives | 100 | | | | | |
| | | 3.2.2 | Decision making processes | 80 | | | | | |
| | | 3.2.3 | Compliance & enforcement | 100 | | | | | |
| | | 3.2.4 | Research plan | 100 | | | | | |
| | | 3.2.5 | Management performance evaluation | 100 | | | | | |

6.3 Summary of Condition and Recommendations

6.3.1 Condition

| Table 6.3: ISF Iceland Saithe Fishery – Condition | | | |
|--|--|--------------------------|--|
| No. | Condition | Performance Indicator | Related to previously raised condition? (Y/N/NA) |
| 1 | Existing measures for the protection of vulnerable habitats shall be evaluated, with the aim to implement conservation and management measures corresponding to those by NAFO and NEAFC. Scientific information on the extent of potential damage by fishing gear to areas of “ostur” shall be evaluated in addition to evaluating the need for closing such areas to potentially damaging fishing activities. | PI 2.4.1 Bottom trawl | NA |

6.3.2 Recommendations

| Table 6.4: ISF Iceland Saithe Fishery – Recommendations | | |
|--|--|-----------------------|
| No. | Recommendation | Performance Indicator |
| 1 | Since Iceland is a signatory to various international conservation conventions it is recommended that all vessels in the client fleet be required to return live grey (common) skate, <i>Raja Dipturus batis</i> , to the sea after capture as soon as practically possible. | PI 2.1.1 |
| 2 | Skippers of all vessels in the client fleet should be required to record all bycatch and ETP species (ie. turtles, birds, marine mammals, elasmobranchs) caught, irrespective of whether they are landed or viable individuals returned back to sea. | PI 2.3.1 |

6.4 Determination, Formal Conclusion and Agreement

(REQUIRED FOR FR AND PCR)

1. The report shall include a formal statement as to the certification determination recommendation reached by the Assessment Team about whether or not the fishery should be certified.

(Reference: CR 27.16)

(REQUIRED FOR PCR)

2. The report shall include a formal statement as to the certification action taken by the CAB's official decision-makers in response to the Determination recommendation.

6.5 Changes in the Fishery Prior to and Since Pre-Assessment

A pre-assessment of the saithe trawl fishery was completed in May 2012. Since then a management plan for saithe was evaluated by ICES (Hjörleifsson & Björnsson 2013). The management plan was formally adopted by the Icelandic authorities²⁰ in June 2013.

²⁰ <http://www.fisheries.is/main-species/codfishes/saithe/management-plan/>

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Icelandic saithe fishery:

Fisheries management plan: <http://eng.atvinnuvegaraduneyti.is/publications/news/nr/7627>

Directorate of Fisheries:

<http://www.fiskistofa.is/>

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Regulations:

Ban on halibut catch:

<http://stjornartidindi.is/Advert.aspx?ID=40837c4b-b17b-4f9b-85d0-7ed3c16d8272>

Marine Research Institute:

<http://www.hafro.is/>

<http://www.hafro.is/Astand/2013/36-engl-sum.PDF>

<http://www.hafro.is/Astand/2013/3-ufsi.PDF>

Ministry of Industries and Innovation:

<http://www.fisheries.is/>

<http://www.fisheries.is/management/>

Icelandic fisheries:

<http://www.fisheries.is/>

Other sources of information:

<http://www.fishbase.org>

Appendices

Appendix 1 Scoring and Rationales

Appendix 1.1 Performance Indicator Scores and Rationale

Principle 1

Evaluation Table for PI 1.1.1

| PI 1.1.1 | | The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing | | |
|---------------|---------------|--|--|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | It is likely that the stock is above the point where recruitment would be impaired. | It is highly likely that the stock is above the point where recruitment would be impaired. | There is a high degree of certainty that the stock is above the point where recruitment would be impaired. |
| | Met? | Yes | Yes | No |
| | Justification | <p>Based on ICES 2013 advice: The fishing mortality has fluctuated around 0.3 between 1998 and 2011, decreasing from around 0.4 in the mid-1990s. SSB has been declining since 2006 and is at present close to the long-term average. Year classes 1998–2000 and 2002 were large, but recruitment since then has been around the long-term average, except for the 2008 cohort which is estimated to be large. Still, current SSB is well above the SSB_{Msy} trigger. The estimated F_{msy} in 2013 was 0.28.</p> <p>Examining the entire history of the fishing mortality rate shows that the early periods included a number of years in which F>F_{msy}. However, SSB did not decline to near SSB_{msy}. Additionally, in recent years the F has been reduced, perhaps in response to regulation, i.e. the establishment of a fishery management plan.</p> <p>Therefore, it is highly likely that the stock is above the point where recruitment would be impaired. Yet it cannot be said that there is a high degree of certainty that the stock is above the point where recruitment would be impaired because the stock-recruitment relationship is largely unknown.</p> | | |
| b | Guidepost | | The stock is at or fluctuating around its target reference point. | There is a high degree of certainty that the stock has been fluctuating around its target reference point, or has been above its target reference point, over recent years. |
| | Met? | | Yes | No |
| | Justification | <p>Spawning stock biomass is above the B_{msy}, which is treated as the lower bound of the target region. However, the SSB had been falling and fishing mortality was well above the target. If SSB were below the trigger it would be considered as “below the target reference point”, resulting in a condition. However, the most recent assessment has indicated reduced F’s near the F_{msy} and that the stock is still well above the SSB_{msy} trigger.</p> <p>Still in the past there was not a clear separation between targets and limits. This has been corrected in the new HCR. In the most recent years a management plan has been implemented including the harvest control rules. This has resulted in F’s close to F_{msy}. Additionally, the recommended HCR reduces F to a level below F_{msy} (~0.2 relative to F_{msy}=0.28). Therefore the stock is at or fluctuating around its target reference point.</p> | | |

| | | | |
|--|---|---------------------------------|---|
| PI 1.1.1 | The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing | | |
| References | Anon. 2013 | | |
| | | | |
| Stock Status relative to Reference Points | | | |
| | Type of reference point | Value of reference point | Current stock status relative to reference point |
| Target reference point | Bmsy | 80000 t | $B_{current}/B_{msy} \sim 1.2$ |
| Limit reference point | Blim | 65000t | $B_{current}/B_{lim} \sim 1.5$ |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table for PI 1.1.2

| PI 1.1.2 | | Limit and target reference points are appropriate for the stock | | |
|---------------|---------------|---|--|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Generic limit and target reference points are based on justifiable and reasonable practice appropriate for the species category. | Reference points are appropriate for the stock and can be estimated. | |
| | Met? | Yes | Yes | |
| | Justification | The SSBMSY and FMSY are estimated as 80,000t and 0.28 year ⁻¹ respectively, based on stochastic projections of the catch-at-age stock assessment with a “hockeystick” stock-recruitment function. The limit reference point (Blim) is 65 000 t, but is derived differently, based on the lowest biomass estimate observed with no significant reduction in recruitment. The reference points are derived appropriately and meet the MSC standard. | | |
| b | Guidepost | | The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity. | The limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity following consideration of precautionary issues. |
| | Met? | | Yes | No |
| | Justification | Prior to the management plan implementation, the limit was close to the MSY trigger. However the management plan separates the targets and limits further (F _{target} =0.22, F _{msy} =0.28). B _{target} is the biomass associated with F=0.22 which is larger than B _{msy} . Given that the limit is relatively high and that it is empirically based, albeit on limited data, it can be argued that this is more precautionary than the default (0.5 BMSY). Nevertheless the limit reference point is set above the level at which there is an appreciable risk of impairing reproductive capacity. | | |
| c | Guidepost | | The target reference point is such that the stock is maintained at a level consistent with B _{MSY} or some measure or surrogate with similar intent or outcome. | The target reference point is such that the stock is maintained at a level consistent with B _{MSY} or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty. |
| | Met? | | Yes | Yes |
| | Justification | F _{target} =0.22, F _{msy} =0.28; B _{target} is the biomass associated with F=0.22 which is larger than B _{msy} . The target reference point is such that the stock is maintained at a level consistent with BMSY or some measure or surrogate with similar intent or outcome, or a higher level, and takes into account relevant precautionary issues such as the ecological role of the stock with a high degree of certainty. The chosen reference points are designed for the saithe life history (relatively low productivity). Given this life history, the target of 0.22 accounts for likely ecological effects such as saithe predator fluctuations. | | |

| | | | | |
|---|----------------------|--|---|-----------|
| PI 1.1.2 | | Limit and target reference points are appropriate for the stock | | |
| d | Guidepost | | For key low trophic level stocks, the target reference point takes into account the ecological role of the stock. | |
| | Met? | | Not relevant | |
| | Justification | Saithe is not a low trophic level stock | | |
| References | | MRI 2013; ICES advice 2012, Saithe management plan | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 90 |
| CONDITION NUMBER (if relevant): | | | | |

Evaluation Table for PI 1.1.3

| PI 1.1.3 | | Where the stock is depleted, there is evidence of stock rebuilding within a specified timeframe | | |
|---|----------------------|---|---|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Where stocks are depleted rebuilding strategies, which have a reasonable expectation of success, are in place. | | Where stocks are depleted, strategies are demonstrated to be rebuilding stocks continuously and there is strong evidence that rebuilding will be complete within the specified timeframe. |
| | Met? | N/A | | N/A |
| | Justification | Saithe is not depleted | | |
| b | Guidepost | A rebuilding timeframe is specified for the depleted stock that is the shorter of 30 years or 3 times its generation time. For cases where 3 generations is less than 5 years, the rebuilding timeframe is up to 5 years. | A rebuilding timeframe is specified for the depleted stock that is the shorter of 20 years or 2 times its generation time. For cases where 2 generations is less than 5 years, the rebuilding timeframe is up to 5 years. | The shortest practicable rebuilding timeframe is specified which does not exceed one generation time for the depleted stock. |
| | Met? | N/A | N/A | N/A |
| | Justification | | | |
| c | Guidepost | Monitoring is in place to determine whether the rebuilding strategies are effective in rebuilding the stock within a specified timeframe. | There is evidence that they are rebuilding stocks, or it is highly likely based on simulation modelling or previous performance that they will be able to rebuild the stock within a specified timeframe. | |
| | Met? | N/A | N/A | |
| | Justification | | | |
| References | | | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | N/A |
| CONDITION NUMBER (if relevant): | | | | |

Evaluation Table for PI 1.2.1

| PI 1.2.1 | | There is a robust and precautionary harvest strategy in place | | |
|---------------|---------------|---|---|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The harvest strategy is expected to achieve stock management objectives reflected in the target and limit reference points. | The harvest strategy is responsive to the state of the stock and the elements of the harvest strategy work together towards achieving management objectives reflected in the target and limit reference points. | The harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points. |
| | Met? | Yes | Yes | Yes |
| | Justification | A management plan has been implemented in which the harvest strategy is to maintain fishing mortality rates near $F=0.22$ (which is less than F_{msy}), maintain biomass above B_{msy} and to set reductions in exploitation as B_{lim} is approached. Additionally, the strategy is to achieve stability in annual catch deviations to the extent possible. Therefore the harvest strategy is responsive to the state of the stock and is designed to achieve stock management objectives reflected in the target and limit reference points. | | |
| b | Guidepost | The harvest strategy is likely to work based on prior experience or plausible argument. | The harvest strategy may not have been fully tested but evidence exists that it is achieving its objectives. | The performance of the harvest strategy has been fully evaluated and evidence exists to show that it is achieving its objectives including being clearly able to maintain stocks at target levels. |
| | Met? | Yes | Yes | Yes |
| | Justification | The strategy was fully evaluated by simulation testing and is now implemented. | | |
| c | Guidepost | Monitoring is in place that is expected to determine whether the harvest strategy is working. | | |
| | Met? | Yes | | |
| | Justification | Monitoring is in place (biomass indices, ICES assessments, annual ICES advice) to determine whether the strategy is working. | | |
| d | Guidepost | | | The harvest strategy is periodically reviewed and improved as necessary. |
| | Met? | | | Yes |

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|---|----------------------|--|---|---|
| PI 1.2.1 | | There is a robust and precautionary harvest strategy in place | | |
| | Justification | MRI annually reviews all management advice. The management plan calls for periodic ICES reviews of the strategy in order to modify/improve it every 5 years. | | |
| e | Guidepost | It is likely that shark finning is not taking place. | It is highly likely that shark finning is not taking place. | There is a high degree of certainty that shark finning is not taking place. |
| | Met? | Not relevant | Not relevant | Not relevant |
| | Justification | Vessels are required to have VMS (although not video linked), and fishermen are required to land all species intact, with dockside verification of the catch. | | |
| References | | Hjörleifsson & Björnsson 2013; http://www.fisheries.is/main-species/codfishes/saithe/management-plan/ | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Evaluation Table for PI 1.2.2

| PI 1.2.2 | | There are well defined and effective harvest control rules in place | | |
|---------------|----------------------|---|--|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Generally understood harvest rules are in place that are consistent with the harvest strategy and which act to reduce the exploitation rate as limit reference points are approached. | Well defined harvest control rules are in place that are consistent with the harvest strategy and ensure that the exploitation rate is reduced as limit reference points are approached. | |
| | Met? | Yes | Yes | |
| | Justification | The HCR is generally understood (SG60) and is now well-defined (SG80) and implemented. The HCR establishes a TAC as an average of the TAC the prior year and 0.2 times the current biomass. Effectively this is maintaining F 's to about 0.22 ($<F_{msy}$) and biomass $>B_{msy}$. The HCR has been implemented through a management plan. One reason for the target F 's being $<F_{msy}$ is to maintain catches without large fluctuations. | | |
| b | Guidepost | | The selection of the harvest control rules takes into account the main uncertainties. | The design of the harvest control rules takes into account a wide range of uncertainties. |
| | Met? | | Yes | No |
| | Justification | The design of the harvest control rules takes into account the main uncertainties. This is demonstrated by Hjörleifsson & Björnsson (2013) which documents the testing procedure or management strategy evaluation. In addition to the estimation of normal estimation uncertainty in the assessment model, further sensitivities on error structure, selection patterns, recovery from low biomass trajectories and historical runs were evaluated relative to the robustness of the HCR in achieving the harvest strategy. Still some issues were not tested including alternative reproductive functions and changes in mortality parameters (i.e. ecological effects). | | |
| c | Guidepost | There is some evidence that tools used to implement harvest control rules are appropriate and effective in controlling exploitation. | Available evidence indicates that the tools in use are appropriate and effective in achieving the exploitation levels required under the harvest control rules. | Evidence clearly shows that the tools in use are effective in achieving the exploitation levels required under the harvest control rules. |
| | Met? | Yes | Yes | Yes |
| | Justification | Since the management plan and HCR is newly in effect, it is premature to evaluate the management outcomes. However, recent management procedures applied prior to the management plan (TACs) imply that these can be implemented. However, in prior years there were some instances where TACs were exceeded. The establishment of the management plan was designed to eliminate these instances and to keep the TAC in line with scientific advice (the HCR). Evidence exists for effective implementation in Icelandic fisheries – one example is the HCR for the cod fishery that has been effectively implemented since 1995. Other examples include capelin, summer spawning herring, and more recently, haddock. Effective monitoring of the catches by the DF ensures that TAC's are adhered to. | | |

| | | |
|---|--|-----------|
| PI 1.2.2 | There are well defined and effective harvest control rules in place | |
| References | Hjörleifsson & Björnsson (2013) | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | 90 |
| CONDITION NUMBER (if relevant): | | |

Evaluation Table for PI 1.2.3

| PI 1.2.3 | | Relevant information is collected to support the harvest strategy | | |
|---------------|----------------------|---|--|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Some relevant information related to stock structure, stock productivity and fleet composition is available to support the harvest strategy. | Sufficient relevant information related to stock structure, stock productivity, fleet composition and other data is available to support the harvest strategy. | A comprehensive range of information (on stock structure, stock productivity, fleet composition, stock abundance, fishery removals and other information such as environmental information), including some that may not be directly related to the current harvest strategy, is available. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>Good information exists on life history, including growth, mortality and movement. Saithe in Icelandic waters (Division Va) is managed as a one unit, although tagging data indicates some exchange with other areas. Survey indices are available and used as indices of abundance. Commercial CPUE indices are also available for 20 years or more, but these are not used as they are considered unreliable as an abundance index. Biological sampling from the catches is well organized and provides sufficient cover to obtain length and weight distributions, age-length keys, maturity schedule and other information required by the stock assessment from the commercial catches. The fishing fleet operating in Icelandic waters consists of a large number of diverse boat types. Information on these vessels is maintained through licensing and registration systems.</p> <p>Overall, data are sufficient to support the stock assessment, as well as the harvest strategy and the harvest control rule developed for this fishery.</p> <p>In addition to information of the stock, fishery removals and fleet, a wide range of other information such as environmental and ecosystem information e.g. stomach contents are collected on a routine basis (see e.g. MRI annual report).</p> <p>Information is considered to be comprehensive at the SG100 level, since a wide range of information, sufficient to support the harvest strategy, is available. In addition, information that may not be directly related to the harvest strategy is also available, e.g. a wide range of environmental and ecological information.</p> | | |
| b | Guidepost | Stock abundance and fishery removals are monitored and at least one indicator is available and monitored with sufficient frequency to support the harvest control rule. | Stock abundance and fishery removals are regularly monitored at a level of accuracy and coverage consistent with the harvest control rule, and one or more indicators are available and monitored with sufficient frequency to support the harvest control rule. | All information required by the harvest control rule is monitored with high frequency and a high degree of certainty, and there is a good understanding of inherent uncertainties in the information [data] and the robustness of assessment and management to this uncertainty. |
| | Met? | Yes | Yes | No |

| | | | |
|---|----------------------|---|---|
| PI 1.2.3 | | Relevant information is collected to support the harvest strategy | |
| | Justification | <p>All catch that is brought ashore must by law be weighed by a licensed body, and is monitored and enforced by the Icelandic Directorate of Fisheries. Discard estimates are available since 2001 and has been decreasing. The MRI concludes that discards of saithe is insignificant (Pálsson et al. 2005 & 2012)</p> <p>The Icelandic March (1985-onwards) and October (1996-onwards) groundfish surveys provide the abundance indices. The survey design is a classical random stratified design with fixed stations (Björnsson et al. 2007). The information is accurate and regular and therefore sufficient for the HCR (SG80), although it is difficult for any fishery to claim “all information” is available (SG100). Uncertainty reported in the assessment may suggest that improvements could be carried out in data collection, so SG100 is not met.</p> | |
| c | Guidepost | | There is good information on all other fishery removals from the stock. |
| | Met? | | Yes |
| | Justification | Removals from the stock are sufficiently well recorded for the stock assessment and harvest strategy. As indicated above, misreporting from the commercial fishery has been estimated as low. In addition, bycatch and discard estimates have been made and these suggest such unrecorded removals are negligible. | |
| References | | Björnsson et al. 2007; MRI Annual Report (http://www.hafro.is/images/2013/arsskyrsla2012.pdf); Pálsson et al. 2005 & 2012 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 90 |
| CONDITION NUMBER (if relevant): | | | |

Evaluation Table for PI 1.2.4

| PI 1.2.4 | | There is an adequate assessment of the stock status | | |
|---------------|---------------|---|---|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | | The assessment is appropriate for the stock and for the harvest control rule. | The assessment is appropriate for the stock and for the harvest control rule and takes into account the major features relevant to the biology of the species and the nature of the fishery. |
| | Met? | | Yes | Yes |
| | Justification | <p>The stock assessment uses a separable statistical catch-at-age model implemented in AD Model Builder, which allows changes in selectivity to occur in specified years. The model is set up so that both stock assessment and predictions are run at the same time. A very similar code is used by ICES for other fisheries, notably the HCR evaluation of Icelandic cod in December 2009. The stock assessment estimates fishing mortality and spawning stock biomass relative to reference points, it is appropriate for the data.</p> <p>This assessment model was used as the “operating model” when developing the HCR. The model accounts for the main biological features; growth, natural mortality, reproductive relationships and the interaction of fish sizes/ages with gear (selectivities).</p> | | |
| b | Guidepost | The assessment estimates stock status relative to reference points. | | |
| | Met? | Yes | | |
| | Justification | As noted above the assessment model estimates status relative to target and limit reference points. | | |
| c | Guidepost | The assessment identifies major sources of uncertainty. | The assessment takes uncertainty into account. | The assessment takes into account uncertainty and is evaluating stock status relative to reference points in a probabilistic way. |
| | Met? | Yes | Yes | No |
| | Justification | The ICES advice indicates that: <i>“The assessment is relatively uncertain, due to high variances in survey measurements and lack of reliable recruitment estimates.”</i> These and other sources of uncertainty are taken into account in the assessment. However, the stock assessment is not probabilistic and importantly does not report results in a probabilistic way. | | |
| d | Guidepost | | | The assessment has been tested and shown to be robust. Alternative hypotheses and assessment approaches have been rigorously explored. |
| | Met? | | | Yes |

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|---|----------------------|---|---|--|
| PI 1.2.4 | | There is an adequate assessment of the stock status | | |
| | Justification | <p>A number of approaches to stock assessment have been carried out in the past, and a benchmark assessment has been completed recently.</p> <p>It is not clear that this amounts to a “rigorous” exploration of alternative approaches. In most cases the “alternatives” have been rejected for the mainline advice for various scientific reasons. Notably ICES says: <i>“The discrepancy between the applied assessment model and a TSA model (NWWG 2012) is greater than in recent years, estimating the total biomass (B4+) as 265 kt and 219 kt, respectively. This difference is mainly due to uncertainty about the 2008 cohort. Next year’s data should decrease this uncertainty about the 2008 cohort size. If the 2008 cohort does not turn out to be large, then the current biomass estimate of 265kt is most likely an overestimate.”</i> This indicates both the uncertainty and the use of alternative models.</p> | | |
| e | Guidepost | | The assessment of stock status is subject to peer review. | The assessment has been internally and externally peer reviewed. |
| | Met? | | Yes | Yes |
| | Justification | <p>The stock assessment has been subject to peer review through the ICES North-West Working Group meetings. In addition, an external review is carried out through North-Western Review Group which reports its technical minutes in the NWWG report (Annex 5). The Group reviews the whole report rather than the assessments (they do not have the opportunity to request analyses, for example, although such requests may be implied by their comments). Additionally the HCR evaluation report was reviewed by the ICES management committee.</p> | | |
| References | | Hjörleiffson & Björnsson 2013, ICES NWWG Report 2012 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 95 |
| CONDITION NUMBER (if relevant): | | | | |

Principle 2

Bottom trawl Principle 2: Retained Species

Bottom trawl – Outcome (Retained species)

Evaluation Table for PI 2.1.1

| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | | |
|---------------|---------------|---|---|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below). | Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below). | There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points. |
| | Met? | Yes | Yes | No |
| | Justification | <p>The following main retained species as defined by weight (>5%) are retained by bottom trawls: Cod, Golden Redfish, Haddock, Greenland halibut, and deepwater redfish. All except the deepwater redfish can be said to be highly likely to be within biologically based limits.</p> <p>Atlantic cod: The reference biomass (age 4+) in 2013 is estimated as 1,170,000t and the spawning stock as 480,000t, compared to Blim=125 and Btrigger=220 thousand t (Anon 2013). Fishing mortality has declined significantly in the last decade and is presently at a historic low and below likely candidates for Fpa and Flim (Anon. 2012, ICES 2012a).</p> <p>Golden Redfish: Current biomass index is 2x the TRP of Upa and 5x the LRP of Ulim and the stock is highly likely to be within biological limits.</p> <p>Haddock: The spawning stock was estimated to be 90,000t and fishable stock (age 3+) at 120,000t. The harvest rate in 2012 was 42%. SSB is above the Blim of 45,000t. The MRI predicts that the stock size of haddock will decrease in coming years and there is some risk that the spawning stock will fall below the historical minimum (Blim=45,000 tonnes) in 2014–2015.</p> <p>Greenland Halibut: Biomass indices increased from 1996 to 2001, but decreased rapidly to a historical low 2004 to 2007. Since then there has been a gradual increase in biomass. Agreement has been reached with East Greenland on exploitation of the stock. TAC for 2013/14 is set at 20,000t (MRI 2013). ICES consider the stock to be above any potential MSY Btrigger (ICES advice 2012: http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2012/2012/ghl-grn.pdf)</p> <p>Species considered not to be within biological limits are wolffish and deepwater redfish. Wolffish is considered as a vulnerable species. These are species where the stock is declining, expected to decline or where recruitment has been declining and/or impaired. See SI c below for scoring.</p> <p>Wolffish (vulnerable): The index of fishable biomass in 2013 was close to the longterm average. However, recruitment indices at a historical low level in recent years. It is expected that the fishable stock will continue to decline due to low recruitment and that productivity of the stock will decline due to small incoming year classes. Wolffish is not considered to be within biological limits – see SI c)</p> | | |

| | | | |
|-----------------|----------------------|--|---|
| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | |
| | | <p>Deepwater redfish: (<i>Sebastes mentella</i>): http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/2013/smn-con.pdf ICES qualitative evaluation indicates a declining stock. The index of fishable biomass decreased between 2000 and 2003, and has been stable since then (MRI 2013). Other species considered as vulnerable are on either the IUCN red list or OSPAR list. Grey skate (<i>Raja Dipturus batis</i>) is considered to be depleted around Iceland and is listed as critically endangered. Vulnerable species taken as retained species in bottom trawls are dogfish (<i>Squalus acanthias</i>), mackerel shark or porbeagle (<i>Lamna nasus</i>), leafscale gulper shark (<i>Centrophorus squamosus</i>) and orange roughy (<i>Hoplostethus atlanticus</i>). These species are all on the IUCN and/or OSPAR list of vulnerable species. Stock status for these species are not known.</p> | |
| b | Guidepost | | Target reference points are defined for retained species. |
| | Met? | | No |
| | Justification | Target reference points are not defined for all retained species. | |
| c | Guidepost | If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. | If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding. |
| | Met? | Yes | Yes |

| | | | |
|---|----------------------|---|-----------|
| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | |
| | Justification | <p>Atlantic wolfish: There are measures in place that is expected to prevent the fishery from hindering recovery of the stock. These measures include a TAC and the closure of a major spawning area off West Iceland during the spawning and incubation season in autumn and winter since 2010 (Regulation 754/2010). Recruitment indices increased for last 2 years, fishing mortality has declined for the last 3 years and the fishable stock is close to average.</p> <p>Demersal Deep-sea redfish (Iceland slope stock): There are measures in place that is expected prevent the fishery from hindering recovery of the stock. These measures include reduced effort and a TAC as recommended by the MRI and ICES, and closure of nursery areas west of Iceland. The biomass index has been relatively stable since 2003.</p> <p>Both wolfish and deepwater redfish are part of the Icelandic fisheries management system. Regular stock assessments are done and they are managed by TAC and/or other measures such as temporal and/or spatial closures. All advice from the MRI has been adopted by the Ministry for setting TACs and/or other regulations for the 2013/14 quota year. The assessed fishery operates within the ITQ system and is subject to monitoring of landings and surveillance, which ensures effective management of TAC's and other measures such as area closures.</p> <p>Vulnerable species: Over the last five years, catches of grey skate from bottom trawls amounted to an average of 25t per year. Catches of other vulnerable species were 5t or less on average, with catches of Mackerel shark, leaf scale gulper shark so low that they can be considered negligible. These low catches demonstrate that the fishery is not targeting these species and therefore do not hinder recovery of these species. In addition, there are other measures in place, such as monitoring of landings, discard bans and area closures.</p> | |
| d | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery. | |
| | Met? | Yes | |
| | Justification | Stock status for most of the vulnerable species is poorly known. None of these species are targeted by the fishery, and catches for all of these species are small and considered as a bycatch in the assessed fishery. In fact, all catches except grey skate are below 5t per year on average. There are measures in place such as monitoring and verification of all catches at landing, discard bans, and areas which have been closed for decades, effectively serving as MPAs. | |
| References | | Anon 2013, ICES advice 2012; Regulation 754/2010 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Bottom trawl - Management (Retained species)

Evaluation Table for PI 2.1.2

| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
|---------------|----------------------|--|--|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing retained species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>The Fisheries Management Act requires that all catches shall be landed. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch. Masters of fishing vessels keep special log books of catch statistics (such as location, dates, gear and catch quantity) and inspectors from the Directorate of Fisheries have access to the log books.</p> <p>In addition, closure of fishing areas is an important part of the quota management system in order to protect spawning grounds and juvenile fish. These measures form a strategy to manage impact of the fishery on retained species.</p> <p>Many of the retained species are managed by the MRI through TACs and/or other appropriate measures. These include all of the species considered as main retained by weight and their management measures would be considered as a strategy at the 100 level.</p> <p>However for other vulnerable species the measures in place include monitoring of landings, spatial and/or temporal closures and bans on discards. These measures form a partial strategy at the 80 level.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | No |

| | | | | |
|-------------------|----------------------|---|---|--|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
| | Justification | <p>SG80: Most of the retained species are monitored by MRI surveys. Strategies for many of the retained species are therefore comparable to those for the target species. Information about the retained species could be directly obtained from the DF database. Information on retained species is based on landed catch and MRI surveys as well as fishermen's logbooks. Fishing efforts are limited by quota, area closures to protect undersized fish as well as and gear specific closures, minimum mesh sizes and regulated use of sorting grids. Closures, mesh size, sorting grids and minimum landing size are monitored by the Coast Guard. The availability of information about the fishery provides direct evidence that the strategy is working.</p> <p>The stock status and track record of the main retained species and many of the lesser retained species, show that the management strategy of these species is working. In addition, there are examples of species, such as cod, that recovered from very low levels under the Icelandic Fisheries Management system.</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The quota system ensures implementation of the strategy. Information from the DF database, the Coast Guard and logbook returns provide evidence that the partial strategy is being implemented successfully. The discard ban and official weighing has been in place for some decades, and studies show a decrease in discards (Pálsson et al. 2013). Area closures during spawning and closures to protect undersized fish have also been in place for decades.</p> | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |
| | Met? | | | No |
| | Justification | <p>Many of the retained species stocks are well managed through the TAC's and other measures including surveillance, verified landings, and discard bans. However, the MRI does not provide TAC advice on some of the lesser retained species which are not targeted. Therefore a score of 100 cannot be justified.</p> | | |
| e | Guidepost | It is likely that shark finning is not taking place. | It is highly likely that shark finning is not taking place. | There is a high degree of certainty that shark finning is not taking place. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>Various shark species are reported on occasion as retained species. Vessels are required to have VMS (although not video linked), and fishermen are required to land all species intact, with dockside verification of the catch. In Iceland there is a domestic market for shark flesh and sharks are landed whole. It is thus the flesh rather than the fins that is valuable.</p> | | |
| References | | Pálsson et al. 2013 | | |

| | |
|---|---|
| PI 2.1.2 | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species |
| OVERALL PERFORMANCE INDICATOR SCORE: | 85 |
| CONDITION NUMBER (if relevant): | |

Bottom trawl - Information (Retained species)

Evaluation Table for PI 2.1.3

| | | | | |
|----------------------|---|---|--|--|
| PI 2.1.3 | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | | |
| Scoring Issue | SG 60 | SG 80 | SG 100 | |
| a | Guidepost | Qualitative information is available on the amount of main retained species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery. | Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch.</p> <p>SG80: By law, all catch shall be landed and recorded by harbour officials and log books are mandatory. Therefore quantitative information on the amount of all retained species taken in the fishery is available.</p> <p>Although accurate and verifiable information is available for all retained species, the consequence for affected populations is not known in all cases.</p> | | |
| b | Guidepost | Information is adequate to qualitatively assess outcome status with respect to biologically based limits. | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: Annually the MRI conducts several types of monitoring surveys. Most of the retained species are routinely monitored through several types of surveys including ground fish-, gill net-, and shrimp surveys extending into shallow and deep waters all around Iceland. They provide relevant information that can be used to assess changes in stock indices, distribution in age and length frequency and spatial distribution. Since all main retained species (by weight) are routinely monitored, changes in stock levels can be monitored. For those species that are also monitored through recordings of landings, enough information exists for stock assessment.</p> <p>SG80: A comprehensive range of data is available for the outcome status of main retained species through MRI monitoring surveys each year. Survey data is used to evaluate changes in stock levels for TAC species and the data can also be used in this way for a number of other retained species which are not subject to TAC (Björnsson et al. 2007).</p> <p>SG100: Many of the retained species are routinely monitored during MRI surveys, which provide quality data fit for stock assessments, and information is sufficient to quantitatively estimate outcome status with a relatively high degree of certainty, if needed. However, not all retained species are part of the MRI monitoring surveys. Therefore information is not adequate in all cases.</p> | | |

| | | | | |
|---|----------------------|--|---|---|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| c | Guidepost | Information is adequate to support measures to manage main retained species. | Information is adequate to support a partial strategy to manage main retained species. | Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Information exists for stock assessments of main retained species by weight. All retained species are monitored through landing recordings.</p> <p>SG80: Monitoring of main retained species is performed during surveys and through statistical analysis of landed catch and information from logbooks. These procedures give a fair estimate of mortalities of most of the retained species and full information on fisheries removals.</p> <p>SG100: Some of the retained species are not part of the MRI monitoring surveys. Therefore, information is not adequate in all cases.</p> | | |
| d | Guidepost | | Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy) | Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG80: Monitoring of main retained species is performed during MRI surveys, through statistical analysis of landed catch and from information in logbooks. These procedures give a fair estimate of mortalities of these species and also a number of other retained species (TAC species) taken by the fishery. Monitoring of landed catches by the DF continues to be collected and information can detect any changes in risk to any of the retained species. There is a continued ban on discards and annual assessment of discard rates for the main species (see table 3.9) is carried out by the MRI (Pálsson 2013).</p> <p>SG100: Monitoring of landed catches is in place and recorded in sufficient detail to assess mortalities of all retained species within the fishery. This assumes that in this context mortality means fishery removals.</p> | | |
| References | | Björnsson et.al. 2007, Anon. 2013, Pálsson 2013 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Bottom trawl Principle 2: Bycatch Species

Bottom Trawl– Outcome (Bycatch species)

Evaluation Table for PI 2.2.1

| | | | | |
|---------------|---------------|---|---|--|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below). | Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below). | There is a high degree of certainty that bycatch species are within biologically based limits. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Bycatch species are defined as those species that are not retained but which are discarded. There is no systematic monitoring of discard in place. However, research by MRI and measurements by the DF indicate that the main discards in the Icelandic fisheries are of cod and haddock. Estimated discards of cod and haddock have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) for cod and haddock were lower than previously recorded, 0.04% of total cod landings (Pálsson et al. 2013). Since cod and haddock are the main discard in Icelandic fisheries and their estimated discard rates are very low we conclude that the scale of discarding of other species is likely to be even smaller. Therefore there are no main bycatch species in the assessed fisheries.</p> <p>SG80: Discarding is not allowed. There are several features in the fisheries management system which reduces the incentive to discard (see chapter 3.4.3 Bycatch species). It is evident that in all the assessed fisheries catches of low commercial value were landed (e.g. dogfish, sea cucumber, black scabbard-fish, ribbonfish, and mackerel shark (Tables 3.2 to 3.7). 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 mortality by the fisheries. Catches representing <0.001% of total catch landed indicate that discarding is insignificant in the assessed fisheries, or at least not reaching the level of major bycatch species (5% of the total catch).</p> | | |
| b | Guidepost | If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. | If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding. | |
| | Met? | N/A | N/A | |
| | Justification | | | |

| | | | | |
|---|----------------------|--|--|-----------|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| c | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery. | | |
| | Met? | N/A | | |
| | Justification | | | |
| References | | ICES 2011b; Jennings <i>et al.</i> 2001; Pálsson <i>et al.</i> 2013; Umhverfissráðuneytið 2011 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Bottom trawl– Management (Bycatch species)

Evaluation Table for PI 2.2.2

| | | | | |
|----------------------|------------------|---|---|---|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing and minimizing bycatch. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|---|---|--|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| | Justification | <p>SG60: The Fisheries Management Act requires that all catches shall be landed; therefore discarding is illegal. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported into a database operated by the Directorate of Fisheries. There are several measures included in the fisheries management system which should disincentive fishermen from discarding, e.g. 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 and up to 5% of the total landed catch can be classified as being of a low commercial value and is not subtracted from the quota allocated to the vessel.</p> <p>SG80: Large areas of Icelandic waters are closed for fishing in order to protect fish and habitats. The level of discarding in fisheries is assessed by MRI. Fishers are required to keep fish logbooks. An observer system is operated by the Directorate of Fisheries, both at landing sites and on board vessels. Breach of regulations leads to a warning or a fine. Repeated offenses lead to heavy fines, revocation of the vessel's license to fish and possibly a prison sentence.</p> <p>SG100: 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) (Figure 3.11), which decreases the likelihood of large catches of juvenile fish. In some areas bottom trawling is only allowed with trawls fitted with a sorting grid. Areas are usually closed for fishing by means of bottom trawl and longline because of the presence of large amounts of juvenile fish or in order to protect spawning fish, but also vulnerable benthic habitats. The Icelandic Coast Guard monitors fishing activities in Icelandic waters, e.g. via VMS, including surveillance of areas closed for fishing.</p> <p>There are strict requirements for the keeping of fish logbooks which must be made available to the Directorate of Fisheries. Following a random inspection on landings, inspectors from the Directorate of Fisheries can directly join a vessel to visit the same fishing ground the vessel visited during the previous fishing trip, in order to examine their fishing practices and compare catch composition between fishing trips. Also, the system of instant recording of landings allows use of the Directorate of Fisheries 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.</p> <p>A vessel owner which is found to have acted in breach of some regulations gets a warning and sometimes a fine. Repeated offenses lead to heavy fines, revocation of the vessel's license to fish and possibly to prison sentences.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|---|----------------------|--|---|--|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| | Justification | <p>SG60: Discarding is illegal. There are a number of measures that aim to ensure compliance with the law. Annual assessment on discarding by MRI indicates that discarding is at the least very limited.</p> <p>SG80: Following discussions with MRI, DF, the MII and the client during the site visit the assessment team concluded that there was a consensus among all parties on very low rate of discarding in the assessed fisheries. Estimated discards have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) were lower than recorded over the period 2001-2011 (Pálsson et al. 2013).</p> <p>SG100: From 2001-2010, mean cod discards were highest in the Danish seine fishery (2.70%) and in the gill net fishery (1.34%), but lower in the demersal trawl fishery (0.77%), and in the long line fishery (0.38%) (Pálsson et al. 2012). Mean haddock discards were highest in the Danish seine, (4.30%), and the demersal trawl (2.47%) fisheries, and lowest in the long line fishery (0.40%). Cod discards in all gear combined were 0.90% of landed catch (1680 tonnes), and haddock discards 2.02% (1488 tonnes).</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG80-SG100: It is evident that retained species from the assessed fisheries were landed even though they are of low commercial value (e.g. dogfish, long rough dab) (Table 4.2). This, together with the fact that the main discards in Icelandic fisheries are of cod and haddock and that MRI has estimated the discard rates of less than 1% of landings, suggests that bycatch/discarding is a minor problem in the assessed fisheries, or at least that it does not reach the level of main bycatch species (5% of the total catch). Discard studies have been in place for over 10 years with well established procedures in place by the MRI, DF and the coast guard. Therefore, the bycatch/discarding management is successfully implemented.</p> | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |
| | Met? | | | Yes |
| | Justification | <p>Assessment by the MRI indicates that the discard rates have reduced from 2001-2011 and was at its lowest in 2011.</p> | | |
| References | | Pálsson et al. 2012& 2013; Stakeholder consultation | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Bottom trawl– Information (Bycatch species)

Evaluation Table for PI 2.2.3

| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | | |
|---------------|---------------|--|---|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Qualitative information is available on the amount of main bycatch species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery. | Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: Research by MRI and measurements by the DF, including on board surveillance, indicate that the main discards in the Icelandic fisheries are of cod and haddock.</p> <p>SG100: While scientific studies indicate that discarding exists at a low level, there is no systematic monitoring of discard in place in Iceland.</p> <p>Harmonisation: The ISF cod/haddock (ISF C/H) assessment scores 100 for this PI. Scoring is not separated by SI, it is thus difficult to explain differences for each SI. However, there is a difference in the species considered. The ISF cod/haddock certifications defined bycatch species as retained species of less than 5%. For the current certification the team used the MSC definition of bycatch (CR Table AA1); and only discards are considered here. The ISF C/H assessments also do not mention the extensive discard studies done in Icelandic waters.</p> | | |
| b | Guidepost | Information is adequate to broadly understand outcome status with respect to biologically based limits | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The main discards in Icelandic fisheries are of cod and haddock and MRI has estimated the discard rate is less than 1% of landings. These facts suggest that bycatch/discarding is a minor problem in the assessed fisheries, or at least that it has not reached the level of main bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG80-100: Standardized annual groundfish surveys have been conducted by MRI since 1985 including biological sampling of large numbers of demersal fish species. This information should make it possible to estimate outcome status for a number of retained/bycatch species, but not all.</p> <p>Harmonisation: see comment in SI a.</p> | | |
| c | Guidepost | Information is adequate to support measures to manage bycatch. | Information is adequate to support a partial strategy to manage main bycatch species. | Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective. |
| | Met? | Yes | Yes | No |

| | | | |
|--|----------------------|--|---|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | |
| | Justification | <p>SG60-80: The main discards in Icelandic fisheries are of cod and haddock and MRI has estimated the discard rate is less than 1% of landings. These facts suggest that bycatch/discarding is a minor problem in the assessed fisheries, or at least that it has not reached the level of major bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG100: It can be inferred that bycatch/discarding is a minor problem in the assessed fisheries. However, since comprehensive monitoring is not in place the level of bycatch/discarding cannot be evaluated with a high degree of certainty.</p> <p>Harmonisation: see comment in SI a.</p> | |
| d | Guidepost | | <p>Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectively of the strategy).</p> <p>Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species.</p> |
| | Met? | | <p>Yes</p> <p>No</p> |
| | Justification | <p>SG80: The fishery is a part of the logbook and observer systems operated by the DF and therefore surveillance of the fishery is in operation. The Directorate's database provides instant quantitative information on landings of all retained species. The database is also used in assessment work by the MRI. Annual discard estimates by the MRI is ongoing.</p> <p>SG100: While scientific studies on discarding are ongoing, there is no systematic monitoring of discard in place in Iceland.</p> <p>Harmonisation: see comment in SI a.</p> | |
| References | | Pálsson et al. 2012& 2013; Stakeholder consultation | |
| OVERALL PERFORMANCE INDICATOR SCORE: All gear | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Bottom Trawl Principle 2: ETP Species

Bottom trawl Outcome (ETP species)

Evaluation Table for PI 2.3.1

| | | | | |
|---------------|---------------|---|--|---|
| PI 2.3.1 | | <p>The fishery meets national and international requirements for the protection of ETP species</p> <p>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species</p> | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species. | The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. | There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>None of the species caught by the fishery are included in Appendix I of CITES. Atlantic halibut (<i>Hippoglossus hippoglossus</i>) is an ETP species recognized by Icelandic authorities.</p> <p>SG60-80: On 1st January 2012 a regulation was implemented stipulating a ban on targeting halibut and demanding that fishers release all viable halibut back to the sea if caught. The effects of the fishery on the halibut stock are known through recordings of landings which operates under regulation 1164/2011 on halibut fishing.</p> <p>SG100: The ban on halibut fishing has only been recently introduced, and the effectiveness of the strategy cannot be determined yet. A decrease in total landings of halibut indicates that the ban is working. However, the survival rate of viable halibut returned to sea is not known.</p> <p>Harmonisation: ISF cod/haddock score = 100. The ISF cod/haddock certifications account for all birds and mammal bycatch in the ETP scoring, whereas in the current assessment the team defined ETP species as indicated by CR3.11.1; i.e. species recognized by national ETP legislation or species listed in CITES Appendix I.</p> | | |
| b | Guidepost | Known direct effects are unlikely to create unacceptable impacts to ETP species. | Direct effects are highly unlikely to create unacceptable impacts to ETP species. | There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species. |
| | Met? | Yes | Yes | No |

| | | | |
|---|---|--|---|
| PI 2.3.1 | <p>The fishery meets national and international requirements for the protection of ETP species</p> <p>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species</p> | | |
| | Justification | <p>SG60: The assessed saithe fishery is not targeting Atlantic halibut. The catch of halibut has decreased since the ban on targeting halibut was introduced.</p> <p>SG80: In the period 2007-2013 the landed catch of Atlantic halibut by the saithe fishery by fishing gear was 0.01 to 0.26% (Table 3.11). None of the assessed fishing gear was targeting halibut and in all gears the lowest annual catch was for the fishing year when the regulation was implemented (2011/12). Catch numbers until May 2013 indicate an even further reduction in landed catch (see Table 3.11).</p> <p>During the period 2007-2011 the landed catch of Atlantic halibut in bottom trawls decreased from 188 tonnes to 69 tonnes in 2012. The landed catch from September 2012 to May 2013 was 39 tonnes.</p> <p>The current landed catch levels indicate that direct mortality of halibut is significantly lower than it used to be. Furthermore, the figures for the period September 2012 to May 2013 (45 tonnes total landed catch) suggest that the direct fishing mortality is going down even further.</p> <p>SG100: The decline in catch of halibut in 2012-13 indicates that the fishery is complying with the regulations which ban targeting halibut. However, it has only been in operation for a short time and it remains to be seen whether it will lead to recovery of the Atlantic halibut stock.</p> <p>Harmonisation: see rationale in Scoring Issue (a) above.</p> | |
| c | Guidepost | | <p>Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.</p> <p>There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.</p> |
| | Met? | | <p>Yes</p> <p>No</p> |
| | Justification | <p>SG80: The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is not targeted and that viable specimens are released and returned to sea. However, there is no information on how much halibut was released in 2012 or its survival rate following discarding. The release mortality rate of Atlantic halibut has not been estimated. On a global scale, release mortality estimates of halibut species are highly variable, commonly ranging between 10-50% (Alverson et al. 1996; Meyer 2007).</p> <p>SG100: The release mortality rate of Atlantic halibut has not been estimated.</p> <p>Harmonisation: see rationale in Scoring Issue (a) above.</p> | |
| References | Alverson et al. 1996; Meyer 2007; Regulation 1164/2011. | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Bottom Trawl - Management (ETP species)

Evaluation Table for PI 2.3.2

| | | | | |
|----------------------|----------------------|---|---|---|
| PI 2.3.2 | | <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are <u>measures</u> in place that <u>minimise</u> mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a <u>strategy</u> in place for managing the fishery’s impact on ETP species, <u>including measures to minimise mortality</u> , which is designed to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a comprehensive strategy in place for managing the fishery’s impact on ETP species, including measures to minimise mortality, which is designed to achieve <u>above</u> national and international requirements for the protection of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: All the catch landed in Iceland must be weighed and reported. Port authorities are responsible for the correct weighing and recording of the catch. Landings are monitored by the Directorate of Fisheries. Area closure for fishing is an integrated part of the management, both for fish species and habitats. The MII issued a regulation stipulating a ban on targeting halibut and demanding fishers to release all viable halibut back to the sea if caught.</p> <p>SG80: 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 these conventions a number of mechanisms have been developed to detect and reduce impacts. For example the OSPAR has identified a number of key species and habitats which are considered threatened or declining (OSPAR Commission 2008a&b). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine species and ecosystems, and (b) protect vulnerable benthic ecosystems. The Ministry of Industries and Innovation issued regulations where a ban was set on a direct fishery for halibut and that all viable halibut must be released in other fisheries.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species). | There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved. | The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work. |
| | Met? | Yes | Yes | No |

| | | | | |
|---|---------------|--|--|--|
| PI 2.3.2 | | The fishery has in place precautionary management strategies designed to: <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| | Justification | <p>SG60: Area closure for fishing and restrictions on mesh size are an integrated part of the fishery management system, in order to reduce catch of juvenile fish (Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands). This is likely to reduce catches of juvenile halibut.</p> <p>SG80: The management strategy is enforced by the Directorate of Fisheries and Icelandic Coast Guard. Data on halibut catch will indicate whether the ban on targeting halibut is working.</p> <p>SG100: The ban on halibut fishing has not been in operation long enough to evaluate its effectiveness, since this is a long lived species.</p> | | |
| c | Guidepost | | There is evidence that the strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: A decrease in landed catches since the ban was implemented, indicates that the strategy is being successfully implemented.</p> <p>SG100: A decreasing trend in landed catch indicates modification of fishing practices. However, no study has been made on the survival rate of viable halibut when released back to sea.</p> | | |
| d | Guidepost | | | There is evidence that the strategy is achieving its objective. |
| | Met? | | | No |
| | Justification | <p>SG100: The ban on direct halibut fishing has not been in operation long enough to evaluate its effectiveness.</p> | | |
| References | | Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands, Anon. 2012a; Ministry for the Environment 2010;OSPAR Commission 2008a&b | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Bottom Trawl - Information (ETP species)

Evaluation Table for PI 2.3.3

| | | | | |
|----------------------|----------------------|--|--|--|
| PI 2.3.3 | | <p>Relevant information is collected to support the management of fishery impacts on ETP species, including:</p> <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Information is sufficient to qualitatively estimate the fishery related mortality of ETP species. | Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species. | Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery. The Atlantic halibut stock is monitored annually by the MRI. The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is released from the fishery and back to sea. No direct estimate on release mortality rate is available for Atlantic halibut.</p> <p>SG80: Quantitative information on the amount of viable halibut released from the fishery and back to sea and its survival rate is not available. Although, release numbers and - mortalities cannot be directly determined, full information is available on landings of halibut for all gears in the fishery.</p> <p>SG100: Information available for halibut includes survey data, catch composition and age/length data. This information can be regarded as sufficient to determine the stock status relative to reference point.</p> | | |
| b | Guidepost | Information is adequate to broadly understand the impact of the fishery on ETP species. | Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. | Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut.</p> <p>SG80: Historically, halibut has mainly been taken as bycatch (retained species) in the bottom trawl and longline fisheries in Iceland, and catch by other gear is relatively insignificant. In recent years the proportional catch by bottom trawl has decreased and the majority of the landed halibut catch has been by longline (Figure 3.29). Since 2000 the main fishing grounds of halibut have been on the Reykjanes ridge and NW of the ridge (Figure 3.29). In the same area bottom trawling is prohibited the whole year or part of the year (Figure 3.11). Since the ban on targeting halibut was introduced the landed catch has decreased considerably (Table 3.12).</p> <p>SG100: The DF database provides quantitative information on retained species taken by the assessed fishery. However, quantitative information on the amount of halibut released following the issuing of the ban on targeting halibut is not available and nor is the survival rate of discarded halibut. Therefore, not all mortalities can be accounted for and hence not the magnitude of all impacts.</p> | | |

| | | | | |
|---|----------------------|--|---|---|
| PI 2.3.3 | | Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • 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. | | |
| c | Guidepost | Information is adequate to support measures to manage the impacts on ETP species. | Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species. | Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut. The halibut stock status is monitored by the MRI and used to be managed by TAC.</p> <p>SG80: Data from the DF and the MRI are used to assess the stock status and trends in the catches and biomass index for Atlantic halibut. The information is sufficient to measure the response of the depleted halibut stock and to evaluate whether the stock will recover following the ban on halibut target fisheries.</p> <p>SG100: Information on the amount of released viable halibut and its survival rate is lacking. Therefore, it cannot be evaluated with a high degree of certainty whether the strategy is achieving its objectives.</p> | | |
| References | | Alverson et al. 1996; Umhverfissráðuneytið 2011 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Bottom trawl Principle 2: Habitat

Bottom trawl – Outcome (Habitat)

Evaluation Table for PI 2.4.1

| | | | | |
|---|------------------|---|---|--|
| PI 2.4.1 | | The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. |
| | Met? | Yes | No | No |
| | | <p>SG60: Evidence of detrimental impact on cold water corals by towed fishing gears has been compiled through scientific mapping (using ROV technique; Ministry of Fisheries 2004, Ólafsdóttir & Burgos 2012). The Fisheries Management Act provides a strategy and based on the act and scientific evidence, coral areas have been closed, and it can be expected that more coral areas will be closed in the future as MRI continues its research project on the mapping of these habitats. These measures are likely to prevent bottom trawling from doing further serious or irreversible harm to cold water corals. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aims to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>In the past, the bottom trawl fishery has reduced coral habitat structure and the present fishing patterns of the saithe fishery overlap with vulnerable habitats of corals and aggregation of large sponges. Coral areas have been closed which will prevent further damage to such biogenic habitats. However, comparable efforts to protect other biogenic habitats, i.e. aggregation of large sponges, are not planned. In addition, no recording of benthic bycatch is in place. A single contact by the bottom trawl has a significant impact on corals and sponges, both of 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 a score of 80 is not achieved for bottom trawl.</p> <p>Harmonisation: IGP score = 90. ISF cod/haddock certifications centre on general assumptions that habitat has been damaged a long time ago and that current fishing patterns are fairly well established, thus resulting in a “new, but well established, baseline habitat”. The current assessment team explicitly considers known vulnerable habitats such as corals and large sponge aggregations or “ostur”. Unlike corals; large sponge aggregations are not protected by closed areas, and fishing areas overlap with some of the recorded mass occurrences of sponges.</p> | | |
| References | | Anon. 2004; Ball <i>et al.</i> 2000; Garcia <i>et.al.</i> 2006; Jennings <i>et al.</i> 2001; Ministry of the Environment 2010; Ministry of Fisheries 2004; OSPAR Commission2008a&b; Thórarinsdóttir et al. 2010; Ólafsdóttir & Burgos 2012; Steingrímsson & Einarsson 2004 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 60 |
| CONDITION NUMBER (if relevant): | | | | 4 |

Bottom trawl – Management (Habitat)

Evaluation Table for PI 2.4.2

| | | | | |
|----------------------|----------------------|--|---|---|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. | There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. | There is a strategy in place for managing the impact of the fishery on habitat types. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: In Icelandic waters, large areas are closed for fishing, some of them temporarily (hours per day, days or seasonal) and others permanently (years) which also protects bottom habitats from being damaged by fishing activities (Figure 3.11). The Icelandic Coast Guard monitors fishing activities in Icelandic waters in real time through VMS, including surveillance of areas closed for fishing.</p> <p>SG80: 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 Commission 2008 a&b).</p> <p>SG 100: Ten coral areas with <i>L. pertusa</i> off S and SE Iceland have been closed for all fisheries using bottom contact gear (Ólafsdóttir & Burgos 2012). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine ecosystems, and (b) protect vulnerable benthic ecosystems.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats). | There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved. |
| | Met? | Yes | Yes | No |

| | | | |
|---|----------------------|--|---|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | |
| | Justification | <p>SG60: Area closure for fishing is an integrated part of the fishery management system, in order to reduce catch of juvenile and spawning fish. This measure has a secondary effect, i.e. protecting bottom habitats. Furthermore, Act 97/1997 (“um veiðar í fiskveiðilandhelgi Íslands”) also allows managers to close vulnerable habitats for fishing. Several vulnerable habitats areas have been closed for fishing.</p> <p>SG80: The management strategy is enforced by the Icelandic Coast Guard including vulnerable habitat areas which are closed for fishing. Operation of all Icelandic fishing vessels is monitored by VMS and MRI has access to electronic logbooks for scientific purposes (high resolution data). During a site visit the DF confirmed that no vessel has violated the closure of coral areas.</p> <p>SG100: The effectiveness of habitat area closures has not been evaluated, therefore clear evidence cannot be provided that the strategy is successfully implemented and is achieving its objectives.</p> | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. |
| | Met? | | Yes |
| | Justification | <p>SG 80: The Icelandic Coast Guard is responsible for law enforcement at sea and monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing.</p> <p>SG100: Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). One of the key strategies is intended to protect vulnerable benthic ecosystems. Ten coral areas off SE Iceland have been closed for all fisheries using bottom contact gear based on the Act 97/1997 (Ólafsdóttir & Burgos 2012).</p> | |
| d | Guidepost | | There is some evidence that the strategy is achieving its objective. |
| | Met? | | Yes |
| | Justification | The significance of closed areas off Iceland in protecting juvenile cod has been evaluated. It provides evidence that closures of nursery grounds can be useful in protecting immature cod (Schopka et.al. 2010). | |
| References | | Anon. 2012a; Act 97/1997; Ministry for the Environment 2010; OSPAR Commission 2008a&b; Ólafsdóttir & Burgos 2012; Schopka et al. 2010 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 95 |
| CONDITION NUMBER (if relevant): | | | |

Bottom trawl – Information (Habitat)

Evaluation Table for PI 2.4.3

| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
|---------------|---------------|--|---|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There is basic understanding of the types and distribution of main habitats in the area of the fishery. | The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery. | The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG 60-80: The BIOICE programme has provided basic inventory of benthic fauna within the Icelandic territorial waters (Figure 3.6). Benthic samples have been collected from a variety of habitats, ranging widely in depth (<100 to 3100 m) and in temperature conditions (12° to -0.9°C). Also, the Marine Research Institute (MRI) has identified areas of vulnerable benthic habitats in Icelandic waters (cold water corals, areas with aggregation of large sponge, maerl beds; Figures 3.7-3.10) in relation to bottom trawl fishing activities (Steingrímsson & Einarsson 2004, Garcia et al. 2006). MRI is currently carrying out research programmes in order to map benthic habitats in Icelandic waters (biology and geology, using multibeam echo sounder), including mapping cold water corals (<i>Lophelia pertusa</i>) and studying the interaction between fish and cold water coral habitats (CoralFISH project, http://www.eu-fp7-coralfish.net/).</p> <p>Through VMS there is detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats.</p> <p>SG 100: Information is available on the distribution of invertebrate species and habitats in Icelandic waters together with data on important environmental parameters. The distribution of main vulnerable habitats in Icelandic waters has been documented and the detail of knowledge is at a relevant scale. The habitat mapping by MRI is ongoing, together with studies on the ecological function of vulnerable habitats (e.g. CoralFISH).</p> | | |
| b | Guidepost | Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. | Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear. | The physical impacts of the gear on the habitat types have been quantified fully. |
| | Met? | Yes | Yes | No |

| | | | |
|---|----------------------|---|--|
| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | |
| | Justification | <p>SG 60: Evidence of detrimental impact on cold water corals by <u>towed fishing gears</u> have been compiled through scientific mapping using ROV techniques (Ministry of Fisheries 2004, Ólafsdóttir & Burgos 2012). There is good knowledge on the distribution of the different fisheries in assessment which can be used to indicate if and where it overlaps with vulnerable habitats.</p> <p>SG 80: Through VMS there is detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. The VMS data is available for scientific purposes. Information is available on the distribution of invertebrate species and habitats in Icelandic waters. Therefore, there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear under assessment.</p> <p>SG 100: Studies on the impact of Danish seine and otter trawl on soft bottom benthic communities are available (Ragnarsson & Lindegarth 2009, Thórarinsdóttir et al. 2010). Also, evidence of detrimental impact on cold water corals by bottom trawling have been collected (Steingrímsson & Einarsson 2004, Ólafsdóttir & Burgos 2012). However, impacts on vulnerable habitats have not been quantified fully.</p> | |
| c | Guidepost | Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | Changes in habitat distributions over time are measured. |
| | Met? | Yes | No |
| | Justification | <p>SG80: The area coverage of the assessed fisheries is monitored through logbooks and VMS, thus their spatial distribution is known in relation to vulnerable habitats. The habitat mapping by MRI is ongoing together with studies on the ecological function of vulnerable habitats (e.g. the CoralFISH project).</p> <p>SG100: The MRI research program aims to map benthic habitats in Icelandic waters but is not aimed at measuring changes in habitat distribution over time.</p> | |
| References | | Bell <i>et al.</i> 2000; Eiríksson 1993; Garcia <i>et al.</i> 2006; Jennings <i>et al.</i> , 2001; Ministry of Fisheries 2004; Ólafsdóttir & Burgos 2012; Ragnarsson & Lindegarth 2009; Steingrímsson & Einarsson 2004; Jennings et al. 2001; Thórarinsdóttir et al. 2010 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 85 |
| CONDITION NUMBER (if relevant): | | | |

Bottom Trawl Principle 2: Ecosystem

Bottom trawl – Outcome (Ecosystem)

Evaluation Table for PI 2.5.1

| | | | |
|----------------------|--|-------|--------|
| PI 2.5.1 | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function | | |
| Scoring Issue | SG 60 | SG 80 | SG 100 |

| | | | | |
|-------------------|----------------------|---|--|---|
| PI 2.5.1 | | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function | | |
| a | Guidepost | The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: Extensive studies on the feeding ecology of a large number of demersal fish species, marine mammals and seabirds have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic marine ecosystems. Cod is a major fish predator in the marine ecosystems around Iceland, which mainly prey on capelin and shrimp (<i>Pandalus borealis</i>).</p> <p>Saithe preys on pelagic prey items, typically capelin (<i>Mallotus villosus</i>) and krill (Euphausiacea).</p> <p>None of the assessed fisheries is likely to affect key ecosystem species to a point where there would be a serious or irreversible harm.</p> <p>SG80-100: Saithe is not considered to be a key prey species in the Icelandic ecosystem, and preys on pelagic items, typically capelin and krill.</p> <p>Cod is one of the main predators in Icelandic waters. In all of the assessed fishing gear, cod was one of the main retained species. It contributed approximately 50-70% to the total catch in the assessed gillnet, handline and longline fisheries but less in bottom trawl, Danish seine and Nephrops trawl (around 30%). The stock biomass of cod has been increasing and is now larger than observed in the last three decades, which is believed to be the result of a decrease in harvest rate. None of the other retained species are considered as key species in the ecosystem of Icelandic waters. Also, the assessed fisheries do not directly affect the most important prey species in the ecosystem, capelin. There is evidence that the main driving factor for ecosystem change in Icelandic waters is abiotic (Valdimarsson <i>et.al.</i> 2012).</p> <p>Cod has been shown to directly affect the biomass of (offshore) shrimp population (<i>Pandalus borealis</i>). This is currently taken into account in the MRI assessments (using GADGET models) as has the effect of the capelin on cod growth (using regression models). All of these models indicate that the cod fishery as a whole has negligible negative effects. If the fishery, targeting the key ecosystem predator in Icelandic waters is not having a significant impact it is unlikely that the saithe fishery will. The assessed fishery is highly unlikely to disrupt any key elements of the ecosystem structure or function.</p> <p>Saithe is commonly associated with deep water coral reefs and they appear to be an important part of the ecosystem surrounding the species.</p> <p>Available evidence indicates that bottom trawling has demolished several relatively large coral areas and direct observation with Remote Operated Vehicles (ROV) has revealed damage to existing coral reefs of <i>Lophelia pertusa</i>, which is linked to bottom trawling. However, the level of the importance of deep water corals in the demography of fish populations and communities has not been demonstrated. Known coral areas where the fishery is operating have been closed to fishing.</p> <p>The DF database provides relatively good evidence that none of the assessed fisheries catch key ecosystem species. The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure.</p> | | |
| References | | Anon. 2010; Anon. 2012b; Anon. 2011b; Astthorsson et al. 2007; Auster 2005; Barbaro et al. 2008; Foley et.al 2010; Garcia et al. 2006; Jaworski & Ragnarsson 2006; Jónsson 1997; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson 1997; Stefánsson 2003; | | |

| | |
|---|---|
| PI 2.5.1 | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function |
| | Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Valdimarsson <i>et.al.</i> 2012; Vilhjálmsón 2002. |
| OVERALL PERFORMANCE INDICATOR SCORE: | |
| | 100 |
| CONDITION NUMBER (if relevant): | |
| | |

Bottom trawl – Management (Ecosystem)

Evaluation Table for PI 2.5.2

| | | | | |
|----------------------|---|--|---|--|
| PI 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | | |
| Scoring Issue | SG 60 | SG 80 | SG 100 | |
| a | Guidepost | There are measures in place, if necessary. | There is a partial strategy in place, if necessary. | There is a strategy that consists of a plan, in place. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The DF database would provide evidence if the assessed fisheries were to catch a significant amount of key ecosystem species.</p> <p>SG80-100: Key ecosystem fish species (e.g. capelin and cod) are subject to the quota system, as is saithe. Large areas are closed for fishing in Icelandic waters in order to protect juvenile fish or spawning fish but also vulnerable habitats. These closures are stipulated in the Fisheries Management Act. 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. There is a strategy with a plan, if it so happened that the saithe fishery should pose a risk or harm to ecosystem structure and function (Ministry of the Environment 2010).</p> | | |
| b | Guidepost | The measures take into account potential impacts of the fishery on key elements of the ecosystem. | The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. | The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|---|--|--|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | |
| | Justification | <p>SG60-80: The DF database would provide evidence if the assessed fisheries were to catch significant amounts of key ecosystem species. 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. MRI is monitoring key elements of the ecosystem and the monitoring would indicate if fisheries are having impact on key elements of the ecosystem.</p> <p>The MRI carries out wide ranging and extensive research on the status and productivity of the 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 the fish stocks (e.g. Anon. 2011a, Anon. 2012a). 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 aims protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>SG100: General measures include monitoring the status of the key ecosystem elements in Icelandic waters (e.g. the capelin stock). In addition, routine monitoring includes biological sampling from catches, which also include non-commercial catch information, as well as verification of log-book records. Capelin and some other key ecosystem species are regulated by TAC. The quota system has been demonstrated to work. Impacts are e.g. restrained by TAC, and area closure in addition to surveillance by the Directorate of Fisheries and Icelandic Coast Guard. Inspectors may accompany fishing vessels on voyages or board 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. Cases of serious or repeated deliberate violation shall furthermore be liable to imprisonment for up to six years. 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 aims to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> | | |
| c | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved. |
| | Met? | Yes | Yes | Yes |

| | | | |
|-------------------|----------------------|--|---|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | |
| | Justification | <p>SG60: There is evidence that the monitoring and surveillance by the DF and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing licenses.</p> <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. The measures are considered highly likely to work.</p> <p>SG 100: Closure of coral areas to fishing off South Iceland, demonstrates that measures to protect the ecosystem are in place and implemented successfully. 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 aim to protect vulnerable benthic ecosystems. (Ministry for the Environment 2010).</p> <p>The fishery has no demonstrable effects on key predator or prey species. If such effects were discovered they would be mitigated with available measures, such as the quota system and area closures. Inspectors may accompany fishing vessels on voyages or board vessels to check their cargo and fishing gear. 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. Violations of the provisions of the Fisheries Management Act are liable to fines, regardless of whether committed deliberately or through negligence. Cases of serious or repeated deliberate violation are liable to imprisonment for up to six years. Violation of the act has resulted in penalties (DF site visit).</p> | |
| d | Guidepost | There is some evidence that the measures comprising the partial strategy are being implemented successfully. | There is evidence that the measures are being implemented successfully. |
| | Met? | Yes | Yes |
| | Justification | <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. There is evidence that the monitoring and surveillance by the Directorate of Fisheries and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing license.</p> <p>SG 100: The strategy is provided by the Fisheries Management Act and government policies. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>Measures have been implemented successfully, including area closures (fish and habitats), fishing bans (Atlantic halibut), discard bans, and ongoing work to increase the awareness of DF observers to bycatch of birds and mammals.</p> <p>Long-term changes in trophic patterns of Icelandic cod demonstrate the importance of capelin, northern shrimp, and euphausiids in the diet of the key fish predator in the ecosystem; cod (Pálsson & Björnsson 2011). Capelin and some other key ecosystem species are regulated by TAC and their importance in the ecosystem is accounted for in management strategies (e.g. Stefánsson 2003, Anon. 2013).</p> | |
| References | | Anon. 2010; Anon. 2012b; Anon. 2011b; Anon. 2013; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Ministry of the Environment 2010; Pálsson 1997; Schopka <i>et.al.</i> 2010; Stefánsson 2003; | |

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| PI 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function |
| | Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. |
| OVERALL PERFORMANCE INDICATOR SCORE: | |
| | 100 |
| CONDITION NUMBER (if relevant): | |
| | |

Bottom trawl – Information (Ecosystem)

Evaluation Table for PI 2.5.3

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|---------------|---------------|---|--|---|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity). | Information is adequate to broadly understand the key elements of the ecosystem. | |
| | Met? | Yes | Yes | |
| | Justification | <p>SG60: Extensive studies have been conducted on the marine ecosystems of Icelandic waters (e.g. Astthorsson <i>et al.</i> 2007, Valdimarsson & Jónsson 2007). Studies on the feeding ecology of a large number of fish species, marine mammals and seabirds has provided information on the ecological function of most of the species caught by the assessed fisheries. These studies have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic waters ecosystems (Marine Research Institute 1997). Biomass estimates for stocks of fish, whales and seabirds in Icelandic waters and production estimates of <i>Calanus finmarchicus</i> and other zooplankton species have been used to calculate the biomass of individual components in the Icelandic marine ecosystem (Astthorsson <i>et al.</i> 2007).</p> <p>SG 80: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters, and this information is used in multi species modelling (GADGET models; e.g. Stefánsson & Pálsson 1998, Stefánsson 2003) for MRI assessments. The models have been used to evaluate interactions between fisheries and key ecosystem elements. Information about these interactions has been taken into account for management purposes.</p> | | |
| b | Guidepost | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail. | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail. | Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated. |
| | Met? | Yes | Yes | Yes |

| | | | |
|-----------------|----------------------|--|--|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| | Justification | <p>SG60: Saithe is not a key ecosystem species and mainly preys on invertebrates. The DF database provides detailed information on catches of target and retained species. This provides information about the impact of the assessed fishery on the populations involved and would provide evidence of impact if any key ecosystem species occur.</p> <p>SG80: The main impacts of the fishery on key elements of the ecosystem such as key predators, prey and vulnerable habitats can be inferred. Information on mortality of key predators and prey is known and recorded (retained species).</p> <p>The DF database provides detailed information on catches of target and retained species (bycatch/discard is considered not significant). This provides information about the impact of the assessed fisheries on the populations involved.</p> <p>Information on vulnerable habitats in Icelandic waters has been documented, including the coral <i>Lophelia pertusa</i>. The MRI has mapped the distribution of coral areas in relation to fishing efforts by bottom trawling and has gathered evidence of impacts caused by such fishery. Coral areas have been closed, based on this evidence, and it can be expected that more coral areas will be closed in the future, as the MRI continues its research project on the mapping of the habitats. The mapping will also support the recent strategic plan for the preservation of biodiversity in Icelandic waters. Furthermore, information on high catches of juvenile fish, gathered through the DF surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries.</p> <p>SG100: There is detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats. Evidence of detrimental impact on cold water corals by towed fishing gears have been compiled through scientific mapping (using ROV technique; Ministry of Fisheries 2004).</p> | |
| c | Guidepost | The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known. | The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood. |
| | Met? | Yes | Yes |
| | Justification | <p>SG80: The effect of the fishery on the target and the retained species are assessed annually. Bycatch is on a relatively small scale (see rationale for scoring bycatch). The feeding ecology of a number of demersal fish species has been documented, providing information on the ecological function of most of the species caught by the assessed fisheries. Information on vulnerable habitats in Icelandic waters has also been documented, including the coral <i>Lophelia pertusa</i>. The MRI has mapped the distribution of coral areas in relation to fishing efforts by otter trawling and has gathered evidence of impacts caused by fishing activities. The importance of vulnerable habitats known to occur in Icelandic waters is generally understood (e.g. <i>Lophelia</i> reefs, sponge aggregations).</p> <p>SG100: The DF database provides quantitative information on retained species taken by the assessed fishery. There is good knowledge on the distribution of the different fisheries which can be used to indicate if and where it overlaps with vulnerable habitats. There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters (e.g. Astthorsson <i>et.al.</i> 2007; Marine Research Institute 1997; Stefánsson & Pálsson 1998; Stefánsson 2003; Valdimarsson & Jónsson 2007). Saithe is not a key ecosystem species.</p> | |

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|-----------------|----------------------|---|---|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| d | Guidepost | Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred. | Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred. |
| | Met? | Yes | Yes |
| | Justification | <p>SG 80: Sufficient information is available on retained species, bycatch and catch of ETP species through log books, and monitoring of landings. Distribution of fishing in relation to vulnerable habitats is known. This information base is sufficient for inferring main consequences of fishing.</p> <p>SG100: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters. There is also detailed information on the catches taken from the system and spatial overlap of the fisheries with vulnerable habitats. This information base is sufficient for inferring main consequences of fishing.</p> | |
| e | Guidepost | Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | Information is sufficient to support the development of strategies to manage ecosystem impacts. |
| | Met? | Yes | Yes |
| | Justification | <p>SG 80: Data on individual landed catch is instantly entered in the DF database. The surveillance system carried out by the DF and the Coast Guard is constantly monitoring catch levels of juvenile fish and MRI provides information on the need for measures in order to reduce impacts by fisheries. All this information is used for implementing protection measures (e.g. area closure) if the management considers it necessary. The MRI also monitors and manages a large number of species and has for decades monitored environmental conditions in the Icelandic waters. Therefore any potential threats or adverse trends can be quickly identified and responded to.</p> <p>SG100: The strategy is provided by the Fisheries Management Act. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and which aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010). Coral areas have been closed, based on scientific evidence, and it can be expected that more coral areas will be closed in the future, as MRI continues its research project on the mapping of the habitats.</p> <p>Information on high catches of juvenile fish, gathered through the DF surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries. Actions which are considered necessary in order to improve species recruitment (e.g. closure of spawning areas) are based on research information by MRI and its recommendations. This also applies to closure of coral areas, which are based on scientific evidence, and it can be expected that more coral areas will be closed in the future, as MRI continues research on the mapping of the habitats, their relationship with fisheries and other relevant environmental data. Collectively this information is sufficient to support development of strategies to manage ecosystem impacts.</p> | |

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|---|---|------------|
| PI 2.5.3 | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| References | Anon. 2010; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson1997; Stefánsson 2003; Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thórarinsdóttir et al. 2010; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | 100 |
| CONDITION NUMBER (if relevant): | | |

Danish seine Principle 2: Retained species

Danish seine - Outcome (Retained species)

Evaluation Table for PI 2.1.1

| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | | |
|---------------|---------------|---|---|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below). | Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below). | There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points. |
| | Met? | Yes | Yes | No |
| | Justification | <p>The following main retained species as defined by weight (>5%) are retained by Danish seines: cod, golden redfish, haddock, and plaice. All can be said to be highly likely to be within biologically based limits.</p> <p>Atlantic cod: The reference biomass (age 4+) in 2013 is estimated as 1,170,000t and the spawning stock as 480,000t, compared to Blim=125 and Btrigger=220 thousand t (Anon 2013). Fishing mortality has declined significantly in the last decade and is presently at a historical low; below likely candidates for Fpa and Flim (Anon. 2012, ICES 2012a).</p> <p>Golden Redfish: Current biomass index is 2x the TRP of Upa and 5x the LRP of Ulim and the stock is highly likely to be within biological limits.</p> <p>Haddock: The spawning stock was estimated to be 90,000t and fishable stock (age 3+) at 120,000t. The harvest rate in 2012 was 42%. SSB is above the Blim of 45,000t. The MRI predicts that the stock size of haddock will decrease in coming years and there is some risk of the spawning stock falling below the historical minimum (Blim=45,000 tonnes) in 2014–2015.</p> <p>Plaice: Mainly caught by Danish seine in shallow water. Biomass has been increasing since 2000 and F has been decreasing, while recruitment (3yr old fish) has been low but stable for the last 10 years. Survey indices have increased somewhat in recent years, and recruitment measurements from the groundfish survey suggest some improvement in the last few years. Given that recruitment remains at recent level, fishing mortality is close to FMSY.</p> <p>Wolffish is also considered as a main retained species since it is valuable as well as vulnerable and is not considered to be within biologically based limits (See SI c below). The index of fishable biomass in 2013 was close to the longterm average. However, recruitment indices were at a historically low level in recent years. It is expected that the fishable stock will continue to decline due to low recruitment and that productivity of the stock will decline due to small incoming year classes.</p> <p>Other species considered as vulnerable are on either the IUCN red list or the OSPAR list.</p> <p>Grey skate (<i>Raja Dipturus batis</i>) is considered to be depleted around Iceland and is listed as critically endangered. Other vulnerable species retained by Danish seine are dogfish (<i>Squalus acanthias</i>), and mackerel shark. Stock status for these species is not known.</p> | | |
| b | Guidepost | | | Target reference points are defined for retained species. |
| | Met? | | | No |

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|---|----------------------|---|---|-----------|
| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | | |
| | Justification | Target reference points are not defined for all retained species. | | |
| c | Guidepost | If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. | If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding. | |
| | Met? | Yes | Yes | |
| | Justification | <p>Atlantic wolfish: There are measures in place that is expected prevent the fishery from hindering recovery of the stock. These measures include a TAC and the closure of a major spawning area off West Iceland during the spawning and incubation season in autumn and winter since 2010 (Regulation 754/2010). Recruitment indices increased for last 2 years, fishing mortality has declined for the last 3 years and the fishable stock is close to average.</p> <p>Wolfish is part of the Icelandic fisheries management system, regular stock assessments are done and the stock is managed by TAC and/or other measures such as temporal and/or spatial closures. All advice from the MRI has been adopted by the Ministry for setting TACs and/or other regulations for the 2013/14 quota year. The assessed fishery operates within the ITQ system and is subject to monitoring of landings and surveillance, which ensures effective management of TAC's and other measures such as area closures.</p> <p><u>Vulnerable species:</u> Over the last five years, catches of grey skate from Danish seine amounted to an average of 32t per year. Catches of dogfish was 6t and catches of Mackerel shark was 0.1t. These low catches demonstrate that the fishery is not targeting these species and therefore do not hinder recovery of these species. In addition, there are other measures in place, such as monitoring of landings and area closures.</p> | | |
| d | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery. | | |
| | Met? | Yes | | |
| | Justification | Stock status for most of the vulnerable species is poorly known. None of these species are targeted in the fishery and catches for all of these species are small and considered as a bycatch in the assessed fishery. In fact all catches except grey skate are below 6t per year on average. There are measures in place such as monitoring and verification of all catches at landing, discards bans, and areas which have been closed for decades having a secondary effect of serving as MPAs. | | |
| References | | Anon. 2013, ICES advice 2012; Regulation 754/2010. | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |

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|--|---|
| PI 2.1.1 | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species |
| CONDITION NUMBER (if relevant): | |

Danish seine - Management (Retained species)

Evaluation Table for PI 2.1.2

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|----------------------|----------------------|--|--|--|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing retained species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>The Fisheries Management Act requires that all catches shall be landed. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch. Masters of fishing vessels shall keep special log books of catch statistics (such as location, dates, gear and catch quantity) and inspectors from the Directorate of Fisheries have access to the log books.</p> <p>In addition, closure of fishing areas is an important part of the quota management system in order to protect spawning grounds and juvenile fish. These measures form a strategy to manage impact of the fishery on retained species.</p> <p>Many of the retained species are managed by the MRI through TACs and/or other appropriate measures. These include all of the species considered as main retained by weight and management measures would be considered as a strategy at the 100 level.</p> <p>However for other vulnerable species the measures in place include monitoring of landings, spatial and/or temporal closures and bans on discards. These measures form a partial strategy at the 80 level.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | No |

| | | | | |
|-------------------|----------------------|--|---|--|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
| | Justification | <p>SG80: Most of the retained species are monitored by MRI surveys. Strategies for many of the retained species are therefore comparable to those for the target species. Information about the retained species could be directly obtained from the DF database. Information on retained species is based on landed catch and MRI surveys as well as fishermen's logbooks. Fishing efforts are limited by quota, area closures to protect undersized fish, gear specific area closures, minimum mesh size and regulated use of sorting grids. Closures, mesh size, sorting grids and minimum landing size are monitored by the Coast Guard. The availability of information about the fishery provides evidence that the strategy is working.</p> <p>The stock status and track record of the main retained species and many of the lesser retained species, show that the management strategy of these species is working. In addition, there are examples of species, such as cod, recovering from very low levels under the Icelandic Fisheries Management system.</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The quota system ensures implementation of the strategy. Information from the DF database, the Coast Guard and the logbook returns provide evidence that the partial strategy is being implemented successfully. The discard ban and official weighing has been in place for some decades. Discards have been decreasing (Pálsson et al. 2013). Area closures during spawning and closures to protect undersized fish have also been in place for decades.</p> | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |
| | Met? | | | No |
| | Justification | <p>Many of the retained species stocks are well managed through the TAC's and other measures including surveillance, verified landings, and discard bans. However, the MRI does not provide TAC advice on some of the lesser retained species which are not targeted. Therefore a score of 100 cannot be justified.</p> | | |
| e | Guidepost | It is likely that shark finning is not taking place. | It is highly likely that shark finning is not taking place. | There is a high degree of certainty that shark finning is not taking place. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>Various shark species are reported on occasion as retained species. Vessels are required to have VMS (although not video linked), and fishermen are required to land all species intact, with dockside verification of the catch. In Iceland there is a domestic market for shark flesh and sharks are landed whole. It is thus the flesh rather than the fins that is valuable.</p> | | |
| References | | Pálsson et al. 2013 | | |

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| PI 2.1.2 | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species |
| OVERALL PERFORMANCE INDICATOR SCORE: | 85 |
| CONDITION NUMBER (if relevant): | |

Danish seine - Information (Retained species)

Evaluation Table for PI 2.1.3

| | | | | |
|----------------------|---|---|--|--|
| PI 2.1.3 | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | | |
| Scoring Issue | SG 60 | SG 80 | SG 100 | |
| a | Guidepost | Qualitative information is available on the amount of main retained species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery. | Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch.</p> <p>SG80: By law, all catch shall be landed and recorded by harbour officials and log books are mandatory. Therefore quantitative information on the amount of all retained species taken in the fishery is available.</p> <p>Although accurate and verifiable information is available for all retained species, the consequence for affected populations is not known in all cases.</p> | | |
| b | Guidepost | Information is adequate to qualitatively assess outcome status with respect to biologically based limits. | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: Annually the MRI conducts several types of monitoring surveys. Most of the retained species are routinely monitored through several types of surveys (ground fish-, gill net-, and shrimp surveys extending into shallow and deep waters all around Iceland) conducted by MRI each year. They provide relevant information that can be used to assess changes in stock indices, distribution in age and length frequency and spatial distribution. As all main retained species (by weight) are routinely monitored, changes in stock levels can be monitored. For those species that are also monitored through recordings of landings, enough information exists for stock assessment.</p> <p>SG80: A comprehensive range of data is available for the outcome status of main retained species through MRI monitoring surveys each year. Survey data is used to evaluate changes in stock levels for TAC species and the data can also be used in this way for a number of other retained species which are not subject to TAC (Björnsson et al. 2007).</p> <p>SG100: Many of the retained species are routinely monitored during MRI surveys, which provide quality data fit for stock assessments, and information is sufficient to quantitatively estimate outcome status with a relatively high degree of certainty, if needed. However, not all retained species are part of the MRI monitoring surveys. Therefore information is not adequate in all cases.</p> | | |

| | | | | |
|---|----------------------|--|---|---|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| c | Guidepost | Information is adequate to support measures to manage main retained species. | Information is adequate to support a partial strategy to manage main retained species. | Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Information exists for stock assessments of main retained species by weight. All retained species are monitored through landing recordings.</p> <p>SG80: Monitoring of main retained species is performed during surveys and through statistical analysis of landed catch and information from logbooks. These procedures give a fair estimate of mortalities of most of the retained species and full information on fisheries removals.</p> <p>SG100: Some of the retained species are not part of the MRI monitoring surveys. Therefore, information is not adequate in all cases.</p> | | |
| d | Guidepost | | Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy) | Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG80: Monitoring of main retained species is performed during MRI surveys, through statistical analysis of landed catch and from information in logbooks. These procedures give a fair estimate of mortalities of these species and also a number of other retained species (TAC species) taken by the fishery. Monitoring of landed catches by the DF continues to be collected and information can detect any changes in risk to any of the retained species. There is a continued ban on discards and annual assessment of discard rates for the main species (see table 3.9) are carried out by the MRI (Pálsson 2013).</p> <p>SG100: Monitoring of landed catches is in place and recorded in sufficient detail to assess mortalities of all retained species within the fishery. This assumes that in this context mortality means fishery removal.</p> | | |
| References | | Björnsson et.al. 2007, Anon. 2013, Pálsson 2013 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Danish seine Principle 2: Bycatch Species

Danish seine– Outcome (Bycatch species)

Evaluation Table for PI 2.2.1

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|-----------------|---|
| PI 2.2.1 | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups |
|-----------------|---|

| | | | | |
|----------------------|----------------------|---|---|--|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below). | Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below). | There is a high degree of certainty that bycatch species are within biologically based limits. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Bycatch species are defined as those species that are not retained but which are discarded. There is no systematic monitoring of discard in place. However, research by MRI and measurements by the DF indicate that the main discards in the Icelandic fisheries are of cod and haddock. Estimated discards of cod and haddock have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) for cod and haddock were lower than previously recorded, 0.04% of total cod landings (Pálsson et al. 2013). Since cod and haddock are the main discard in Icelandic fisheries and their estimated discard rates are very low we conclude that the scale of discarding of other species is likely to be even smaller. Therefore there are no main bycatch species in the assessed fisheries.</p> <p>SG80: Discarding is not allowed. There are several features in the fisheries management system which reduces the incentive to discard (see chapter 3.4.3 Bycatch species). It is evident that in all the assessed fisheries catches of low commercial value were landed (e.g. dogfish, sea cucumber, black scabbard-fish, ribbonfish, and mackerel shark (Tables 3.2 to 3.7). 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 mortality by the fisheries. Catches representing <0.001% of total catch landed indicate that discarding is insignificant in the assessed fisheries, or at least not reaching the level of major bycatch species (5% of the total catch).</p> | | |
| b | Guidepost | If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. | If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding. | |
| | Met? | N/A | N/A | |
| | Justification | | | |

| | | | | |
|---|----------------------|--|--|-----------|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| c | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery. | | |
| | Met? | N/A | | |
| | Justification | | | |
| References | | ICES 2011b; Jennings <i>et al.</i> 2001; Pálsson et al. 2013; Umhverfissráðuneytið 2011 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Danish seine– Management (Bycatch species)

Evaluation Table for PI 2.2.2

| | | | | |
|----------------------|----------------------|---|---|---|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing and minimizing bycatch. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The Fisheries Management Act requires that all catches shall be landed; therefore discarding is illegal. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported into a database operated by the Directorate of Fisheries. There are several measures included in the fisheries management system which should disincentive fishermen from discarding, e.g. 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 and up to 5% of the total landed catch can be classified as being of a low commercial value and is not subtracted from the quota allocated to the vessel.</p> <p>SG80: Large areas of Icelandic waters are closed for fishing in order to protect fish and habitats. The level of discarding in fisheries is assessed by MRI. Fishers are required to keep fish logbooks. An observer system is operated by the Directorate of Fisheries, both at landing sites and on board vessels. Breach of regulations leads to a warning or a fine. Repeated offenses lead to heavy fines, revocation of the vessel’s license to fish and possibly a prison sentence.</p> <p>SG100: 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) (Figure 3.11), which decreases the likelihood of large catches of juvenile fish. Areas are usually closed for fishing by means of bottom trawl and longline because of the presence of large amounts of juvenile fish or in order to protect spawning fish, but also vulnerable benthic habitats. The Icelandic Coast Guard monitors fishing activities in Icelandic waters, e.g. via VMS, including surveillance of areas closed for fishing.</p> <p>There are strict requirements for the keeping of fish logbooks which must be made available to the Directorate of Fisheries. Following a random inspection on landings, inspectors from the Directorate of Fisheries can directly join a vessel to visit the same fishing ground the vessel visited during the previous fishing trip, in order to examine their fishing practices and compare catch composition between fishing trips. Also, the system of instant recording of landings allows use of the Directorate of Fisheries 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.</p> <p>A vessel owner which is found to have acted in breach of some regulations gets a warning and sometimes a fine. Repeated offenses lead to heavy fines, revocation of the vessel’s license to fish and possibly to prison sentences.</p> | | |

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|-----------------|----------------------|--|---|--|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: Discarding is illegal. There are a number of measures that aim to ensure compliance with the law. Annual assessment on discarding by MRI indicates that discarding is at the least very limited.</p> <p>SG80: Following discussions with the MRI, DF, MII and the client during the site visit the assessment team concluded that there was a consensus among all parties on very low rate of discarding in the assessed fisheries. Estimated discards have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) were lower than recorded over the period 2001-2011 (Pálsson et al. 2013).</p> <p>SG100: From 2001-2010, mean cod discards were highest in the Danish seine fishery (2.70%) and in the gill net fishery (1.34%), but lower in the demersal trawl fishery (0.77%), and in the long line fishery (0.38%) (Pálsson et al. 2012). Mean haddock discards were highest in the Danish seine, (4.30%), and the demersal trawl (2.47%) fisheries, and lowest in the long line fishery (0.40%). Cod discards in all gear combined were 0.90% of landed catch (1680 tonnes), and haddock discards 2.02% (1488 tonnes).</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG80-SG100: It is evident that retained species from the assessed fisheries were landed even though they are of low commercial value (e.g. dogfish, long rough dab) (Table 4.2). This, together with the fact that the main discards in Icelandic fisheries are of cod and haddock and that the MRI has estimated the discard rates to be less than 1% of landings, suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it does not reach the level of main bycatch species (5% of the total catch). Discard studies have been in place for over 10 years with well established procedures in place by the MRI, DF and the coast guard. Therefore, the bycatch/discarding management is successfully implemented.</p> | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |

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|---|----------------------|---|------------|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | |
| | Met? | | Yes |
| | Justification | Assessment by the MRI indicates that discard rates have declined from 2001-2011 and was at its lowest in 2011. | |
| References | | Pálsson et al. 2012& 2013; Stakeholder consultation | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 100 |
| CONDITION NUMBER (if relevant): | | | |

Danish seine– Information (Bycatch species)

Evaluation Table for PI 2.2.3

| | | | | |
|----------------------|----------------------|--|---|---|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Qualitative information is available on the amount of main bycatch species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery. | Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: Research by MRI and measurements by the DF, including on board surveillance, indicate that the main discards in the Icelandic fisheries are of cod and haddock.</p> <p>SG100: While scientific studies indicate that discarding exists at a low level, there is no systematic monitoring of discard in place in Iceland.</p> <p>Harmonisation: The ISF cod/haddock (ISF C/H) assessment scores 100 for this PI. Scoring is not separated by SI, it is thus difficult to explain differences for each SI. However, there is a difference in the species considered. The ISF cod/haddock certifications defined bycatch species as retained species of less than 5%. For the current certification the team used the MSC definition of bycatch (CR Table AA1); and only discards are considered here. The ISF C/H assessments also do not mention the extensive discard studies done in Icelandic waters.</p> | | |
| b | Guidepost | Information is adequate to broadly understand outcome status with respect to biologically based limits | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty. |
| | Met? | Yes | Yes | No |

| | | | | |
|-------------------|----------------------|--|--|--|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | | |
| | Justification | <p>SG60: The main discards in Icelandic fisheries are of cod and haddock and the MRI has estimated the discard rate to be less than 1% of landings, which suggests that bycatch/discarding is a minor problem in the assessed fisheries, or at least that it has not reached the level of main bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG80-100: Standardized annual groundfish surveys have been conducted by MRI since 1985, including biological sampling of large numbers of demersal fish species. This information should make it possible to estimate outcome status of a number of retained/bycatch species, but not all.</p> <p>Harmonisation: see comment in SI a.</p> | | |
| c | Guidepost | Information is adequate to support measures to manage bycatch. | Information is adequate to support a partial strategy to manage main bycatch species. | Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: The main discards in Icelandic fisheries are of cod and haddock and the MRI has estimated the discard rate to be less than 1% of landings, which suggests that bycatch/discarding is a minor problem in the assessed fisheries, or at least that it has not reached the level of main bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG100: It can be inferred that bycatch/discarding is a minor problem in the assessed fisheries. However, since comprehensive monitoring is not in place the level of bycatch/discarding cannot be evaluated with a high degree of certainty.</p> <p>Harmonisation: see comment in SI a.</p> | | |
| d | Guidepost | | Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy). | Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The fishery is a part of the logbook and observer systems operated by the DF and surveillance of the fishery is in operation. The Directorate's database provides instant quantitative information on landings of all retained species. The database is also used in assessment work by MRI. Annual discard estimates by MRI is ongoing.</p> <p>SG100: While scientific studies on discarding are ongoing, there is no systematic monitoring of discard in place in Iceland.</p> <p>Harmonisation: see comment in SI a.</p> | | |
| References | | Pálsson et al. 2012& 2013; Stakeholder consultation | | |

| | | |
|---|--|----|
| PI 2.2.3 | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | |
| OVERALL PERFORMANCE INDICATOR SCORE: All gear | | 80 |
| CONDITION NUMBER (if relevant): | | |

Danish seine Principle 2: ETP Species

Danish Seine - Outcome (ETP species)

Evaluation Table for PI 2.3.1

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|---------------|--|---|--|---|
| PI 2.3.1 | The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species | | | |
| Scoring Issue | SG 60 | SG 80 | SG 100 | |
| a | Guidepost | Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species. | The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. | There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>None of the species caught by the fishery are included in Appendix I of CITES. Atlantic halibut (<i>Hippoglossus hippoglossus</i>) is an ETP species recognized by Icelandic authorities.</p> <p>SG60-80: On 1st January 2012 a regulation was implemented stipulating a ban on targeting halibut and demanding fishers to release all viable halibut back to the sea if by-caught. The effects of the fishery on the halibut stock are known through recordings of landings and it operates under regulation 1164/2011 on halibut fishing.</p> <p>SG100: The ban on halibut fishing has only been recently introduced, and the effectiveness of the strategy cannot be determined yet. A decrease in total landings of halibut indicates that the ban is working. However, the survival rate of viable halibut returned to sea is not known.</p> <p>Harmonisation: ISF cod/haddock score = 100. The ISF cod/haddock certifications account for all birds and mammal bycatch in the ETP scoring, whereas in the current assessment the team defined ETP species as indicated by CR3.11.1; i.e. species recognized by national ETP legislation or species listed in CITES Appendix I.</p> | | |
| b | Guidepost | Known direct effects are unlikely to create unacceptable impacts to ETP species. | Direct effects are highly unlikely to create unacceptable impacts to ETP species. | There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species. |
| | Met? | Yes | Yes | No |

| | | | |
|---|---|--|---|
| PI 2.3.1 | <p>The fishery meets national and international requirements for the protection of ETP species</p> <p>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species</p> | | |
| | Justification | <p>SG60: The assessed saithe fishery is not targeting Atlantic halibut. The catch of halibut has decreased since the ban on targeting halibut was introduced.</p> <p>SG80: In the period 2007-2013 the landed catch of Atlantic halibut by the saithe fishery by fishing gear was 0.01 to 0.26% (Table 3.11). None of the assessed fishing gear was targeting halibut and in all gears the lowest annual catch was for the fishing year when the regulation was implemented (2011/12). Catch numbers until May 2013 indicate an even further reduction in landed catch (see Table 3.11).</p> <p>During the period 2007-2011 the landed catch of Atlantic halibut in Danish seine decreased from 47 tonnes to 13 tonnes in 2012. The landed catch from September 2012 to May 2013 was less than a ton.</p> <p>The current landed catch levels indicate that direct mortality of halibut is significantly lower than it used to be. Furthermore, the figures for the period September 2012 to May 2013 (45 tonnes total landed catch) suggest that the direct fishing mortality is decreasing even further.</p> <p>SG100: The decline in catch of halibut in 2012-13 indicates that the fishery is complying with the regulations which ban targeting halibut. However, it has only been in operation for short time and it remains to be seen whether it will lead to recovery of the Atlantic halibut stock.</p> <p>Harmonisation: see rationale in Scoring Issue (a) above.</p> | |
| c | Guidepost | | <p>Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.</p> <p>There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.</p> |
| | Met? | Yes | No |
| | Justification | <p>SG80: The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is not targeted and that viable specimens are released and returned to sea. However, there is no information on how much halibut was released in 2012 or its survival rate following discarding. The release mortality rate of Atlantic halibut has not been estimated. On a global scale, release mortality estimates of halibut species are highly variable, commonly ranging between 10-50% (Alverson et al. 1996; Meyer 2007).</p> <p>SG100: The release mortality rate of Atlantic halibut has not been estimated.</p> <p>Harmonisation: see rationale in Scoring Issue (a) above.</p> | |
| References | Alverson et al. 1996; Meyer 2007; Regulation 1164/2011. | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Danish Seine - Management (ETP species)

Evaluation Table for PI 2.3.2

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|----------------------|----------------------|---|---|---|
| PI 2.3.2 | | <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are <u>measures</u> in place that <u>minimise</u> mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a <u>strategy</u> in place for managing the fishery’s impact on ETP species, <u>including measures to minimise mortality</u> , which is designed to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a comprehensive strategy in place for managing the fishery’s impact on ETP species, including measures to minimise mortality, which is designed to achieve <u>above</u> national and international requirements for the protection of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: All the catch landed in Iceland must be weighed and reported. Port authorities are responsible for the correct weighing and recording of the catch. Landings are monitored by the Directorate of Fisheries. Area closure for fishing is an integrated part of the management, both for fish species and habitats. The MII issued a regulation imposing a ban on targeting halibut and demanding fishers to release all viable halibut back to the sea if caught.</p> <p>SG80: 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 these conventions a number of mechanisms have been developed to detect and reduce impacts. For example the OSPAR has identified a number of key species and habitats which are considered threatened or declining (OSPAR Commission 2008 a&b). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine species and ecosystems, and (b) protect vulnerable benthic ecosystems. The Ministry of Industries and Innovation issued regulations where a ban was set on a direct fishery for halibut and that all viable halibut must be released in other fisheries.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species). | There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved. | The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work. |
| | Met? | Yes | Yes | No |

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|---|---------------|--|--|--|
| PI 2.3.2 | | The fishery has in place precautionary management strategies designed to: <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| | Justification | <p>SG60: Area closure for fishing and restrictions on mesh size are an integrated part of the fishery management system, in order to reduce catch of juvenile fish (Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands). This is likely to reduce catches of juvenile halibut.</p> <p>SG80: The management strategy is enforced by the Directorate of Fisheries and Icelandic Coast Guard. Data on halibut catch will indicate whether the ban on targeting halibut is working.</p> <p>SG100: The ban on halibut fishing has not been in operation long enough to evaluate its effectiveness, since this is a long lived species.</p> | | |
| c | Guidepost | | There is evidence that the strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: A decrease in landed catches since the ban was implemented, indicates that the strategy is being successfully implemented.</p> <p>SG100: A decreasing trend in landed catch indicates modification of fishing practices. However, no study has been made on the survival rate of viable halibut when released back to sea.</p> | | |
| d | Guidepost | | | There is evidence that the strategy is achieving its objective. |
| | Met? | | | No |
| | Justification | <p>SG100: The ban on direct halibut fishing has not been in operation long enough to evaluate its effectiveness.</p> | | |
| References | | Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands, Anon. 2012a; Ministry for the Environment 2010;OSPAR Commission 2008a&b | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Danish Seine - Information (ETP species)

Evaluation Table for PI 2.3.3

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|----------------------|----------------------|---|--|--|
| PI 2.3.3 | | Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Information is sufficient to qualitatively estimate the fishery related mortality of ETP species. | Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species. | Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery. The Atlantic halibut stock is monitored annually by the MRI. The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is released from the fishery and back to sea. No direct estimate on release mortality rate is available for Atlantic halibut.</p> <p>SG80: Quantitative information on the amount of viable halibut released from the fishery and back to sea and its survival rate is not available. Although, release numbers and - mortalities cannot be directly determined, full information is available on landings of halibut for all gears in the fishery.</p> <p>SG100: Information available for halibut includes survey data, catch composition and age/length data. This information can be regarded as sufficient to determine the stock status relative to reference point.</p> | | |
| b | Guidepost | Information is adequate to broadly understand the impact of the fishery on ETP species. | Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. | Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut.</p> <p>SG80: Historically, halibut has mainly been taken as bycatch (retained species) in the bottom trawl and longline fisheries in Iceland, and catch by other gear is relatively insignificant. In recent years the proportional catch by bottom trawl has decreased and the majority of the landed halibut catch has been by longline (Figure 3.29). Since 2000 the main fishing grounds of halibut have been on the Reykjanes ridge and NW of the ridge (Figure 3.29). In the same area bottom trawling is prohibited the whole year or part of the year (Figure 3.11). Since the ban on targeting halibut was introduced the landed catch has decreased considerably (Table 3.12).</p> <p>SG100: The DF database provides quantitative information on retained species taken by the assessed fishery. However, quantitative information on the amount of halibut released following the issuing of the ban on targeting halibut is not available, nor is the survival rate of discarded halibut. Therefore, not all mortalities can be accounted for and hence not the magnitude of all impacts.</p> | | |

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|---|----------------------|--|---|---|
| PI 2.3.3 | | Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • 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. | | |
| c | Guidepost | Information is adequate to support measures to manage the impacts on ETP species. | Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species. | Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut. The halibut stock status is monitored by MRI and used to be managed by TAC.</p> <p>SG80: Data from the DF and the MRI are used to assess the stock status and trends in the catches and biomass index for Atlantic halibut. The information is sufficient to measure the response of the depleted halibut stock and to evaluate whether the stock will recover following the ban on halibut target fisheries.</p> <p>SG100: Information on the amount of released viable halibut and its survival rate is lacking. Therefore, it cannot be evaluated with a high degree of certainty whether the strategy is achieving its objectives.</p> | | |
| References | | Alverson et al 1996; Umhverfissráðuneytið 2011 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Danish seine Principle 2: Habitat

Danish seine - Outcome (Habitat)

Evaluation Table for PI 2.4.1

| | | | | |
|---|------------------|---|---|--|
| PI 2.4.1 | | The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |
| | | <p>SG60: A recent study on the impact of the Danish seine on benthos showed that it has limited negative impact on benthic habitats (Thórarinsdóttir et al. 2010).</p> <p>SG80-100: Scientific evidence indicates that it is highly unlikely that gillnets, handline, longlines, Danish seine and <i>Nephrops</i> trawl reduce habitat structure and function to a point where there would be serious or irreversible harm (Ball et al. 2000, Jennings et al. 2001, Thórarinsdóttir et al. 2010).</p> | | |
| References | | Anon. 2004; Ball <i>et al.</i> 2000; Garcia <i>et.al.</i> 2006; Jennings <i>et al.</i> 2001; Ministry of the Environment 2010; Ministry of Fisheries 2004; OSPAR Commission2008a&b; Thórarinsdóttir et al. 2010; Ólafsdóttir & Burgos 2012; Steingrímsson & Einarsson 2004 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Danish seine - Management (Habitat)

Evaluation Table for PI 2.4.2

| | | | | |
|----------------------|------------------|--|---|---|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. | There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. | There is a strategy in place for managing the impact of the fishery on habitat types. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|---|---|---|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | | |
| | Justification | <p>SG60: In Icelandic waters, large areas are closed for fishing, some of them temporarily (hours per day, days or seasonal) and others permanently (years) which protects bottom habitats from being damaged by fishing activities (Figure 3.11). The Icelandic Coast Guard monitors fishing activities in Icelandic waters in real time through VMS, including surveillance of areas closed for fishing.</p> <p>SG80: 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 Commission 2008 a&b).</p> <p>SG 100: Ten coral areas with <i>L. pertusa</i> off S and SE Iceland have been closed for all fisheries using bottom contact gear (Ólafsdóttir & Burgos 2012). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine ecosystems, and (b) protect vulnerable benthic ecosystems.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats). | There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Area closure for fishing is an integrated part of the fishery management system, in order to reduce catch of juvenile and spawning fish. This measure has a secondary effect, i.e. protecting bottom habitats. Furthermore, the Act 97/1997 (“um veiðar í fiskveiðilandhelgi Íslands”) allows managers to close vulnerable habitats for fishing. Several vulnerable habitats areas have been closed for fishing.</p> <p>SG80: The management strategy is enforced by the Icelandic Coast Guard including vulnerable habitat areas which are closed for fishing. Operation of all Icelandic fishing vessels is monitored by VMS and the MRI has access to electronic logbooks for scientific purposes (high resolution data). During a site visit the DF confirmed that no vessel has violated the closure of coral areas.</p> <p>SG100: The effectiveness of habitat area closures has not been evaluated, therefore clear evidence cannot be provided to show that the strategy is successfully implemented and is achieving its objectives.</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | Yes |

| | | | |
|---|----------------------|---|--|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | |
| | Justification | <p>SG 80: The Icelandic Coast Guard is responsible for law enforcement at sea and monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing.</p> <p>SG100: Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). One of the key strategies is intended to protect vulnerable benthic ecosystems. Ten coral areas off SE Iceland have been closed for all fisheries using bottom contact gear based on the Act 97/1997 (Ólafsdóttir & Burgos 2012).</p> | |
| d | Guidepost | | There is some evidence that the strategy is achieving its objective. |
| | Met? | | Yes |
| | Justification | The significance of closed areas off Iceland in protecting juvenile cod has been evaluated. It provides evidence that closures of nursery grounds can be useful in protecting immature cod (Schopka et.al. 2010). | |
| References | | Anon. 2012a; Regulation 97/1997; Ministry for the Environment 2010; OSPAR Commission 2008a&b; Ólafsdóttir & Burgos 2012; Schopka et al. 2010 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 95 |
| CONDITION NUMBER (if relevant): | | | |

Dansih seine – Information (Habitat)

Evaluation Table for PI 2.4.3

| | | | | |
|----------------------|------------------|---|--|---|
| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There is basic understanding of the types and distribution of main habitats in the area of the fishery. | The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery. | The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|--|---|---|
| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
| | Justification | <p>SG 60-80: The BIOICE programme has provided basic inventory of benthic fauna within the Icelandic territorial waters (Figure 3.6). Benthic samples have been collected from a variety of habitats, ranging widely in depth (<100 to 3100 m) and in temperature conditions (12° to -0.9°C). Also, the Marine Research Institute (MRI) has identified areas of vulnerable benthic habitats in Icelandic waters (cold water corals, areas with aggregation of large sponge, maerl beds; Figures 3.7-3.10) in relation to bottom trawl fishing activities (Steingrímsson & Einarsson 2004, Garcia et al. 2006). The MRI is currently carrying out research programmes in order to map benthic habitats in Icelandic waters (biology and geology, using multibeam echo sounder), including mapping cold water corals (<i>Lophelia pertusa</i>) and studying the interaction between fish and cold water coral habitats (CoralFISH project, http://www.eu-fp7-coralfish.net/).</p> <p>Through VMS there is detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats.</p> <p>SG 100: Information is available on the distribution of invertebrate species and habitats in Icelandic waters, as well as data on important environmental parameters. The distribution of main vulnerable habitats in Icelandic waters has been documented and the detail of knowledge is at a relevant scale. The habitat mapping by MRI is ongoing in addition to studies on the ecological function of vulnerable habitats (e.g. CoralFISH).</p> | | |
| b | Guidepost | Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. | Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear. | The physical impacts of the gear on the habitat types have been quantified fully. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG 60: A recent study on the impact of the <u>Danish seine</u> on benthos showed that it has limited negative impact on benthic habitats (Thórarinsdóttir et al. 2010).</p> <p>Evidence of detrimental impacts on cold water corals by <u>towed fishing gears</u> has been compiled through scientific mapping using ROV techniques (Ministry of Fisheries 2004, Ólafsdóttir & Burgos 2012). There is good knowledge on the distribution of the different fisheries in assessment which can be used to indicate if and where it overlaps with vulnerable habitats.</p> <p>SG 80: VMS data has provided detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. The VMS data is available for scientific purposes. Information is available on the distribution of invertebrate species and habitats in Icelandic waters. Therefore, there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear under assessment.</p> <p>SG 100: Studies on the impact of Danish seine and otter trawl on soft bottom benthic communities are available (Ragnarsson & Lindegarth 2009, Thórarinsdóttir et al. 2010). Also, evidence of detrimental impacts of bottom trawling on cold water corals have been collected (Steingrímsson & Einarsson 2004, Ólafsdóttir & Burgos 2012). However, impacts on vulnerable habitats have not been quantified fully.</p> | | |

| | | | | |
|---|----------------------|---|--|--|
| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
| c | Guidepost | | Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | Changes in habitat distributions over time are measured. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The area coverage of the assessed fisheries is monitored through logbooks and VMS, thus their spatial distribution is known in relation to vulnerable habitats. The habitat mapping by MRI is ongoing in addition to studies on the ecological function of vulnerable habitats (e.g. the CoralFISH project).</p> <p>SG100: The MRI research program aims to map benthic habitats in Icelandic waters but not to measure the changes in habitat distribution over time.</p> | | |
| References | | Bell <i>et al.</i> 2000; Eiríksson 1993; Garcia <i>et al.</i> 2006; Jennings <i>et al.</i> , 2001; Ministry of Fisheries 2004; Ólafsdóttir & Burgos 2012; Ragnarsson & Lindegarth 2009; Steingrímsson & Einarsson 2004; Jennings <i>et al.</i> 2001; Thórarinsdóttir <i>et al.</i> 2010 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Danish seine Principle 2: Ecosystem

Danish seine – Outcome (Ecosystem)

Evaluation Table for PI 2.5.1

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

| | | |
|---|--|---|
| PI 2.5.1 | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function | |
| | Justification | <p>SG60: Extensive studies on the feeding ecology of a large number of demersal fish species, marine mammals and seabirds have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic marine ecosystems. Cod is a major fish predator in the marine ecosystems around Iceland, which preys mainly on capelin and shrimp (<i>Pandalus borealis</i>).</p> <p>Saithe preys on pelagic prey items, typically capelin (<i>Mallotus villosus</i>) and krill (Euphausiacea).</p> <p>None of the assessed fisheries is likely to affect key ecosystem species to a point where there would be serious or irreversible harm.</p> <p>SG80-100: Saithe is not considered to be a key prey species in the Icelandic ecosystem, and preys on pelagic items, typically capelin and krill.</p> <p>Cod is one of the main predators in Icelandic waters. In all of the assessed fishing gear, cod was one of the main retained species. It contributed approximately 50-70% to the total catch in the assessed gillnet, handline and longline fisheries but less in bottom trawl, Danish seine and Nephrops trawl (around 30%). The stock biomass of cod has been increasing and is now larger than observed in the last three decades. This is believed to be the result of a decrease in harvest rate. None of the other retained species are considered as key species in the ecosystem of Icelandic waters. Also, the assessed fisheries do not directly affect the most important prey species in the ecosystem, capelin. There is evidence that the main driving factor for ecosystem change in Icelandic waters is abiotic (Valdimarsson <i>et.al.</i> 2012).</p> <p>Cod has been shown to directly affect the biomass of the (offshore) shrimp population (<i>Pandalus borealis</i>). This is currently taken into account in the MRI assessments (using GADGET models) as has the effect of the capelin on cod growth (using regression models). All of these models indicate that the cod fishery as a whole has negligible negative effects. If the fishery targeting the key ecosystem predator in Icelandic waters is not having a significant impact, it is unlikely that the saithe fishery will. The assessed fishery is highly unlikely to disrupt any key elements of the ecosystem structure or function.</p> <p>Saithe is commonly associated with deep water coral reefs and they appear to be an important part of the ecosystem surrounding the species.</p> <p>Available evidence indicates that bottom trawling has demolished several relatively large coral areas and direct observation with Remote Operated Vehicles (ROV) has revealed damage to existing coral reefs of <i>Lophelia pertusa</i>, which is linked to bottom trawling. However, the level of the importance of deep water corals in the demography of fish populations and communities has not been demonstrated. Known coral areas where the fishery is operating have been closed to fishing.</p> <p>The DF database provides relatively good evidence that none of the assessed fisheries catch key ecosystem species. The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure.</p> |
| | References | <p>Anon. 2010; Anon. 2012b; Anon. 2011b; Astthorsson et al. 2007; Auster 2005; Barbaro et al. 2008; Foley et.al 2010; Garcia et al. 2006; Jaworski & Ragnarsson 2006; Jónsson 1997; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson 1997; Stefánsson 2003; Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Valdimarsson <i>et.al.</i> 2012; Vilhjálmsón 2002.</p> |
| OVERALL PERFORMANCE INDICATOR SCORE: | | 100 |
| CONDITION NUMBER (if relevant): | | |

Danish seine – Management (Ecosystem)

Evaluation Table for PI 2.5.2

| | | | | |
|----------------------|----------------------|--|---|---|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary. | There is a partial strategy in place, if necessary. | There is a strategy that consists of a plan, in place. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The DF database would provide evidence if the assessed fisheries were to catch a significant amount of key ecosystem species.</p> <p>SG80-100: Key ecosystem fish species (e.g. capelin and cod) are subject to the quota system, as is saithe. Large areas are closed for fishing in Icelandic waters in order to protect juvenile fish or spawning fish but also vulnerable habitats. These closures are stipulated in the Fisheries Management Act. 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. There is a strategy with a plan, if it so happened that the saithe fishery should pose a risk or harm to ecosystem structure and function (Ministry of the Environment 2010).</p> | | |
| b | Guidepost | The measures take into account potential impacts of the fishery on key elements of the ecosystem. | The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. | <p>The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem.</p> <p>This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.</p> |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|---|--|--|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | |
| | Justification | <p>SG60-80: The DF database would provide evidence if the assessed fisheries were to catch significant amounts of key ecosystem species. 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. MRI is monitoring key elements of the ecosystem and the monitoring would indicate if fisheries are having impact on key elements of the ecosystem.</p> <p>The MRI carries out wide ranging and extensive research on the status and productivity of the 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 the fish stocks (e.g. Anon. 2011a, Anon. 2012a). 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 aims protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>SG100: General measures include monitoring the status of the key ecosystem elements in Icelandic waters (e.g. the capelin stock). In addition, routine monitoring includes biological sampling from catches, which also include non-commercial catch information, as well as verification of log-book records. Capelin and some other key ecosystem species are regulated by TAC. The quota system has been demonstrated to work. Impacts are e.g. restrained by TAC, and area closure in addition to surveillance by the Directorate of Fisheries and Icelandic Coast Guard. Inspectors may accompany fishing vessels on voyages or board 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. Cases of serious or repeated deliberate violation shall furthermore be liable to imprisonment for up to six years. 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 aims to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> | | |
| c | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved. |
| | Met? | Yes | Yes | Yes |

| | | | |
|-------------------|----------------------|--|---|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | |
| | Justification | <p>SG60: There is evidence that the monitoring and surveillance by the DF and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing licenses.</p> <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. The measures are considered highly likely to work.</p> <p>SG 100: Closure of coral areas to fishing off South Iceland, demonstrates that measures to protect the ecosystem are in place and implemented successfully. 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 aim to protect vulnerable benthic ecosystems. (Ministry for the Environment 2010).</p> <p>The fishery has no demonstrable effects on key predator or prey species. If such effects were discovered they would be mitigated with available measures, such as the quota system and area closures. Inspectors may accompany fishing vessels on voyages or board vessels to check their cargo and fishing gear. 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. Violations of the provisions of the Fisheries Management Act are liable to fines, regardless of whether committed deliberately or through negligence. Cases of serious or repeated deliberate violation are liable to imprisonment for up to six years. Violation of the act has resulted in penalties (DF site visit).</p> | |
| d | Guidepost | There is some evidence that the measures comprising the partial strategy are being implemented successfully. | There is evidence that the measures are being implemented successfully. |
| | Met? | Yes | Yes |
| | Justification | <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. There is evidence that the monitoring and surveillance by the Directorate of Fisheries and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing license.</p> <p>SG 100: The strategy is provided by the Fisheries Management Act and government policies. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>Measures have been implemented successfully, including area closures (fish and habitats), fishing bans (Atlantic halibut), discard bans, and ongoing work to increase the awareness of DF observers to bycatch of birds and mammals.</p> <p>Long-term changes in trophic patterns of Icelandic cod demonstrate the importance of capelin, northern shrimp, and euphausiids in the diet of the key fish predator in the ecosystem; cod (Pálsson & Björnsson 2011). Capelin and some other key ecosystem species are regulated by TAC and their importance in the ecosystem is accounted for in management strategies (e.g. Stefánsson 2003, Anon. 2013).</p> | |
| References | | Anon. 2010; Anon. 2012b; Anon. 2011b; Anon. 2013; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Ministry of the Environment 2010; Pálsson 1997; Schopka <i>et.al.</i> 2010; Stefánsson 2003; | |

| | |
|---|---|
| PI 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function |
| | Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. |
| OVERALL PERFORMANCE INDICATOR SCORE: | |
| | 100 |
| CONDITION NUMBER (if relevant): | |
| | |

Danish seine – Information (Ecosystem)

Evaluation Table for PI 2.5.3

| | | | | |
|---------------|---------------|---|--|---|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity). | Information is adequate to broadly understand the key elements of the ecosystem. | |
| | Met? | Yes | Yes | |
| | Justification | <p>SG60: Extensive studies have been conducted on the marine ecosystems of Icelandic waters (e.g. Astthorsson <i>et al.</i> 2007, Valdimarsson & Jónsson 2007). Studies on the feeding ecology of a large number of fish species, marine mammals and seabirds has provided information on the ecological function of most of the species caught by the assessed fisheries. These studies have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic waters ecosystems (Marine Research Institute 1997). Biomass estimates for stocks of fish, whales and seabirds in Icelandic waters and production estimates of <i>Calanus finmarchicus</i> and other zooplankton species have been used to calculate the biomass of individual components in the Icelandic marine ecosystem (Astthorsson <i>et al.</i> 2007).</p> <p>SG 80: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters, and this information is used in multi species modelling (GADGET models; e.g. Stefánsson & Pálsson 1998, Stefánsson 2003) for MRI assessments. The models have been used to evaluate interactions between fisheries and key ecosystem elements. Information about these interactions has been taken into account for management purposes.</p> | | |
| b | Guidepost | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail. | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail. | Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated. |
| | Met? | Yes | Yes | Yes |

| | | | |
|-----------------|----------------------|---|--|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| | Justification | <p>SG60: Saithe is not a key ecosystem species and preys mainly on invertebrates. The DF database provides detailed information on catches of target and retained species. This provides information about the impact of the assessed fishery on the populations involved and would provide evidence if adverse impacts on any key ecosystem species occur.</p> <p>SG80: The main impacts of the fishery on key elements of the ecosystem such as key predators, prey and vulnerable habitats can be inferred. Information on mortality of key predators and prey is known and recorded (retained species).</p> <p>The DF database provides detailed information on catches of target and retained species (bycatch/discard is considered not significant). This provides information about the impact of the assessed fisheries on the populations involved.</p> <p>Information on vulnerable habitats in Icelandic waters has been documented, including the coral <i>Lophelia pertusa</i>. MRI has mapped the distribution of coral areas in relation to fishing efforts by bottom trawling and has gathered evidence of impacts caused by such fishery. Coral areas have been closed, based on this evidence, and it can be expected that more coral areas will be closed in the future, as MRI continues its research project on the mapping of the habitats. The mapping will also support the recent strategic plan for the preservation of biodiversity in Icelandic waters. Furthermore, information on high catches of juvenile fish, gathered through the Directorate of Fisheries surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries.</p> <p>SG100: There is detailed information on the distribution of fishing efforts around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats. Evidence of detrimental impact on cold water corals by towed fishing gears have been compiled through scientific mapping (using ROV technique; Ministry of Fisheries 2004)</p> | |
| c | Guidepost | The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known. | The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood. |
| | Met? | Yes | Yes |
| | Justification | <p>SG80: The effect of the fishery on the target and the retained species are assessed annually. Bycatch is on a relatively small scale (see rationale for scoring bycatch). The feeding ecology of a number of demersal fish species has been documented, providing information on the ecological function of most of the species caught by the assessed fisheries. Information on vulnerable habitats in Icelandic waters has also been documented, including the coral <i>Lophelia pertusa</i>. The MRI has mapped the distribution of coral areas in relation to fishing efforts by otter trawling and has gathered evidence of impacts caused by fishing activities. The importance of vulnerable habitats known to occur in Icelandic waters is generally understood (e.g. <i>Lophelia</i> reefs, sponge aggregations).</p> <p>SG100: The DF database provides quantitative information on retained species taken by the assessed fishery. There is good knowledge on the distribution of the different fisheries which can be used to indicate if and where it overlaps with vulnerable habitats. There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters (e.g. Astthorsson <i>et.al.</i> 2007; Marine Research Institute 1997; Stefánsson & Pálsson 1998; Stefánsson 2003; Valdimarsson & Jónsson 2007). Saithe is not a key ecosystem species.</p> | |

| | | | |
|-----------------|----------------------|---|---|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| d | Guidepost | Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred. | Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred. |
| | Met? | Yes | Yes |
| | Justification | <p>SG 80: Sufficient information is available on retained species, bycatch and catch of ETP species through log books, and monitoring of landings. Distribution of fishing in relation to vulnerable habitats is known. This information base is sufficient for inferring main consequences of fishing.</p> <p>SG100: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters. There is also detailed information on the catches taken from the system and spatial overlap of the fisheries with vulnerable habitats. This information base is sufficient for inferring main consequences of fishing.</p> | |
| e | Guidepost | Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | Information is sufficient to support the development of strategies to manage ecosystem impacts. |
| | Met? | Yes | Yes |
| | Justification | <p>SG 80: Data on individual landed catch is instantly entered in the DF database. The surveillance system carried out by the DF and the Coast Guard is constantly monitoring catch levels of juvenile fish and MRI provides information on the need for measures in order to reduce impacts by fisheries. All this information is used for implementing protection measures (e.g. area closure) if the management considers it necessary. The MRI also monitors and manages a large number of species and has monitored environmental conditions in the Icelandic waters for decades. Therefore any potential threats or adverse trends can be quickly identified and responded to.</p> <p>SG100: The strategy is provided by the Fisheries Management Act. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010). Coral areas have been closed, based on scientific evidence, and it can be expected that more coral areas will be closed in the future as MRI continues its research project on the mapping of the habitats.</p> <p>Information on high catches of juvenile fish, gathered through the Directorate of Fisheries surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries. Actions which are considered necessary in order to improve species recruitment (e.g. closure of spawning areas) are based on research information and recommendations from the MRI. The closure of coral areas, are also based on scientific evidence, and it can be expected that more coral areas will be closed in the future as MRI continues research on the mapping of the habitats, their relationship with fisheries and other relevant environmental data. Collectively this information is sufficient to support development of strategies to manage ecosystem impacts.</p> | |

| | | |
|---|---|------------|
| PI 2.5.3 | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| References | Anon. 2010; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson1997; Stefánsson 2003; Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thórarinsdóttir et al. 2010; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | 100 |
| CONDITION NUMBER (if relevant): | | |

Longline Principle 2: Retained Species

Longline - Outcome (Retained species)

Evaluation Table for PI 2.1.1

| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | | |
|---------------|---------------|---|---|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below). | Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below). | There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points. |
| | Met? | Yes | Yes | No |
| | Justification | <p>The following main retained species, as defined by weight (>5%), are retained by Longlines: cod, haddock, wolffish, ling and tusk. Cod, haddock, ling and tusk can be said to be highly likely to be within biologically based limits, whereas wolfish is not likely to be within biologically based limits.</p> <p>Atlantic cod: The reference biomass (age 4+) in 2013 is estimated as 1,170,000t and the spawning stock as 480,000t, compared to Blim=125 and Btrigger=220 thousand t (Anon 2013). Fishing mortality has declined significantly in the last decade and is presently at a historical low, below likely candidates for Fpa and Flim (Anon. 2012, ICES 2012a).</p> <p>Haddock: The spawning stock was estimated to be 90,000t and fishable stock (age 3+) at 120,000t. The harvest rate in 2012 was 42%. SSB is above the Blim of 45,000t. The MRI predicts that the stock size of haddock will decrease in coming years and there is some risk of the spawning stock falling below the historical minimum (Blim=45,000 tonnes) in 2014–2015.</p> <p>Ling: The Biomass index has been increasing since 2005. In 2007 the biomass index was the highest since 1985 and it has been rising ever since. Recruitment has decreased from the high numbers from 2004 – 2010, and is now closer to the average for years 1985-2004. Exploitation rates for 2012 are close to the average for 2004-2008 when exploitation was lowest. Analysis indicates that these catches are close to FMSY.</p> <p>Tusk: Standardized annual groundfish surveys have been conducted by MRI since 1985 including biological sampling of tusk. The index of fishable biomass has increased considerably since 2001 and is now at a historically high. On the other hand, recruitment indices have decreased since 2006 (MRI 2013) and is at the lowest observed. There are indications that fishing mortality may have declined in recent years and is close to the proxy for FMSY. SSB has been increasing in recent years and is likely above candidate MSY Btrigger. (http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2012/2012/Tusk%20in%20Va%20XIV.pdf) – ICES states: “All the signs from commercial catch data and surveys indicate that tusk in Division Va and Subarea XIV is at present in a good state. This is confirmed in the Gadget model assessment. However, the drop in recruitment since 2005–2006 will result in a decline in fishable biomass and sustainable catches in the coming years”. Nursery areas off the south and southeast coast of Iceland have been closed to prevent the fishing of juveniles, including tusk. Tusk is within the TAC system and preliminary stock assessments under ICES WGDEEP.</p> <p>Wolffish is considered <u>not to be within biological limits</u>. Wolffish is also a valuable and vulnerable species. These are species where there the stock is declining, expected to decline or where recruitment has been declining and/or impaired. See Sl c below for scoring.</p> <p>Wolffish: The index of fishable biomass in 2013 was close to the longterm average. However, recruitment indices were at a historically low level in recent years. It is expected that the fishable stock will continue to decline due to low recruitment and that productivity of the stock will decline due to small incoming year classes.</p> <p>Other species considered as <u>vulnerable</u> are on either the IUCN red list or the OSPAR list. Grey skate (<i>Raja Dipturus batis</i>) and the European/common eel (<i>Anguilla anguilla</i>) are considered to be main retained species since they are considered to be critically endangered. Grey skate is considered to be depleted around Iceland. The common eel is mainly a freshwater species and is considered to be fairly common in Iceland, especially in the southern lowlands. Information on stock status for these species is not available.</p> | | |

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|-----------------|----------------------|---|---|---|
| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | | |
| | | <p>Vulnerable species taken as retained species in longlines are dogfish (<i>Squalus acanthias</i>) and mackerel shark (<i>Lamna nasus</i>). These two species are on the IUCN and/or the OSPAR list of vulnerable species. Stock status for these species is not known.</p> <p>Three types of bait are mainly used in the assessed longline fishery:</p> <ol style="list-style-type: none"> 1) The Argentinean short-finned squid (<i>Illex argentinus</i>); caught in the Southwest Atlantic. 2) Pacific saury (<i>Cololabis saira</i>), caught in the north Pacific. 3) Icelandic herring (<i>Clupea harengus</i>), from the Icelandic market. <p>Herring is managed through the Icelandic quota system or through NEAFC, and the amount used for bait was estimated to be ~0.09% of Icelandic landings. The estimated amount of bait used in the fishery amounted to ~2% of the international catches of saury and squid. Both saury and squid are short-lived pelagic species with rapid growth rates. The population size of these stocks is driven by environmental and biological factors to a large degree, apart from exploitation. It is thus highly unlikely that bait used in the Icelandic fishery can significantly affect population sizes.</p> | | |
| b | Guidepost | | | Target reference points are defined for retained species. |
| | Met? | | | No |
| | Justification | Target reference points are not defined for all retained species. | | |
| c | Guidepost | If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. | If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding. | |
| | Met? | Yes | Yes | |

| | | | |
|---|----------------------|---|-----------|
| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | |
| | Justification | <p>Atlantic wolffish: There are measures in place that is expected to prevent the fishery from hindering recovery of the stock. These measures include a TAC and the closure of a major spawning area off West Iceland during the spawning and incubation season in autumn and winter since 2010 (Regulation 754/2010). Recruitment indices increased for last 2 years, fishing mortality has declined for the last 3 years and the fishable stock is close to average.</p> <p>Wolffish is part of the Icelandic fisheries management system, regular stock assessments are done and the stock is managed by TAC and/or other measures such as temporal and/or spatial closures. All advice from the MRI has been adopted by the Ministry for setting TACs and/or other regulations for the 2013/14 quota year. The assessed fishery operates within the ITQ system and is subject to monitoring of landings and surveillance, which ensures effective management of TAC's and other measures such as area closures.</p> <p>Vulnerable species: Over the last five years, catches of grey skate from longlines amounted to an average of 37t per year. Catches of dogfish were 20t and catches of Mackerel shark were 0.04t. These low catches demonstrate that the fishery is not targeting these species and therefore do not hinder recovery of these species. In addition, there are other measures in place to protect vulnerable species, such as monitoring of landings, discard bans and area closures.</p> <p>Common eel (<i>Anguilla anguilla</i>): The species is catadromous, living in fresh water and migrating to marine waters to breed. Only 0.05t were caught by longliners on average over the past 5 years. Impacts of the fishery in the eel stock would be considered to be negligible and catches are purely incidental, since the species completes the majority of its lifecycle in freshwater.</p> | |
| d | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery. | |
| | Met? | Yes | |
| | Justification | Stock status for most of the vulnerable species is poorly known. None of these species are targeted in the fishery and catches for all of these species are small and considered as a bycatch in the assessed fishery. In fact, all catches except grey skate are below 6t per year on average. There are measures in place such as monitoring and verification of all catches at landing, discards bans, and areas which have been closed for decades having a secondary effect of serving as MPAs. | |
| References | | Anon. 2013, ICES advice 2012; Regulation 754/2010. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Longline - Management (Retained species)

Evaluation Table for PI 2.1.2

| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
|---------------|----------------------|--|--|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing retained species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>The Fisheries Management Act requires that all catches shall be landed. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch. Masters of fishing vessels shall keep special log books of catch statistics (such as location, dates, gear and catch quantity) and inspectors from the DF have access to the log books.</p> <p>In addition, closure of fishing areas is an important part of the quota management system in order to protect spawning grounds and juvenile fish. These measures form a strategy to manage impact of the fishery on retained species.</p> <p>Many of the retained species are managed by the MRI through TACs and/or other appropriate measures. These include all of the species considered as main retained by weight and management measures would be considered as a strategy at the 100 level.</p> <p>However for other vulnerable species the measures in place include monitoring of landings, spatial and/or temporal closures and bans on discards. These measures form a partial strategy at the 80 level.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG80: Most of the retained species are monitored by MRI surveys. Strategies for many of the retained species are therefore comparable to those for the target species. Information about the retained species could be directly obtained from the DF database. Information on retained species is based on landed catch and MRI surveys as well as fishermen’s logbooks. Fishing efforts are limited by quota, area closures to protect undersized fish, and gear specific closures. Closures and minimum landing size are monitored by the Coast Guard. The availability of information about the fishery provides evidence that the strategy is working.</p> <p>The stock status and track record of the main retained species and many of the lesser retained species, show that the management strategy of these species is working. In addition, there are examples of species, such as cod, recovering from very low levels under the Icelandic Fisheries Management system.</p> | | |

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|---|----------------------|--|---|--|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | SG80: The quota system ensures implementation of the strategy. Information from the DF database, the Coast Guard and the logbook returns provide evidence that the partial strategy is being implemented successfully. The discard ban and official weighing has been in place for some decades. Discards have been decreasing (Pálsson et al. 2013). Area closures during spawning and closures to protect undersized fish have also been in place for decades. | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |
| | Met? | | | No |
| | Justification | Many of the retained species stocks are well managed through the TAC's and other measures including surveillance, verified landings, and discard bans. However, MRI does not provide TAC advice on some of the lesser retained species which are not targeted. Therefore a score of 100 cannot be justified. | | |
| e | Guidepost | It is likely that shark finning is not taking place. | It is highly likely that shark finning is not taking place. | There is a high degree of certainty that shark finning is not taking place. |
| | Met? | Yes | Yes | Yes |
| | Justification | Various shark species are occasionally reported as retained species. Vessels are required to have VMS (although not video linked), and fishermen are required to land all species intact, with dockside verification of the catch. In Iceland there is a domestic market for shark flesh and sharks are landed whole. It is thus the flesh rather than the fins that is valuable. | | |
| References | | Pálsson et al. 2013 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Longline - Information (Retained species)

Evaluation Table for PI 2.1.3

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|----------------------|---|-------|--------|
| PI 2.1.3 | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| Scoring Issue | SG 60 | SG 80 | SG 100 |

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|-----------------|----------------------|---|--|---|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| a | Guidepost | Qualitative information is available on the amount of main retained species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery. | Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch.</p> <p>SG80: By law, all catch shall be landed and recorded by harbour officials and log books are mandatory. Therefore quantitative information on the amount of all retained species taken in the fishery is available.</p> <p>Although accurate and verifiable information is available for all retained species, the consequence for affected populations is not known in all cases.</p> | | |
| b | Guidepost | Information is adequate to qualitatively assess outcome status with respect to biologically based limits. | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: The MRI conducts several types of monitoring surveys annually. Most of the retained species are routinely monitored through several types of surveys (ground fish-, gill net-, and shrimp surveys extending into shallow and deep waters all around Iceland) conducted by MRI each year. They provide relevant information that can be used to assess changes in stock indices, distribution in age and length frequency and spatial distribution. As all main retained species (by weight) are routinely monitored, changes in stock levels can be monitored. For those species that are also monitored through recordings of landings, enough information exists for stock assessment.</p> <p>SG80: A comprehensive range of data is available for the outcome status of main retained species through MRI monitoring surveys each year. Survey data is used to evaluate changes in stock levels for TAC species and the data can also be used in this way for a number of other retained species which are not subject to TAC (Björnsson et al. 2007).</p> <p>SG100: Many of the retained species are routinely monitored during MRI surveys, which provide quality data fit for stock assessments, and information is sufficient to quantitatively estimate outcome status with a relatively high degree of certainty, if needed. However, not all retained species are part of the MRI monitoring surveys. Therefore information is not adequate in all cases.</p> | | |
| c | Guidepost | Information is adequate to support measures to manage main retained species. | Information is adequate to support a partial strategy to manage main retained species. | Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. |
| | Met? | Yes | Yes | No |

| | | | | |
|---|----------------------|--|---|---|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| | Justification | <p>SG60: Information exists for stock assessments of main retained species by weight. All retained species are monitored through landing recordings.</p> <p>SG80: Monitoring of main retained species is performed during surveys and through statistical analysis of landed catch and information from logbooks. These procedures give a fair estimate of mortalities of most of the retained species and full information on fisheries removals.</p> <p>SG100: Some of the retained species are not part of the MRI monitoring surveys. Therefore, information is not adequate in all cases.</p> | | |
| d | Guidepost | | Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy) | Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG80: Monitoring of main retained species is performed during MRI surveys, through statistical analysis of landed catch and from information in logbooks. These procedures give a fair estimate of mortalities of these species and also a number of other retained species (TAC species) taken by the fishery. Monitoring of landed catches by the DF continues to be collected and information can detect any changes in risk to any of the retained species. There is a continued ban on discards and annual assessment of discard rates for the main species (see table 3.9) are carried out by the MRI (Pálsson 2013).</p> <p>SG100: Monitoring of landed catches is in place and recorded in sufficient detail to assess mortalities of all retained species within the fishery. This assumes that in this context mortality means fishery removal.</p> | | |
| References | | Björnsson et.al. 2007, Anon. 2013, Pálsson 2013 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Longline Principle 2: Bycatch Species

Longline – Outcome (Bycatch species)

Evaluation Table for PI 2.2.1

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|----------------------|------------------|---|--|--|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below). | Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below). | There is a high degree of certainty that bycatch species are within biologically based limits. |

| | | | | |
|-----------------|----------------------|---|---|----|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Bycatch species are defined as those species that are not retained but which are discarded. There is no systematic monitoring of discard in place. However, research by MRI and measurements by the DF indicate that the main discards in the Icelandic fisheries are of cod and haddock. Estimated discards of cod and haddock have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) for cod and haddock were lower than previously recorded, 0.04% of total cod landings (Pálsson et al. 2013). Since cod and haddock are the main discard in Icelandic fisheries and their estimated discard rates are very low we conclude that the scale of discarding of other species is likely to be even smaller. Therefore there are no main bycatch species in the assessed fisheries.</p> <p>SG80: Discarding is not allowed. There are several features in the fisheries management system which reduces the incentive to discard (see chapter 3.4.3 Bycatch species). It is evident that in all the assessed fisheries catches of low commercial value were landed (e.g. dogfish, sea cucumber, black scabbard-fish, ribbonfish, and mackerel shark (Tables 3.2 to 3.7). Discarding ban, measures which reduces the incentive to discard and landing of catches of low commercial value will suggest that the total catch is retained and landing data is representing the approximate total mortality by the fisheries. Catches representing <0.001% of total catch landed indicate that discarding is insignificant in the assessed fisheries, or at least not reaching the level of major bycatch species (5% of the total catch).</p> <p>It has been estimated that more than 12.000 seabirds (more than one species) are drowned in gillnets each year (Petersen 2002). This is not a significant number compared to the estimated population size of seabirds around Iceland (see section 3.4.1, p. 19). According to Petersen (2002) similar number of birds are killed by gillnets and longline.</p> | | |
| b | Guidepost | If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. | If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding. | |
| | Met? | N/A | N/A | |
| | Justification | | | |
| c | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery. | | |

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|---|----------------------|---|--|-----------|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| | Met? | N/A | | |
| | Justification | | | |
| References | | ICES 2011b; Jennings <i>et al.</i> 2001; Pálsson et al. 2013; Umhverfísráðuneytið 2011 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Longline– Management (Bycatch species)

Evaluation Table for PI 2.2.2

| | | | | |
|----------------------|----------------------|---|---|---|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing and minimizing bycatch. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The Fisheries Management Act requires that all catches shall be landed; therefore discarding is illegal. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported into a database operated by the DF. There are several measures included in the fisheries management system which should disincentive fishermen from discarding, e.g. 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 and up to 5% of the total landed catch can be classified as being of a low commercial value and is not subtracted from the quota allocated to the vessel.</p> <p>SG80: Large areas of Icelandic waters are closed for fishing in order to protect fish and habitats. The level of discarding in fisheries is assessed by MRI. Fishers are required to keep fish logbooks. An observer system is operated by the DF, both at landing sites and on board vessels. Breach of regulations leads to a warning or a fine. Repeated offenses lead to heavy fines, revocation of the vessel’s license to fish and possibly a prison sentence.</p> <p>SG100: 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) (Figure 3.11), which decreases the likelihood of large catches of juvenile fish. Areas are usually closed for fishing by means of bottom trawl and longline because of the presence of large amounts of juvenile fish or in order to protect spawning fish, but also vulnerable benthic habitats. The Icelandic Coast Guard monitors fishing activities in Icelandic waters, e.g. via VMS, including surveillance of areas closed for fishing.</p> <p>There are strict requirements for the keeping of fish logbooks which must be made available to the DF. Following a random inspection on landings, inspectors from the DF can directly join a vessel to visit the same fishing ground the vessel visited during the previous fishing trip, in order to examine their fishing practices and compare catch composition between fishing trips. Also, the system of instant recording of landings allows use of the 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.</p> <p>A vessel owner which is found to have acted in breach of some regulations gets a warning and sometimes a fine. Repeated offenses lead to heavy fines, revocation of the vessel’s license to fish and possibly to prison sentences.</p> <p>The assessed longline fishery uses mitigation measures in order to reduce bycatch of seabirds, i.e. 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.</p> | | |

| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
|----------|---------------|---|---|--|
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: Discarding is illegal. There are a number of measures that aim to ensure compliance with the law. Annual assessment on discarding by MRI indicates that discarding is at the least very limited.</p> <p>SG80: Following discussions with MRI, DF, the MII and the client during the site visit the assessment team concluded that there was a consensus among all parties on very low rate of discarding in the assessed fisheries. Estimated discards have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) were lower than recorded over the period 2001-2011 (Pálsson et al. 2013).</p> <p>SG100: From 2001-2010, mean cod discards were highest in the Danish seine fishery (2.70%) and in the gill net fishery (1.34%), but lower in the demersal trawl fishery (0.77%), and in the long line fishery (0.38%) (Pálsson et al. 2012). Mean haddock discards were highest in the Danish seine, (4.30%), and the demersal trawl (2.47%) fisheries, and lowest in the long line fishery (0.40%). Cod discards in all gear combined were 0.90% of landed catch (1680 tonnes), and haddock discards 2.02% (1488 tonnes).</p> <p>The population size of seabirds in Iceland is commonly more than 300.000 pairs and can be up to more than three million pairs (see section 3.4.1, p. 19). Bycatch estimates suggest that tens of thousand seabirds are drowned in gillnets each year (Petersen 2002) which is an insignificant number compared to the overall population sizes of seabirds around Iceland. According to Petersen (2002, table 3) similar number of birds are killed by gillnets and longline.</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG80-SG100: It is evident that retained species from the assessed fisheries were landed even though they are of low commercial value (e.g. dogfish, long rough dab) (Table 4.2). This, together with the fact that the main discards in Icelandic fisheries are of cod and haddock and that the MRI has estimated the discard rates to be less than 1% of landings, suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it does not reach the level of main bycatch species (5% of the total catch). Discard studies have been in place for over 10 years with well established procedures in place by the MRI, DF and the coast guard. Therefore, the bycatch/discarding management is successfully implemented.</p> | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |

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|---|----------------------|---|------------|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | |
| | Met? | | Yes |
| | Justification | Assessment by MRI indicates that the discard rates have declined from 2001-2011 and was at its lowest in 2011. | |
| References | | Pálsson et al. 2012& 2013; Stakeholder consultation | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 100 |
| CONDITION NUMBER (if relevant): | | | |

Longline– Information (Bycatch species)

Evaluation Table for PI 2.2.3

| | | | | |
|----------------------|----------------------|---|---|---|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Qualitative information is available on the amount of main bycatch species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery. | Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: Research by the MRI and measurements by the DF, including on board surveillance, indicate that the main discards in the Icelandic fisheries are of cod and haddock.</p> <p>SG100: While scientific studies indicate that discarding exists at a low level, there is no systematic monitoring of discards in place in Iceland.</p> <p>Harmonisation: The ISF cod/haddock (ISF C/H) assessment scores 100 for this PI. Scoring is not separated by SI, it is thus difficult to explain differences for each SI. However, there is a difference in the species considered. The ISF cod/haddock certifications defined bycatch species as retained species of less than 5%. For the current certification the team used the MSC definition of bycatch (CR Table AA1); and only discards are considered here. The ISF C/H assessments also do not mention the extensive discard studies done in Icelandic waters.</p> | | |
| b | Guidepost | Information is adequate to broadly understand outcome status with respect to biologically based limits | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty. |
| | Met? | Yes | Yes | No |

| | | | | |
|-----------------|----------------------|---|--|--|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | | |
| | Justification | <p>SG60: The main discards in Icelandic fisheries are of cod and haddock. The MRI has estimated the discard rate to be less than 1% of landings, which suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it has not reached the level of main bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG80-100: Standardized annual groundfish surveys have been conducted by MRI since 1985 including biological sampling of large numbers of demersal fish species. This information should make it possible to estimate outcome status of a number of retained/bycatch species, but not all.</p> <p>The population size of seabirds in Iceland is commonly more than 300.000 pairs and can be up to more than three million pairs (see section 3.4.1, p. 19). Bycatch estimates suggest that tens of thousands seabirds are drowned in gillnets each year (Petersen 2002), which is an insignificant number compared to the overall population sizes of seabirds around Iceland.</p> <p>Harmonisation: see comment in SI a.</p> | | |
| c | Guidepost | Information is adequate to support measures to manage bycatch. | Information is adequate to support a partial strategy to manage main bycatch species. | Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: The main discards in Icelandic fisheries are of cod and haddock. The MRI has estimated the discard rate to be less than 1% of landings, which suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it has not reached the level of major bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG100: It can be inferred that bycatch/discarding is a minor problem in the assessed fisheries. However, since comprehensive monitoring is not in place, the level of bycatch/discarding cannot be evaluated with a high degree of certainty.</p> <p>Harmonisation: see comment in SI a.</p> | | |
| d | Guidepost | | Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy). | Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species. |
| | Met? | | Yes | No |

| | | | |
|--|----------------------|---|-----------|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | |
| | Justification | <p>SG80: The fishery is a part of the logbook and observer system operated by the DF and surveillance of the fishery is in operation. The Directorate's database provides instant quantitative information on landings of all retained species. The database is also used in assessment work by the MRI. Annual discard estimates by the MRI is ongoing.</p> <p>SG100: While scientific studies on discarding are ongoing, there is no systematic monitoring of discards in place in Iceland.</p> <p>Harmonisation: see comment in SI a.</p> | |
| References | | Pálsson et al. 2012& 2013; Stakeholder consultation | |
| OVERALL PERFORMANCE INDICATOR SCORE: All gear | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Longline Principle 2: ETP Species

Longline - Outcome (ETP species)

Evaluation Table for PI 2.3.1

| | | | | |
|----------------------|----------------------|---|--|---|
| PI 2.3.1 | | The fishery meets national and international requirements for the protection of ETP species | | |
| | | The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species. | The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. | There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>None of the species caught by the fishery are included in Appendix I of CITES. Atlantic halibut (<i>Hippoglossus hippoglossus</i>) is an ETP species recognized by Icelandic authorities.</p> <p>SG60-80: On 1st January 2012 a regulation was implemented stipulating a ban on targeting halibut and demanding fishers to release all viable halibut back to the sea if by-caught. The effects of the fishery on the halibut stock are known through recordings of landings and it operates under regulation 1164/2011 on halibut fishing.</p> <p>SG100: The ban on halibut fishing has only been recently introduced, and the effectiveness of the strategy cannot be determined yet. A decrease in total landings of halibut indicates that the ban is working. However, the survival rate of viable halibut returned to sea is not known.</p> <p>Harmonisation: ISF cod/haddock score = 95. The ISF cod/haddock certifications account for all birds and mammal bycatch in the ETP scoring, whereas in the current assessment, the team defined ETP species as indicated by CR3.11.1; i.e. species recognized by national ETP legislation or species listed in CITES Appendix I.</p> | | |

| | | | | |
|---|----------------------|---|--|--|
| PI 2.3.1 | | The fishery meets national and international requirements for the protection of ETP species | | |
| | | The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species | | |
| b | Guidepost | Known direct effects are unlikely to create unacceptable impacts to ETP species. | Direct effects are highly unlikely to create unacceptable impacts to ETP species. | There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The assessed saithe fishery is not targeting Atlantic halibut. The catch of halibut has decreased since the ban on targeting halibut was introduced.</p> <p>SG80: In the period 2007-2013 the landed catch of Atlantic halibut by the saithe fishery by fishing gear was 0.01 to 0.26% (Table 3.11). None of the assessed fishing gear was targeting halibut and in all gears the lowest annual catch was for the fishing year when the regulation was implemented (2011/12). Catch numbers until May 2013 indicate an even further reduction in landed catch (see Table 3.11).</p> <p>During the period 2007-2011 the landed catch of Atlantic halibut ranged from 249 to 448 tonnes. In 2012 the catch was 112 tonnes. The landed catch from September 2012 to May 2013 was 4 tonnes.</p> <p>The current landed catch levels indicate that direct mortality of halibut is significantly lower than it used to be. Furthermore, the figures for the period September 2012 to May 2013 (45 tonnes total landed catch) suggest that the direct fishing mortality is decreasing even further.</p> <p>SG100: The decline in catch of halibut in 2012-13 indicates that the fishery is complying with the regulations which ban targeting halibut. However, it has only been in operation for short time and it remains to be seen whether it will lead to recovery of the Atlantic halibut stock.</p> <p>Harmonisation: see rationale in Scoring Issue (a) above.</p> | | |
| c | Guidepost | | Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts. | There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is not targeted and that viable specimens are released and returned to sea. However, there is no information on how much halibut was released in 2012 or its survival rate following discarding. The release mortality rate of Atlantic halibut has not been estimated. On a global scale, release mortality estimates of halibut species are highly variable, commonly ranging between 10-50% (Alverson et al. 1996; Meyer 2007).</p> <p>SG100: The release mortality rate of Atlantic halibut has not been estimated.</p> <p>Harmonisation: see rationale in Scoring Issue (a) above.</p> | | |
| References | | Alverson et al. 1996; Meyer 2007; Regulation 1164/2011. | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Longline - Management (ETP species)

Evaluation Table for PI 2.3.2

| | | | | |
|----------------------|----------------------|--|---|---|
| PI 2.3.2 | | <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are <u>measures</u> in place that <u>minimise</u> mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a <u>strategy</u> in place for managing the fishery’s impact on ETP species, <u>including measures to minimise mortality</u> , which is designed to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a comprehensive strategy in place for managing the fishery’s impact on ETP species, including measures to minimise mortality, which is designed to achieve <u>above</u> national and international requirements for the protection of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: All the catch landed in Iceland must be weighed and reported. Port authorities are responsible for the correct weighing and recording of the catch. Landings are monitored by the DF. Area closure for fishing is an integrated part of the management, both for fish species and habitats. The MII issued a regulation imposing a ban on targeting halibut and demanding fishers to release all viable halibut back to the sea if caught.</p> <p>SG80: 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 these conventions a number of mechanisms have been developed to detect and reduce impacts. For example the OSPAR has identified a number of key species and habitats which are considered threatened or declining (OSPAR Commission 2008a&b). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine species and ecosystems, and (b) protect vulnerable benthic ecosystems. The MII issued regulations where a ban was set on a direct fishery for halibut and that all viable halibut must be released in other fisheries.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species). | There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved. | The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work. |
| | Met? | Yes | Yes | No |

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|---|---------------|---|--|--|
| PI 2.3.2 | | <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| | Justification | <p>SG60: Area closure for fishing is an integrated part of the fishery management system, in order to reduce catch of juvenile fish (Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands). This is likely to reduce catches of juvenile halibut.</p> <p>SG80: The management strategy is enforced by the Directorate of Fisheries and Icelandic Coast Guard. Data on halibut catch will indicate whether the ban on targeting halibut is working.</p> <p>SG100: The ban on halibut fishing has not been in operation long enough to evaluate its effectiveness, since this is a long lived species.</p> | | |
| c | Guidepost | | There is evidence that the strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: A decrease in landed catches since the ban was implemented, indicates that the strategy is being successfully implemented.</p> <p>SG100: A decreasing trend in landed catch indicates modification of fishing practices. However, no study has been made on the survival rate of viable halibut when released back to sea.</p> | | |
| d | Guidepost | | | There is evidence that the strategy is achieving its objective. |
| | Met? | | | No |
| | Justification | <p>SG100: The ban on direct halibut fishing has not been in operation long enough to evaluate its effectiveness.</p> | | |
| References | | Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands, Anon. 2012a; Ministry for the Environment 2010;OSPAR Commission 2008a&b | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Longline - Information (ETP species)

Evaluation Table for PI 2.3.3

| | | | | |
|----------------------|----------------------|--|--|--|
| PI 2.3.3 | | Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Information is sufficient to qualitatively estimate the fishery related mortality of ETP species. | Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species. | Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The Directorate of Fisheries database provides quantitative information on retained species taken by the assessed fishery. The Atlantic halibut stock is monitored annually by the MRI. The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is released from the fishery and back to sea. No direct estimate on release mortality rate is available for Atlantic halibut.</p> <p>SG80: Quantitative information on the amount of viable halibut released from the fishery and back to sea and its survival rate is not available. Although, release numbers and - mortalities cannot be directly determined, full information is available on landings of halibut for all gears in the fishery.</p> <p>SG100: Information available for halibut includes survey data, catch composition and age/length data. This information can be regarded as sufficient to determine the stock status relative to reference point.</p> | | |
| b | Guidepost | Information is adequate to broadly understand the impact of the fishery on ETP species. | Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. | Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut.</p> <p>SG80: Historically, halibut has mainly been taken as bycatch (retained species) in the bottom trawl and longline fisheries in Iceland, and catch by other gear is relatively insignificant. In recent years the proportional catch by bottom trawl has decreased and the majority of the landed halibut catch has been by longline (Figure 3.29). Since 2000 the main fishing grounds of halibut have been on the Reykjanes ridge and NW of the ridge (Figure 3.29). Since the ban on targeting halibut was introduced the landed catch has decreased considerably (Table 3.12).</p> <p>SG100: The DF database provides quantitative information on retained species taken by the assessed fishery. However, quantitative information on the amount of halibut released following the issuing of the ban on targeting halibut is not available, nor is the survival rate of discarded halibut. Therefore, not all mortalities can be accounted for and hence not the magnitude of all impacts.</p> | | |

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|---|----------------------|--|---|---|
| PI 2.3.3 | | Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • 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. | | |
| c | Guidepost | Information is adequate to support measures to manage the impacts on ETP species. | Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species. | Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut. The halibut stock status is monitored by MRI and used to be managed by TAC.</p> <p>SG80: Data from the DF and MRI are used to assess the stock status and trends in the catches and biomass index for Atlantic halibut. The information is sufficient to measure the response of the depleted halibut stock and to evaluate whether the stock will recover following the ban on halibut target fisheries.</p> <p>SG100: Information on the amount of released viable halibut and its survival rate is lacking. Therefore, it cannot be evaluated with a high degree of certainty whether the strategy is achieving its objectives.</p> | | |
| References | | Alverson et al 1996; Umhverfissráðuneytið 2011 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Longline Principle 2: Habitat

Longline - Outcome (Habitat)

Evaluation Table for PI 2.4.1

| | | | | |
|----------------------|------------------|---|---|--|
| PI 2.4.1 | | The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |
| | | SG60: Static fishing gear, such as set nets, handline and longlines do not affect large areas of seabed and are not thought to cause serious or irreversible harm to habitat structures (Jennings <i>et al.</i> , 2001). | | |

| | | |
|---|--|--|
| PI 2.4.1 | The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function | |
| | | SG80-100: Scientific evidence indicates that it is highly unlikely that gillnets, handline, longlines, Danish seine and <i>Nephrops</i> trawl reduce habitat structure and function to a point where there would be serious or irreversible harm (Ball et al. 2000, Jennings et al. 2001, Thórarinsdóttir et al. 2010). |
| References | Anon. 2004; Ball <i>et al.</i> 2000; Garcia <i>et.al.</i> 2006; Jennings <i>et al.</i> 2001; Ministry of the Environment 2010; Ministry of Fisheries 2004; OSPAR Commission2008a&b; Thórarinsdóttir et al. 2010; Ólafsdóttir & Burgos 2012; Steingrímsson & Einarsson 2004 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | 100 |
| CONDITION NUMBER (if relevant): | | |

Longline - Management (Habitat)

Evaluation Table for PI 2.4.2

| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | | |
|---------------|----------------------|--|---|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. | There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. | There is a strategy in place for managing the impact of the fishery on habitat types. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: In Icelandic waters, large areas are closed for fishing, some of them temporarily (hours per day, days or seasonal) and others permanently (years) which protects bottom habitats from being damaged by fishing activities (Figure 3.11). The Icelandic Coast Guard monitors fishing activities in Icelandic waters in real time through VMS, including surveillance of areas closed for fishing.</p> <p>SG80: 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 Commission 2008a&b).</p> <p>SG 100: Ten coral areas with <i>L. pertusa</i> off S and SE Iceland have been closed for all fisheries using bottom contact gear (Ólafsdóttir & Burgos 2012). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine ecosystems, and (b) protect vulnerable benthic ecosystems.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats). | There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved. |
| | Met? | Yes | Yes | No |

| | | | | |
|---|----------------------|---|---|--|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | | |
| | Justification | <p>SG60: Area closure for fishing is an integrated part of the fishery management system, in order to reduce catch of juvenile and spawning fish. This measure has a secondary effect, i.e. protecting bottom habitats. Furthermore, the Act 97/1997 (“um veiðar í fiskveiðilandhelgi Íslands”) allows managers to close vulnerable habitats for fishing. Several vulnerable habitats areas have been closed for fishing.</p> <p>SG80: The management strategy is enforced by the Icelandic Coast Guard including vulnerable habitat areas which are closed for fishing. Operation of all Icelandic fishing vessels is monitored by VMS and the MRI has access to electronic logbooks for scientific purposes (high resolution data). During a site visit the DF confirmed that no vessel has violated the closure of coral areas.</p> <p>SG100: The effectiveness of habitat area closures has not been evaluated, therefore clear evidence cannot be provided to show that the strategy is successfully implemented and is achieving its objectives.</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG 80: The Icelandic Coast Guard is responsible for law enforcement at sea and monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing.</p> <p>SG100: Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). One of the key strategies is intended to protect vulnerable benthic ecosystems. Ten coral areas off SE Iceland have been closed for all fisheries using bottom contact gear based on the Act 97/1997 (Ólafsdóttir & Burgos 2012).</p> | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its objective. |
| | Met? | | | Yes |
| | Justification | The significance of closed areas off Iceland in protecting juvenile cod has been evaluated. It provides evidence that closures of nursery grounds can be useful in protecting immature cod (Schopka et.al. 2010). | | |
| References | | Anon. 2012a; Regulation 97/1997; Ministry for the Environment 2010; OSPAR Commission 2008a&b; Ólafsdóttir & Burgos 2012; Schopka et al. 2010 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 95 |
| CONDITION NUMBER (if relevant): | | | | |

Longline – Information (Habitat)

Evaluation Table for PI 2.4.3

| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
|---------------|---------------|--|---|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There is basic understanding of the types and distribution of main habitats in the area of the fishery. | The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery. | The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG 60-80: The BIOICE programme has provided basic inventory of benthic fauna within the Icelandic territorial waters (Figure 3.6). Benthic samples have been collected from a variety of habitats, ranging widely in depth (<100 to 3100 m) and in temperature conditions (12° to -0.9°C). Also, the Marine Research Institute (MRI) has identified areas of vulnerable benthic habitats in Icelandic waters (cold water corals, areas with aggregation of large sponge, maerl beds; Figures 3.7-3.10) in relation to bottom trawl fishing activities (Steingrímsson & Einarsson 2004, Garcia et al. 2006). The MRI is currently carrying out research programmes in order to map benthic habitats in Icelandic waters (biology and geology, using multibeam echo sounder), including mapping cold water corals (<i>Lophelia pertusa</i>) and studying the interaction between fish and cold water coral habitats (CoralFISH project, http://www.eu-fp7-coralfish.net/).</p> <p>Through VMS there is detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats.</p> <p>SG 100: Information is available on the distribution of invertebrate species and habitats in Icelandic waters, as well as data on important environmental parameters. The distribution of main vulnerable habitats in Icelandic waters has been documented and the detail of knowledge is at a relevant scale. The habitat mapping by MRI is ongoing in addition to studies on the ecological function of vulnerable habitats (e.g. CoralFISH).</p> | | |
| b | Guidepost | Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. | Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear. | The physical impacts of the gear on the habitat types have been quantified fully. |
| | Met? | Yes | Yes | No |

| | | | | |
|---|----------------------|--|--|--|
| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
| | Justification | <p>SG 60: Static fishing gear, such as set nets, handline and longlines do not affect large areas of seabed and are not thought to cause serious or irreversible harm to habitat structures (Jennings <i>et al.</i>, 2001).</p> <p>SG 80: Through VMS there is detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. The VMS data is available for scientific purposes. Information is available on the distribution of invertebrate species and habitats in Icelandic waters. Therefore, there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear under assessment.</p> <p>SG 100: Although longline is unlikely to impact habitats; no studies have been conducted in Iceland.</p> | | |
| c | Guidepost | | Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | Changes in habitat distributions over time are measured. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The area coverage of the assessed fisheries is monitored through logbooks and VMS, thus their spatial distribution is known in relation to vulnerable habitats. The habitat mapping by MRI is ongoing in addition to studies on the ecological function of vulnerable habitats (e.g. the CoralFISH project).</p> <p>SG100: The MRI research program aims to map benthic habitats in Icelandic waters but not to measure the changes in habitat distribution over time.</p> | | |
| References | | Bell <i>et al.</i> 2000; Eiríksson 1993; Garcia <i>et al.</i> 2006; Jennings <i>et al.</i> , 2001; Ministry of Fisheries 2004; Ólafsdóttir & Burgos 2012; Ragnarsson & Lindegarth 2009; Steingrímsson & Einarsson 2004; Jennings <i>et al.</i> 2001; Thórarinsdóttir <i>et al.</i> 2010 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Longline Principle 2: Ecosystem

Longline – Outcome (Ecosystem)

Evaluation Table for PI 2.5.1

| | | | | |
|----------------------|----------------------|--|--|---|
| PI 2.5.1 | | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: Extensive studies on the feeding ecology of a large number of demersal fish species, marine mammals and seabirds have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic marine ecosystems. Cod is a major fish predator in the marine ecosystems around Iceland, which preys mainly on capelin and shrimp (<i>Pandalus borealis</i>).</p> <p>Saithe preys on pelagic prey items, typically capelin (<i>Mallotus villosus</i>) and krill (Euphausiacea).</p> <p>None of the assessed fisheries is likely to affect key ecosystem species to a point where there would be serious or irreversible harm.</p> <p>SG80-100: Saithe is not considered to be a key prey species in the Icelandic ecosystem, and preys on pelagic items, typically capelin and krill.</p> <p>Cod is one of the main predators in Icelandic waters. In all of the assessed fishing gear, cod was one of the main retained species. It contributed approximately 50-70% to the total catch in the assessed gillnet, handline and longline fisheries but less in bottom trawl, Danish seine and Nephrops trawl (around 30%). The stock biomass of cod has been increasing and is now larger than observed in the last three decades. This is believed to be the result of a decrease in harvest rate. None of the other retained species are considered as key species in the ecosystem of Icelandic waters. Also, the assessed fisheries do not directly affect the most important prey species in the ecosystem, capelin. There is evidence that the main driving factor for ecosystem change in Icelandic waters is abiotic (Valdimarsson <i>et.al.</i> 2012).</p> <p>Cod has been shown to directly affect the biomass of the (offshore) shrimp population (<i>Pandalus borealis</i>). This is currently taken into account in the MRI assessments (using GADGET models) as has the effect of the capelin on cod growth (using regression models). All of these models indicate that the cod fishery as a whole has negligible negative effects. If the fishery targeting the key ecosystem predator in Icelandic waters is not having a significant impact, it is unlikely that the saithe fishery will. The assessed fishery is highly unlikely to disrupt any key elements of the ecosystem structure or function.</p> <p>Saithe is commonly associated with deep water coral reefs and they appear to be an important part of the ecosystem surrounding the species.</p> <p>The DF database provides relatively good evidence that none of the assessed fisheries catch key ecosystem species. The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure.</p> | | |
| References | | Anon. 2010; Anon. 2012b; Anon. 2011b; Astthorsson et al. 2007; Auster 2005; Barbaro et al. 2008; Foley et.al 2010; Garcia et al. 2006; Jaworski & Ragnarsson 2006; Jónsson 1997; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson 1997; Stefánsson 2003; Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; | | |

| | |
|---|--|
| PI 2.5.1 | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function |
| | Valdimarsson & Jónsson 2007; Valdimarsson <i>et.al.</i> 2012; Vilhjálmsson 2002. |
| OVERALL PERFORMANCE INDICATOR SCORE: | 100 |
| CONDITION NUMBER (if relevant): | |

Longline – Management (Ecosystem)

Evaluation Table for PI 2.5.2

| | | | | |
|----------------------|---|---|---|--|
| PI 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | | |
| Scoring Issue | SG 60 | SG 80 | SG 100 | |
| a | Guidepost | There are measures in place, if necessary. | There is a partial strategy in place, if necessary. | There is a strategy that consists of a plan, in place. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The DF database would provide evidence if the assessed fisheries were to catch a significant amount of key ecosystem species.</p> <p>SG80-100: Key ecosystem fish species (e.g. capelin and cod) are subject to the quota system, as is saithe. Large areas are closed for fishing in Icelandic waters in order to protect juvenile fish or spawning fish but also vulnerable habitats. These closures are stipulated in the Fisheries Management Act. The Icelandic Coast Guard monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing and inspection of gear related practices. There is a strategy with a plan, if it so happened that the saithe fishery should pose a risk or harm to ecosystem structure and function (Ministry of the Environment 2010).</p> | | |
| b | Guidepost | The measures take into account potential impacts of the fishery on key elements of the ecosystem. | The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. | The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|---|--|--|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | |
| | Justification | <p>SG60-80: The DF database would provide evidence if the assessed fisheries were to catch significant amounts of key ecosystem species. 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. MRI is monitoring key elements of the ecosystem and the monitoring would indicate if fisheries are having impact on key elements of the ecosystem.</p> <p>The MRI carries out wide ranging and extensive research on the status and productivity of the 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 the fish stocks (e.g. Anon. 2011a, Anon. 2012a). 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 aims protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>SG100: General measures include monitoring the status of the key ecosystem elements in Icelandic waters (e.g. the capelin stock). In addition, routine monitoring includes biological sampling from catches, which also include non-commercial catch information, as well as verification of log-book records. Capelin and some other key ecosystem species are regulated by TAC. The quota system has been demonstrated to work. Impacts are e.g. restrained by TAC, and area closure in addition to surveillance by the Directorate of Fisheries and Icelandic Coast Guard. Inspectors may accompany fishing vessels on voyages or board 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. Cases of serious or repeated deliberate violation shall furthermore be liable to imprisonment for up to six years. 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 aims to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> | | |
| c | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved. |
| | Met? | Yes | Yes | Yes |

| | | | |
|-------------------|----------------------|--|---|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | |
| | Justification | <p>SG60: There is evidence that the monitoring and surveillance by the DF and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing licenses.</p> <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. The measures are considered highly likely to work.</p> <p>SG 100: Closure of coral areas to fishing off South Iceland, demonstrates that measures to protect the ecosystem are in place and implemented successfully. 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 aim to protect vulnerable benthic ecosystems. (Ministry for the Environment 2010).</p> <p>The fishery has no demonstrable effects on key predator or prey species. If such effects were discovered they would be mitigated with available measures, such as the quota system and area closures. Inspectors may accompany fishing vessels on voyages or board vessels to check their cargo and fishing gear. 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. Violations of the provisions of the Fisheries Management Act are liable to fines, regardless of whether committed deliberately or through negligence. Cases of serious or repeated deliberate violation are liable to imprisonment for up to six years. Violation of the act has resulted in penalties (DF site visit).</p> | |
| d | Guidepost | There is some evidence that the measures comprising the partial strategy are being implemented successfully. | There is evidence that the measures are being implemented successfully. |
| | Met? | Yes | Yes |
| | Justification | <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. There is evidence that the monitoring and surveillance by the DF and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing license.</p> <p>SG 100: The strategy is provided by the Fisheries Management Act and government policies. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>Measures have been implemented successfully, including area closures (fish and habitats), fishing bans (Atlantic halibut), discard bans, and ongoing work to increase the awareness of DF observers to bycatch of birds and mammals.</p> <p>Long-term changes in trophic patterns of Icelandic cod demonstrate the importance of capelin, northern shrimp, and euphausiids in the diet of the key fish predator in the ecosystem; cod (Pálsson & Björnsson 2011). Capelin and some other key ecosystem species are regulated by TAC and their importance in the ecosystem is accounted for in management strategies (e.g. Stefánsson 2003, Anon. 2013).</p> | |
| References | | Anon. 2010; Anon. 2012b; Anon. 2011b; Anon. 2013; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Ministry of the Environment 2010; Pálsson 1997; Schopka <i>et.al.</i> 2010; Stefánsson 2003; | |

| | |
|---|---|
| PI 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function |
| | Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. |
| OVERALL PERFORMANCE INDICATOR SCORE: | |
| | 100 |
| CONDITION NUMBER (if relevant): | |
| | |

Longline – Information (Ecosystem)

Evaluation Table for PI 2.5.3

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|---------------|---------------|---|--|---|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity). | Information is adequate to broadly understand the key elements of the ecosystem. | |
| | Met? | Yes | Yes | |
| | Justification | <p>SG60: Extensive studies have been conducted on the marine ecosystems of Icelandic waters (e.g. Astthorsson <i>et al.</i> 2007, Valdimarsson & Jónsson 2007). Studies on the feeding ecology of a large number of fish species, marine mammals and seabirds has provided information on the ecological function of most of the species caught by the assessed fisheries. These studies have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic waters ecosystems (Marine Research Institute 1997). Biomass estimates for stocks of fish, whales and seabirds in Icelandic waters and production estimates of <i>Calanus finmarchicus</i> and other zooplankton species have been used to calculate the biomass of individual components in the Icelandic marine ecosystem (Astthorsson <i>et al.</i> 2007).</p> <p>SG 80: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters, and this information is used in multi species modelling (GADGET models; e.g. Stefánsson & Pálsson 1998, Stefánsson 2003) for MRI assessments. The models have been used to evaluate interactions between fisheries and key ecosystem elements. Information about these interactions has been taken into account for management purposes.</p> | | |
| b | Guidepost | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail. | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail. | Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated. |
| | Met? | Yes | Yes | No |

| | | | |
|-----------------|----------------------|---|--|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| | Justification | <p>SG60: Saithe is not a key ecosystem species and preys mainly on invertebrates. The DF database provides detailed information on catches of target and retained species. This provides information about the impact of the assessed fishery on the populations involved and would provide evidence if adverse impacts on any key ecosystem species occur.</p> <p>SG80: The main impacts of the fishery on key elements of the ecosystem such as key predators, prey and vulnerable habitats can be inferred. Information on mortality of key predators and prey is known and recorded (retained species).</p> <p>The DF database provides detailed information on catches of target and retained species (bycatch/discard is considered not significant). This provides information about the impact of the assessed fisheries on the populations involved.</p> <p>Information on vulnerable habitats in Icelandic waters has been documented, including the coral <i>Lophelia pertusa</i>. MRI has mapped the distribution of coral areas in relation to fishing efforts by bottom trawling and has gathered evidence of impacts caused by such fishery. Coral areas have been closed, based on this evidence, and it can be expected that more coral areas will be closed in the future, as MRI continues its research project on the mapping of the habitats. The mapping will also support the recent strategic plan for the preservation of biodiversity in Icelandic waters. Furthermore, information on high catches of juvenile fish, gathered through the Directorate of Fisheries surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries.</p> <p>SG100: There is detailed information on the distribution of fishing efforts around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats. Evidence of detrimental impact on cold water corals by towed fishing gears have been compiled through scientific mapping (using ROV technique; Ministry of Fisheries 2004)</p> | |
| c | Guidepost | | <p>The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known.</p> <p>The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood.</p> |
| | Met? | | <p>Yes</p> <p>Yes</p> |
| | Justification | <p>SG80: The effect of the fishery on the target and the retained species are assessed annually. Bycatch is on a relatively small scale (see rationale for scoring bycatch). The feeding ecology of a number of demersal fish species has been documented, providing information on the ecological function of most of the species caught by the assessed fisheries. Information on vulnerable habitats in Icelandic waters has also been documented, including the coral <i>Lophelia pertusa</i>. The MRI has mapped the distribution of coral areas in relation to fishing efforts by otter trawling and has gathered evidence of impacts caused by fishing activities. The importance of vulnerable habitats known to occur in Icelandic waters is generally understood (e.g. <i>Lophelia</i> reefs, sponge aggregations).</p> <p>SG100: The DF database provides quantitative information on retained species taken by the assessed fishery. There is good knowledge on the distribution of the different fisheries which can be used to indicate if and where it overlaps with vulnerable habitats. There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters (e.g. Astthorsson <i>et.al.</i> 2007; Marine Research Institute 1997; Stefánsson & Pálsson 1998; Stefánsson 2003; Valdimarsson & Jónsson 2007). Saithe is not a key ecosystem species.</p> | |

| | | | |
|-----------------|----------------------|---|--|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| d | Guidepost | | <p>Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred.</p> <p>Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred.</p> |
| | Met? | | <p>Yes</p> <p>Yes</p> |
| | Justification | <p>SG 80: Sufficient information is available on retained species, bycatch and catch of ETP species through log books, and monitoring of landings. Distribution of fishing in relation to vulnerable habitats is known. This information base is sufficient for inferring the main consequences of fishing.</p> <p>SG100: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters. There is also detailed information on the catches taken from the system and the spatial overlap of the fisheries with vulnerable habitats. This information base is sufficient for inferring the main consequences of fishing.</p> | |
| e | Guidepost | | <p>Sufficient data continue to be collected to detect any increase in risk level (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures).</p> <p>Information is sufficient to support the development of strategies to manage ecosystem impacts.</p> |
| | Met? | | <p>Yes</p> <p>Yes</p> |
| | Justification | <p>SG 80: Data on individual landed catch is instantly entered in the DF database. The surveillance system carried out by the DF and the Coast Guard is constantly monitoring catch levels of juvenile fish and the MRI provides information on the need for measures in order to reduce impacts by fisheries. All this information is used for implementing protection measures (e.g. area closure) if the management considers it necessary. The MRI also monitors and manages a large number of species and has monitored environmental conditions in the Icelandic waters for decades. Therefore any potential threats or adverse trends can be quickly identified and responded to.</p> <p>SG100: The strategy is provided by the Fisheries Management Act. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010). Coral areas have been closed, based on scientific evidence, and it can be expected that more coral areas will be closed in the future as MRI continues its research project on the mapping of the habitats.</p> <p>Information on high catches of juvenile fish, gathered through the DF surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries. Actions which are considered necessary in order to improve species recruitment (e.g. closure of spawning areas) are based on research information and recommendations from the MRI. The closure of coral areas, are also based on scientific evidence, and it can be expected that more coral areas will be closed in the future as MRI continues research on the mapping of the habitats, their relationship with fisheries and other relevant environmental data. Collectively this information is sufficient to support development of strategies to manage ecosystem impacts.</p> | |

| | | |
|---|---|-----------|
| PI 2.5.3 | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| References | Anon. 2010; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson1997; Stefánsson 2003; Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thórarinsdóttir et al. 2010; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | 95 |
| CONDITION NUMBER (if relevant): | | |

Handline Principle 2: Retained species

Handline - Outcome (Retained species)

Evaluation Table for PI 2.1.1

| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | | |
|---------------|---------------|---|---|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below). | Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below). | There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points. |
| | Met? | Yes | Yes | No |
| | Justification | <p>Cod is the only main retained species as defined by weight (>5%) by Handline: Cod can be said to be highly likely to be within biologically based limits.</p> <p>Atlantic cod: The reference biomass (age 4+) in 2013 is estimated as 1,170,000t and the spawning stock as 480,000t, compared to Blim=125 and Btrigger=220 thousand t (Anon 2013). Fishing mortality has declined significantly in the last decade and is presently at a historical low, below likely candidates for Fpa and Flim (Anon. 2012, ICES 2012a).</p> <p>One vulnerable species is retained by handline; the mackerel shark (<i>Lamna nasus</i>). The species is on the IUCN and/or OSPAR list of vulnerable species. Stock status for this species is not known.</p> <p>Harmonisation: ISF cod/haddock score = 95. ISF cod/haddock certifications consider only saithe as a retained species and considered quantities of other retained species to be “trivial”. Here the team considered all retained species at SI100. Information is not available for all species, although they are caught in small quantities. There are also differences in methods for calculating retained species (see section 4.1).</p> | | |
| b | Guidepost | | | Target reference points are defined for retained species. |
| | Met? | | | No |
| | Justification | Target reference points are not defined for all retained species. | | |
| c | Guidepost | If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. | If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding. | |
| | Met? | Yes | Yes | |

| | | | | |
|---|----------------------|--|--|-----------|
| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | | |
| | Justification | Average catches of mackerel shark for the last 5 years was 0.02t per year. This negligible catch demonstrates that the fishery is not targeting this species and therefore do not hinder recovery. In addition, there are other measures in place, such as monitoring of landings, discard bans and area closures. | | |
| d | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery. | | |
| | Met? | Yes | | |
| | Justification | The stock status of mackerel shark is poorly known. However, the catch in this fishery is considered negligible, demonstrating that it is not targeted. There are measures in place such as monitoring and verification of all catches at landing, discards bans, and areas which have been closed for decades having a secondary effect of serving as MPAs. | | |
| References | | MRI 2013, ICES advice 2012. | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Handline - Management (Retained species)

Evaluation Table for PI 2.1.2

| | | | | |
|----------------------|------------------|--|--|---|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing retained species. |
| | Met? | Yes | Yes | No |

| | | | | |
|-----------------|----------------------|--|---|--|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
| | Justification | <p>The Fisheries Management Act requires that all catches shall be landed. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch. Masters of fishing vessels shall keep special log books of catch statistics (such as location, dates, gear and catch quantity) and inspectors from the Directorate of Fisheries have access to the log books.</p> <p>In addition, closure of fishing areas is an important part of the quota management system in order to protect spawning grounds and juvenile fish. These measures form a strategy to manage impact of the fishery on retained species.</p> <p>Many of the retained species are managed by the MRI through TACs and/or other appropriate measures. These include all of the species considered as main retained by weight and management measures would be considered as a strategy at the 100 level.</p> <p>However for other vulnerable species the measures in place include monitoring of landings, spatial and/or temporal closures and bans on discards. These measures form a partial strategy at the 80 level.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG80: Most of the retained species are monitored by MRI surveys. Strategies for many of the retained species are therefore comparable to those for the target species. Information about the retained species can be directly obtained from the DF database. Information on retained species is based on landed catch and the MRI surveys as well as fishermen's logbooks. Fishing efforts are limited by quota, area closures to protect undersized fish and gear specific closures. Closures and minimum landing size are monitored by the Coast Guard. The availability of information about the fishery provides evidence that the strategy is working.</p> <p>The stock status and track record of the main retained species and many of the lesser retained species, show that the management strategy of these species is working. In addition, there are examples of species, such as cod, recovering from very low levels under the Icelandic Fisheries Management system.</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The quota system ensures implementation of the strategy. Information from the DF database, the Coast Guard and the logbook returns provide evidence that the partial strategy is being implemented successfully. The discard ban and official weighing has been in place for some decades. Discards have been decreasing (Pálsson et al. 2013). Area closures during spawning and closures to protect undersized fish have also been in place for decades.</p> | | |

| | | | | |
|---|----------------------|---|---|--|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |
| | Met? | | | No |
| | Justification | Many of the retained species stocks are well managed through the TAC's and other measures including surveillance, verified landings, and discard bans. However, MRI does not provide TAC advice on some of the lesser retained species which are not targeted. Therefore a score of 100 cannot be justified. | | |
| e | Guidepost | It is likely that shark finning is not taking place. | It is highly likely that shark finning is not taking place. | There is a high degree of certainty that shark finning is not taking place. |
| | Met? | Yes | Yes | Yes |
| | Justification | Various shark species are occasionally reported as retained species. Vessels are required to have VMS (although not video linked), and fishermen are required to land all species intact, with dockside verification of the catch. In Iceland there is a domestic market for shark flesh and sharks are landed whole. It is thus the flesh rather than the fins that is valuable. | | |
| References | | Pálsson et al. 2013 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Handline - Information (Retained species)

Evaluation Table for PI 2.1.3

| | | | | |
|----------------------|------------------|---|--|--|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Qualitative information is available on the amount of main retained species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery. | Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |

| | | | | |
|-----------------|----------------------|---|---|---|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| | Justification | <p>SG60: All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch.</p> <p>SG80: By law, all catch shall be landed and recorded by harbour officials and log books are mandatory. Therefore quantitative information on the amount of all retained species taken by the fishery is available.</p> <p>Although accurate and verifiable information is available for all retained species, the consequence for affected populations is not known in all cases.</p> | | |
| b | Guidepost | Information is adequate to qualitatively assess outcome status with respect to biologically based limits. | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: The MRI conducts several types of monitoring surveys annually. Most of the retained species are routinely monitored through several types of surveys (ground fish-, gill net-, and shrimp surveys extending into shallow and deep waters all around Iceland) conducted by MRI each year. They provide relevant information that can be used to assess changes in stock indices, distribution in age and length frequency and spatial distribution. As all main retained species (by weight) are routinely monitored, changes in stock levels can be monitored. For those species that are also monitored through recordings of landings, enough information exists for stock assessment.</p> <p>SG80: A comprehensive range of data is available for the outcome status of main retained species through MRI monitoring surveys each year. Survey data is used to evaluate changes in stock levels for TAC species and the data can also be used in this way for a number of other retained species which are not subject to TAC (Björnsson et al. 2007).</p> <p>SG100: Many of the retained species are routinely monitored during MRI surveys, which provide quality data fit for stock assessments, and information is sufficient to quantitatively estimate outcome status with a relatively high degree of certainty, if needed. However, not all retained species are part of the MRI monitoring surveys. Therefore information is not adequate in all cases.</p> | | |
| c | Guidepost | Information is adequate to support measures to manage main retained species. | Information is adequate to support a partial strategy to manage main retained species. | Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Information exists for stock assessments of main retained species by weight. All retained species are monitored through landing recordings.</p> <p>SG80: Monitoring of main retained species is performed during surveys and through statistical analysis of landed catch and information from logbooks. These procedures give a fair estimate of mortalities of most of the retained species and full information on fisheries removals.</p> <p>SG100: Some of the retained species are not part of the MRI monitoring surveys. Therefore, information is not adequate in all cases.</p> | | |

| | | | | |
|---|----------------------|--|---|---|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| d | Guidepost | | Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy) | Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG80: Monitoring of main retained species is performed during MRI surveys, through statistical analysis of landed catch and from information in logbooks. These procedures give a fair estimate of mortalities of these species and also a number of other retained species (TAC species) taken by the fishery. Monitoring of landed catches by the DF continues to be collected and information can detect any changes in risk to any of the retained species. There is a continued ban on discards and annual assessment of discard rates for the main species (see table 3.9) are carried out by the MRI (Pálsson 2013).</p> <p>SG100: Monitoring of landed catches is in place and recorded in sufficient detail to assess mortalities of all retained species within the fishery. This assumes that in this context mortality means fishery removal.</p> | | |
| References | | Björnsson et.al. 2007, Anon. 2013, Pálsson 2013 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Handline Principle 2: Bycatch Species

Handline– Outcome (Bycatch species)

Evaluation Table for PI 2.2.1

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|----------------------|------------------|---|--|--|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below). | Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below). | There is a high degree of certainty that bycatch species are within biologically based limits. |
| | Met? | Yes | Yes | No |

| | | | | |
|-----------------|----------------------|---|---|--|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| | Justification | <p>SG60: Bycatch species are defined as those species that are not retained but which are discarded. There is no systematic monitoring of discard in place. However, research by MRI and measurements by the DF indicate that the main discards in the Icelandic fisheries are of cod and haddock. Estimated discards of cod and haddock have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) for cod and haddock were lower than previously recorded, 0.04% of total cod landings (Pálsson et al. 2013). Since cod and haddock are the main discard in Icelandic fisheries and their estimated discard rates are very low we conclude that the scale of discarding of other species is likely to be even smaller. Therefore there are no main bycatch species in the assessed fisheries.</p> <p>SG80: Discarding is not allowed. There are several features in the fisheries management system which reduces the incentive to discard (see chapter 3.4.3 Bycatch species). It is evident that in all the assessed fisheries catches of low commercial value were landed (e.g. dogfish, sea cucumber, black scabbard-fish, ribbonfish, and mackerel shark (Tables 3.2 to 3.7). 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 mortality by the fisheries. Catches representing <0.001% of total catch landed indicate that discarding is insignificant in the assessed fisheries, or at least not reaching the level of major bycatch species (5% of the total catch).</p> | | |
| b | Guidepost | If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. | If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding. | |
| | Met? | N/A | N/A | |
| | Justification | | | |
| c | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery. | | |
| | Met? | N/A | | |
| | Justification | | | |

| | | |
|---|---|-----------|
| PI 2.2.1 | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | |
| References | ICES 2011b; Jennings <i>et al.</i> 2001; Pálsson et al. 2013; Umhverfissráðuneytið 2011 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | 80 |
| CONDITION NUMBER (if relevant): | | |

Handline– Management (Bycatch species)

Evaluation Table for PI 2.2.2

| | | | | |
|----------------------|----------------------|---|---|---|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing and minimizing bycatch. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The Fisheries Management Act requires that all catches shall be landed; therefore discarding is illegal. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported into a database operated by the DF. There are several measures included in the fisheries management system which should disincentive fishermen from discarding, e.g. 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 and up to 5% of the total landed catch can be classified as being of a low commercial value and is not subtracted from the quota allocated to the vessel.</p> <p>SG80: Large areas of Icelandic waters are closed for fishing in order to protect fish and habitats. The level of discarding in fisheries is assessed by MRI. Fishers are required to keep fish logbooks. An observer system is operated by the DF, both at landing sites and on board vessels. Breach of regulations leads to a warning or a fine. Repeated offenses lead to heavy fines, revocation of the vessel’s license to fish and possibly a prison sentence.</p> <p>SG100: 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) (Figure 3.11), which decreases the likelihood of large catches of juvenile fish. Areas are usually closed for fishing by means of bottom trawl and longline because of the presence of large amounts of juvenile fish or in order to protect spawning fish, but also vulnerable benthic habitats. The Icelandic Coast Guard monitors fishing activities in Icelandic waters, e.g. via VMS, including surveillance of areas closed for fishing.</p> <p>There are strict requirements for the keeping of fish logbooks which must be made available to the DF. Following a random inspection on landings, inspectors from the DF can directly join a vessel to visit the same fishing ground the vessel visited during the previous fishing trip, in order to examine their fishing practices and compare catch composition between fishing trips. Also, the system of instant recording of landings allows use of the 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.</p> <p>A vessel owner which is found to have acted in breach of some regulations gets a warning and sometimes a fine. Repeated offenses lead to heavy fines, revocation of the vessel’s license to fish and possibly to prison sentences.</p> | | |

| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
|----------|---------------|---|---|--|
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Discarding is illegal. There are a number of measures that aim to ensure compliance with the law. Annual assessment on discarding by MRI indicates that discarding is at the least very limited.</p> <p>SG80: Following discussions with MRI, DF, the MII and the client during the site visit the assessment team concluded that there was a consensus among all parties on very low rate of discarding in the assessed fisheries. Estimated discards have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) were lower than recorded over the period 2001-2011 (Pálsson et al. 2013).</p> <p>SG100: From 2001-2010, mean cod discards were highest in the Danish seine fishery (2.70%) and in the gill net fishery (1.34%), but lower in the demersal trawl fishery (0.77%), and in the long line fishery (0.38%) (Pálsson et al. 2012). Mean haddock discards were highest in the Danish seine, (4.30%), and the demersal trawl (2.47%) fisheries, and lowest in the long line fishery (0.40%). Cod discards in all gear combined were 0.90% of landed catch (1680 tonnes), and haddock discards 2.02% (1488 tonnes).</p> <p>Harmonisation (Handline): ISF cod/haddock score = 95. Testing supports discard estimates in the bottom trawl, Danish seine, and gillnet fisheries. However, discard estimates for the handline and Nephrops trawl fisheries are not available; therefore a score of 100 for these fisheries cannot be justified.</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80-SG100: It is evident that retained species from the assessed fisheries were landed even though they are of low commercial value (e.g. dogfish, long rough dab) (Table 4.2). This, together with the fact that the main discards in Icelandic fisheries are of cod and haddock and that the MRI has estimated the discard rates to be less than 1% of landings, suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it does not reach the level of main bycatch species (5% of the total catch). Discard studies have been in place for over 10 years with well established procedures in place by the MRI, DF and the coast guard. Therefore, the bycatch/discarding management is successfully implemented.</p> | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |
| | Met? | | | No |

| | | | |
|---|----------------------|---|-----------|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | |
| | Justification | Assessment by the MRI indicates that the discard rates have declined since 2001 and were lowest in 2011. | |
| References | | Pálsson et al. 2012& 2013; Stakeholder consultation | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 85 |
| CONDITION NUMBER (if relevant): | | | |

Handline– Information (Bycatch species)

Evaluation Table for PI 2.2.3

| | | | | |
|----------------------|----------------------|--|---|---|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Qualitative information is available on the amount of main bycatch species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery. | Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: Research by the MRI and measurements by the DF, including on board surveillance, indicate that the main discards in the Icelandic fisheries are of cod and haddock.</p> <p>SG100: While scientific studies indicate that discarding exists at a low level, there is no systematic monitoring of discard in place in Iceland.</p> <p>Harmonisation: The ISF cod/haddock (ISF C/H) assessment scores 100 for this PI. Scoring is not separated by SI, it is thus difficult to explain differences for each SI. However, there is a difference in the species considered. The ISF cod/haddock certifications defined bycatch species as retained species of less than 5%. For the current certification the team used the MSC definition of bycatch (CR Table AA1); and only discards are considered here. The ISF C/H assessments also do not mention the extensive discard studies done in Icelandic waters.</p> | | |
| b | Guidepost | Information is adequate to broadly understand outcome status with respect to biologically based limits | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty. |
| | Met? | Yes | Yes | No |

| | | | | |
|-------------------|----------------------|---|--|--|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | | |
| | Justification | <p>SG60: The main discards in Icelandic fisheries are of cod and haddock. The MRI has estimated the discard rate to be less than 1% of landings, which suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it has not reached the level of main bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG80-100: Standardized annual groundfish surveys have been conducted by MRI since 1985 including biological sampling of large numbers of demersal fish species. This information should make it possible to estimate outcome status of a number of retained/bycatch species, but not all.</p> <p>Harmonisation: see comment in SI a.</p> | | |
| c | Guidepost | Information is adequate to support measures to manage bycatch. | Information is adequate to support a partial strategy to manage main bycatch species. | Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: The main discards in Icelandic fisheries are of cod and haddock. The MRI has estimated the discard rate to be less than 1% of landings, which suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it has not reached the level of major bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG100: It can be inferred that bycatch/discarding is a minor problem in the assessed fisheries. However, since comprehensive monitoring is not in place, the level of bycatch/discarding cannot be evaluated with a high degree of certainty.</p> <p>Harmonisation: see comment in SI a.</p> | | |
| d | Guidepost | | Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy). | Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The fishery is a part of the logbook and observer system operated by DF and surveillance of the fishery is in operation. The Directorate's database provides instant quantitative information on landings of all retained species. The database is also used in assessment work by the MRI. Annual discard estimates by the MRI is ongoing.</p> <p>SG100: While scientific studies on discarding are ongoing, there is no systematic monitoring of discards in place in Iceland.</p> <p>Harmonisation: see comment in SI a.</p> | | |
| References | | Pálsson et al. 2012& 2013; Stakeholder consultation | | |

| | | |
|---|--|----|
| PI 2.2.3 | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | |
| OVERALL PERFORMANCE INDICATOR SCORE: All gear | | 80 |
| CONDITION NUMBER (if relevant): | | |

Handline Principle 2: ETP Species

Handline - Outcome (ETP species)

Evaluation Table for PI 2.3.1

| | | | | |
|---------------|--|---|--|---|
| PI 2.3.1 | The fishery meets national and international requirements for the protection of ETP species The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species | | | |
| Scoring Issue | SG 60 | SG 80 | SG 100 | |
| a | Guidepost | Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species. | The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. | There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species. |
| | Met? | Yes | Yes | No |
| b | Justification | None of the species caught by the fishery are included in Appendix I of CITES. Atlantic halibut (<i>Hippoglossus hippoglossus</i>) is an ETP species recognized by Icelandic authorities. SG60-80: On 1 st January 2012 a regulation was implemented stipulating a ban on targeting halibut and demanding fishers to release all viable halibut back to the sea if by-caught. The effects of the fishery on the halibut stock are known through recordings of landings and it operates under regulation 1164/2011 on halibut fishing. SG100: The ban on halibut fishing has only been recently introduced, and the effectiveness of the strategy cannot be determined yet. A decrease in total landings of halibut indicates that the ban is working. However, the survival rate of viable halibut returned to sea is not known. Harmonisation: ISF cod/haddock score = 100. The ISF cod/haddock certifications account for all birds and mammal bycatch in the ETP scoring, whereas in the current assessment the team defined ETP species as indicated by CR3.11.1; i.e. species recognized by national ETP legislation or species listed in CITES Appendix I. | | |
| | Guidepost | Known direct effects are unlikely to create unacceptable impacts to ETP species. | Direct effects are highly unlikely to create unacceptable impacts to ETP species. | There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species. |
| | Met? | Yes | Yes | No |

| | | | |
|---|---|---|---|
| PI 2.3.1 | <p>The fishery meets national and international requirements for the protection of ETP species</p> <p>The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species</p> | | |
| | Justification | <p>SG60: The assessed saithe fishery is not targeting Atlantic halibut. The catch of halibut has decreased since the ban on targeting halibut was introduced.</p> <p>SG80: In the period 2007-2013 the landed catch of Atlantic halibut by the saithe fishery by fishing gear was 0.01 to 0.26% (Table 3.11). None of the assessed fishing gear was targeting halibut and in all gears the lowest annual catch was for the fishing year when the regulation was implemented (2011/12). Catch numbers until May 2013 indicate an even further reduction in landed catch (see Table 3.11).</p> <p>During the period 2007-2011 the landed catch of Atlantic halibut was approximately one to two tonnes. No halibut was landed by the handline fishery from September 2012 to May 2013.</p> <p>The current landed catch levels indicate that direct mortality of halibut is significantly lower than it used to be. Furthermore, the figures for the period September 2012 to May 2013 (45 tonnes total landed catch) suggest that the direct fishing mortality is decreasing even further.</p> <p>SG100: The decline in catch of halibut in 2012-13 indicates that the fishery is complying with the regulations which ban targeting halibut. However, it has only been in operation for short time and it remains to be seen whether it will lead to recovery of the Atlantic halibut stock.</p> <p>Harmonisation: see rationale in Scoring Issue (a) above.</p> | |
| c | Guidepost | | <p>Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts.</p> <p>There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species.</p> |
| | Met? | Yes | No |
| | Justification | <p>SG80: The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is not targeted and that viable specimens are released and returned to sea. However, there is no information on how much halibut was released in 2012 or its survival rate following discarding. The release mortality rate of Atlantic halibut has not been estimated. On a global scale, release mortality estimates of halibut species are highly variable, commonly ranging between 10-50% (Alverson et al. 1996; Meyer 2007).</p> <p>SG100: The release mortality rate of Atlantic halibut has not been estimated.</p> <p>Harmonisation: see rationale in Scoring Issue (a) above.</p> | |
| References | Alverson et al. 1996; Meyer 2007; Regulation 1164/2011. | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Handline - Management (ETP species)

Evaluation Table for PI 2.3.2

| | | | | |
|----------------------|----------------------|--|---|---|
| PI 2.3.2 | | <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are <u>measures</u> in place that <u>minimise</u> mortality of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a <u>strategy</u> in place for managing the fishery’s impact on ETP species, <u>including measures to minimise mortality</u> , which is designed to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a comprehensive strategy in place for managing the fishery’s impact on ETP species, including measures to minimise mortality, which is designed to achieve <u>above</u> national and international requirements for the protection of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: All the catch landed in Iceland must be weighed and reported. Port authorities are responsible for the correct weighing and recording of the catch. Landings are monitored by the DF. Area closure for fishing is an integrated part of the management, both for fish species and habitats. The MII issued a regulation imposing a ban on targeting halibut and demanding fishers to release all viable halibut back to the sea if caught.</p> <p>SG80: 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 these conventions a number of mechanisms have been developed to detect and reduce impacts. For example the OSPAR has identified a number of key species and habitats which are considered threatened or declining (OSPAR Commission 2008a&b). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine species and ecosystems, and (b) protect vulnerable benthic ecosystems. The MII issued regulations where a ban was set on a direct fishery for halibut and that all viable halibut must be released in other fisheries.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species). | There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved. | The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work. |
| | Met? | Yes | Yes | No |

| | | | | |
|---|---------------|---|--|--|
| PI 2.3.2 | | <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| | Justification | <p>SG60: Area closure for fishing is an integrated part of the fishery management system, in order to reduce catch of juvenile fish (Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands). This is likely to reduce catches of juvenile halibut.</p> <p>SG80: The management strategy is enforced by the Directorate of Fisheries and Icelandic Coast Guard. Data on halibut catch will indicate whether the ban on targeting halibut is working.</p> <p>SG100: The ban on halibut fishing has not been in operation long enough to evaluate its effectiveness, since this is a long lived species.</p> <p>Harmonisation: See rationale for Scoring Issue (a) above.</p> | | |
| c | Guidepost | | There is evidence that the strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: A decrease in landed catches since the ban was implemented, indicates that the strategy is being successfully implemented.</p> <p>SG100: A decreasing trend in landed catch indicates modification of fishing practices. However, no study has been made on the survival rate of viable halibut when released back to sea.</p> <p>Harmonisation: See rationale for Scoring Issue (a) above.</p> | | |
| d | Guidepost | | | There is evidence that the strategy is achieving its objective. |
| | Met? | | | No |
| | Justification | <p>SG100: The ban on direct halibut fishing has not been in operation long enough to evaluate its effectiveness.</p> <p>Harmonisation: See rationale for Scoring Issue (a) above.</p> | | |
| References | | Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands, Anon. 2012a; Ministry for the Environment 2010;OSPAR Commission 2008a&b | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Handline - Information (ETP species)

Evaluation Table for PI 2.3.3

| | | | | |
|----------------------|----------------------|---|--|--|
| PI 2.3.3 | | Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Information is sufficient to qualitatively estimate the fishery related mortality of ETP species. | Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species. | Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The Directorate of Fisheries database provides quantitative information on retained species taken by the assessed fishery. The Atlantic halibut stock is monitored annually by the MRI. The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is released from the fishery and back to sea. No direct estimate on release mortality rate is available for Atlantic halibut.</p> <p>SG80: Quantitative information on the amount of viable halibut released from the fishery and back to sea and its survival rate is not available. Although, release numbers and - mortalities cannot be directly determined, full information is available on landings of halibut for all gears in the fishery.</p> <p>SG100: Information available for halibut includes survey data, catch composition and age/length data. This information can be regarded as sufficient to determine the stock status relative to reference point.</p> | | |
| b | Guidepost | Information is adequate to broadly understand the impact of the fishery on ETP species. | Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. | Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species. |
| | Met? | Yes | Yes | No |

| | | | | |
|---|---------------|---|---|---|
| PI 2.3.3 | | Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. | | |
| | Justification | <p>SG60: The Directorate of Fisheries database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut.</p> <p>SG80: Historically, halibut has mainly been taken as bycatch (retained species) in the bottom trawl and longline fisheries in Iceland, and catch by other gear is relatively insignificant. In recent years the proportional catch by bottom trawl has decreased and the majority of the landed halibut catch has been by longline (Figure 3.29). Since 2000 the main fishing grounds of halibut have been on the Reykjanes ridge and NW of the ridge (Figure 3.29). Since the ban on targeting halibut was introduced the landed catch has decreased considerably (Table 3.12).</p> <p>SG100: The Directorate of Fisheries database provides quantitative information on retained species taken by the assessed fishery. However, quantitative information on the amount of halibut released following the issuing of the ban on targeting halibut is not available, nor is the survival rate of discarded halibut. Therefore, not all mortalities can be accounted for and hence not the magnitude of all impacts.</p> <p>Harmonisation: IGP score = 100. There are differences in which species are considered (see PI 2.3.1) and the IGP certification considers ETP catch in the handline fishery as negligible and therefore scores 100.</p> | | |
| c | Guidepost | Information is adequate to support measures to manage the impacts on ETP species. | Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species. | Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The Directorate of Fisheries database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut. The halibut stock status is monitored by MRI and used to be managed by TAC.</p> <p>SG80: Data from the Directorate of Fisheries and MRI are used to assess the stock status and trends in the catches and biomass index for Atlantic halibut. The information is sufficient to measure the response of the depleted halibut stock and to evaluate whether the stock will recover following the ban on halibut target fisheries.</p> <p>SG100: Information on the amount of released viable halibut and its survival rate is lacking. Therefore, it cannot be evaluated with a high degree of certainty whether the strategy is achieving its objectives.</p> <p>Harmonisation: See rationale for Scoring Issue (b) above.</p> | | |
| References | | Alverson et al 1996; Umhverfissráðuneytið 2011 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Handline Principle 2: Habitat

Handline - Outcome (Habitat)

Evaluation Table for PI 2.4.1

| | | | | |
|---|----------------------|--|---|--|
| PI 2.4.1 | | The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: Static fishing gear, such as set nets, handline and longlines do not affect large areas of seabed and are not thought to cause serious or irreversible harm to habitat structures (Jennings <i>et al.</i>, 2001).</p> <p>SG80-100: Scientific evidence indicates that it is highly unlikely that gillnets, handline, longlines, Danish seine and <i>Nephrops</i> trawl reduce habitat structure and function to a point where there would be serious or irreversible harm (Ball <i>et al.</i> 2000, Jennings <i>et al.</i> 2001, Thórarinsdóttir <i>et al.</i> 2010).</p> | | |
| References | | Anon. 2004; Ball <i>et al.</i> 2000; Garcia <i>et.al.</i> 2006; Jennings <i>et al.</i> 2001; Ministry of the Environment 2010; Ministry of Fisheries 2004; OSPAR Commission2008a&b; Thórarinsdóttir <i>et al.</i> 2010; Ólafsdóttir & Burgos 2012; Steingrímsson & Einarsson 2004 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Handline - Management (Habitat)

Evaluation Table for PI 2.4.2

| | | | | |
|----------------------|------------------|--|---|---|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. | There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. | There is a strategy in place for managing the impact of the fishery on habitat types. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|---|---|---|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | | |
| | Justification | <p>SG60: In Icelandic waters, large areas are closed for fishing, some of them temporarily (hours per day, days or seasonal) and others permanently (years) which protects bottom habitats from being damaged by fishing activities (Figure 3.11). The Icelandic Coast Guard monitors fishing activities in Icelandic waters in real time through VMS, including surveillance of areas closed for fishing.</p> <p>SG80: 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 Commission 2008 a&b).</p> <p>SG 100: Ten coral areas with <i>L. pertusa</i> off S and SE Iceland have been closed for all fisheries using bottom contact gear (Ólafsdóttir & Burgos 2012). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine ecosystems, and (b) protect vulnerable benthic ecosystems.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats). | There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Area closure for fishing is an integrated part of the fishery management system, in order to reduce catch of juvenile and spawning fish. This measure has a secondary effect, i.e. protecting bottom habitats. Furthermore, the Act 97/1997 (“um veiðar í fiskveiðilandhelgi Íslands”) allows managers to close vulnerable habitats for fishing. Several vulnerable habitats areas have been closed for fishing.</p> <p>SG80: The management strategy is enforced by the Icelandic Coast Guard including vulnerable habitat areas which are closed for fishing. Operation of all Icelandic fishing vessels is monitored by VMS and the MRI has access to electronic logbooks for scientific purposes (high resolution data). During a site visit the DF confirmed that no vessel has violated the closure of coral areas.</p> <p>SG100: The effectiveness of habitat area closures has not been evaluated, therefore clear evidence cannot be provided to show that the strategy is successfully implemented and is achieving its objectives.</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | Yes |

| | | | |
|---|----------------------|---|--|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | |
| | Justification | <p>SG 80: The Icelandic Coast Guard is responsible for law enforcement at sea and monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing.</p> <p>SG100: Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). One of the key strategies is intended to protect vulnerable benthic ecosystems. Ten coral areas off SE Iceland have been closed for all fisheries using bottom contact gear based on the Act 97/1997 (Ólafsdóttir & Burgos 2012).</p> | |
| d | Guidepost | | There is some evidence that the strategy is achieving its objective. |
| | Met? | | Yes |
| | Justification | The significance of closed areas off Iceland in protecting juvenile cod has been evaluated. It provides evidence that closures of nursery grounds can be useful in protecting immature cod (Schopka et.al. 2010). | |
| References | | Anon. 2012a; Regulation 97/1997; Ministry for the Environment 2010; OSPAR Commission 2008a&b; Ólafsdóttir & Burgos 2012; Schopka et al. 2010 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 95 |
| CONDITION NUMBER (if relevant): | | | |

Handline – Information (Habitat)

Evaluation Table for PI 2.4.3

| | | | | |
|----------------------|------------------|---|--|---|
| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There is basic understanding of the types and distribution of main habitats in the area of the fishery. | The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery. | The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|--|---|---|
| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
| | Justification | <p>SG 60-80: The BIOICE programme has provided basic inventory of benthic fauna within the Icelandic territorial waters (Figure 3.6). Benthic samples have been collected from a variety of habitats, ranging widely in depth (<100 to 3100 m) and in temperature conditions (12° to -0.9°C). Also, the Marine Research Institute (MRI) has identified areas of vulnerable benthic habitats in Icelandic waters (cold water corals, areas with aggregation of large sponge, maerl beds; Figures 3.7-3.10) in relation to bottom trawl fishing activities (Steingrímsson & Einarsson 2004, Garcia et al. 2006). The MRI is currently carrying out research programmes in order to map benthic habitats in Icelandic waters (biology and geology, using multibeam echo sounder), including mapping cold water corals (<i>Lophelia pertusa</i>) and studying the interaction between fish and cold water coral habitats (CoralFISH project, http://www.eu-fp7-coralfish.net/).</p> <p>Through VMS there is detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats.</p> <p>SG 100: Information is available on the distribution of invertebrate species and habitats in Icelandic waters, as well as data on important environmental parameters. The distribution of main vulnerable habitats in Icelandic waters has been documented and the detail of knowledge is at a relevant scale. The habitat mapping by MRI is ongoing in addition to studies on the ecological function of vulnerable habitats (e.g. CoralFISH).</p> | | |
| b | Guidepost | Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. | Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear. | The physical impacts of the gear on the habitat types have been quantified fully. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG 60: Static fishing gear, such as set nets, handline and longlines do not affect large areas of seabed and are not thought to cause serious or irreversible harm to habitat structures (Jennings <i>et al.</i>, 2001).</p> <p>SG 80: Through VMS there is detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. The VMS data is available for scientific purposes. Information is available on the distribution of invertebrate species and habitats in Icelandic waters. Therefore, there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear under assessment.</p> <p>SG 100: Although handline is unlikely to impact bottom habitats; no studies have been conducted in Iceland.</p> | | |

| | | | | |
|---|----------------------|---|--|--|
| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
| c | Guidepost | | Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | Changes in habitat distributions over time are measured. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The area coverage of the assessed fisheries is monitored through logbooks and VMS, thus their spatial distribution is known in relation to vulnerable habitats. The habitat mapping by MRI is ongoing in addition to studies on the ecological function of vulnerable habitats (e.g. the CoralFISH project).</p> <p>SG100: The MRI research program aims to map benthic habitats in Icelandic waters but not to measure the changes in habitat distribution over time.</p> | | |
| References | | Bell <i>et al.</i> 2000; Eiríksson 1993; Garcia <i>et al.</i> 2006; Jennings <i>et al.</i> , 2001; Ministry of Fisheries 2004; Ólafsdóttir & Burgos 2012; Ragnarsson & Lindegarth 2009; Steingrímsson & Einarsson 2004; Jennings <i>et al.</i> 2001; Thórarinsdóttir <i>et al.</i> 2010 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Handline Principle 2: Ecosystem

Handline – Outcome (Ecosystem)

Evaluation Table for PI 2.5.1

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

| | | |
|---|---|--|
| PI 2.5.1 | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function | |
| | Justification | <p>SG60: Extensive studies on the feeding ecology of a large number of demersal fish species, marine mammals and seabirds have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic marine ecosystems. Cod is a major fish predator in the marine ecosystems around Iceland, which preys mainly on capelin and shrimp (<i>Pandalus borealis</i>).</p> <p>Saithe preys on pelagic prey items, typically capelin (<i>Mallotus villosus</i>) and krill (Euphausiacea).</p> <p>None of the assessed fisheries is likely to affect key ecosystem species to a point where there would be serious or irreversible harm.</p> <p>SG80-100: Saithe is not considered to be a key prey species in the Icelandic ecosystem, and preys on pelagic items, typically capelin and krill.</p> <p>Cod is one of the main predators in Icelandic waters. In all of the assessed fishing gear, cod was one of the main retained species. It contributed approximately 50-70% to the total catch in the assessed gillnet, handline and longline fisheries but less in bottom trawl, Danish seine and Nephrops trawl (around 30%). The stock biomass of cod has been increasing and is now larger than observed in the last three decades. This is believed to be the result of a decrease in harvest rate. None of the other retained species are considered as key species in the ecosystem of Icelandic waters. Also, the assessed fisheries do not directly affect the most important prey species in the ecosystem, capelin. There is evidence that the main driving factor for ecosystem change in Icelandic waters is abiotic (Valdimarsson <i>et.al.</i> 2012).</p> <p>Cod has been shown to directly affect the biomass of the (offshore) shrimp population (<i>Pandalus borealis</i>). This is currently taken into account in the MRI assessments (using GADGET models) as has the effect of the capelin on cod growth (using regression models). All of these models indicate that the cod fishery as a whole has negligible negative effects. If the fishery targeting the key ecosystem predator in Icelandic waters is not having a significant impact, it is unlikely that the saithe fishery will. The assessed fishery is highly unlikely to disrupt any key elements of the ecosystem structure or function.</p> <p>Saithe is commonly associated with deep water coral reefs and they appear to be an important part of the ecosystem surrounding the species.</p> <p>The DF database provides relatively good evidence that none of the assessed fisheries catch key ecosystem species. The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure.</p> |
| References | <p>Anon. 2010; Anon. 2012b; Anon. 2011b; Astthorsson et al. 2007; Auster 2005; Barbaro et al. 2008; Foley et.al 2010; Garcia et al. 2006; Jaworski & Ragnarsson 2006; Jónsson 1997; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson 1997; Stefánsson 2003; Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Valdimarsson <i>et.al.</i> 2012; Vilhjálmsson 2002.</p> | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | 100 |
| CONDITION NUMBER (if relevant): | | |

Handline – Management (Ecosystem)

Evaluation Table for PI 2.5.2

| | | | | |
|----------------------|----------------------|--|---|---|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary. | There is a partial strategy in place, if necessary. | There is a strategy that consists of a plan, in place. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The DF database would provide evidence if the assessed fisheries were to catch a significant amount of key ecosystem species.</p> <p>SG80-100: Key ecosystem fish species (e.g. capelin and cod) are subject to the quota system, as is saithe. Large areas are closed for fishing in Icelandic waters in order to protect juvenile fish or spawning fish but also vulnerable habitats. These closures are stipulated in the Fisheries Management Act. 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. There is a strategy with a plan, if it so happened that the saithe fishery should pose a risk or harm to ecosystem structure and function (Ministry of the Environment 2010).</p> | | |
| b | Guidepost | The measures take into account potential impacts of the fishery on key elements of the ecosystem. | The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. | <p>The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem.</p> <p>This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm.</p> |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|---|--|--|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | |
| | Justification | <p>SG60-80: The DF database would provide evidence if the assessed fisheries were to catch significant amounts of key ecosystem species. 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. MRI is monitoring key elements of the ecosystem and the monitoring would indicate if fisheries are having impact on key elements of the ecosystem.</p> <p>The MRI carries out wide ranging and extensive research on the status and productivity of the 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 the fish stocks (e.g. Anon. 2011a, Anon. 2012a). 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 aims protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>SG100: General measures include monitoring the status of the key ecosystem elements in Icelandic waters (e.g. the capelin stock). In addition, routine monitoring includes biological sampling from catches, which also include non-commercial catch information, as well as verification of log-book records. Capelin and some other key ecosystem species are regulated by TAC. The quota system has been demonstrated to work. Impacts are e.g. restrained by TAC, and area closure in addition to surveillance by the Directorate of Fisheries and Icelandic Coast Guard. Inspectors may accompany fishing vessels on voyages or board 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. Cases of serious or repeated deliberate violation shall furthermore be liable to imprisonment for up to six years. 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 aims to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> | | |
| c | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved. |
| | Met? | Yes | Yes | Yes |

| | | | |
|-------------------|----------------------|--|---|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | |
| | Justification | <p>SG60: There is evidence that the monitoring and surveillance by the DF and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing licenses.</p> <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. The measures are considered highly likely to work.</p> <p>SG 100: Closure of coral areas to fishing off South Iceland, demonstrates that measures to protect the ecosystem are in place and implemented successfully. 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 aim to protect vulnerable benthic ecosystems. (Ministry for the Environment 2010).</p> <p>The fishery has no demonstrable effects on key predator or prey species. If such effects were discovered they would be mitigated with available measures, such as the quota system and area closures. Inspectors may accompany fishing vessels on voyages or board vessels to check their cargo and fishing gear. 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. Violations of the provisions of the Fisheries Management Act are liable to fines, regardless of whether committed deliberately or through negligence. Cases of serious or repeated deliberate violation are liable to imprisonment for up to six years. Violation of the act has resulted in penalties (DF site visit).</p> | |
| d | Guidepost | There is some evidence that the measures comprising the partial strategy are being implemented successfully. | There is evidence that the measures are being implemented successfully. |
| | Met? | Yes | Yes |
| | Justification | <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. There is evidence that the monitoring and surveillance by the DF and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing license.</p> <p>SG 100: The strategy is provided by the Fisheries Management Act and government policies. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>Measures have been implemented successfully, including area closures (fish and habitats), fishing bans (Atlantic halibut), discard bans, and ongoing work to increase the awareness of DF observers to bycatch of birds and mammals.</p> <p>Long-term changes in trophic patterns of Icelandic cod demonstrate the importance of capelin, northern shrimp, and euphausiids in the diet of the key fish predator in the ecosystem; cod (Pálsson & Björnsson 2011). Capelin and some other key ecosystem species are regulated by TAC and their importance in the ecosystem is accounted for in management strategies (e.g. Stefánsson 2003, Anon. 2013).</p> | |
| References | | Anon. 2010; Anon. 2012b; Anon. 2011b; Anon. 2013; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Ministry of the Environment 2010; Pálsson 1997; Schopka <i>et.al.</i> 2010; Stefánsson 2003; | |

| | |
|---|---|
| PI 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function |
| | Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. |
| OVERALL PERFORMANCE INDICATOR SCORE: | |
| | 100 |
| CONDITION NUMBER (if relevant): | |
| | |

Handline – Information (Ecosystem)

Evaluation Table for PI 2.5.3

| | | | | |
|---------------|---------------|---|--|---|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity). | Information is adequate to broadly understand the key elements of the ecosystem. | |
| | Met? | Yes | Yes | |
| | Justification | <p>SG60: Extensive studies have been conducted on the marine ecosystems of Icelandic waters (e.g. Astthorsson <i>et al.</i> 2007, Valdimarsson & Jónsson 2007). Studies on the feeding ecology of a large number of fish species, marine mammals and seabirds has provided information on the ecological function of most of the species caught by the assessed fisheries. These studies have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic waters ecosystems (Marine Research Institute 1997). Biomass estimates for stocks of fish, whales and seabirds in Icelandic waters and production estimates of <i>Calanus finmarchicus</i> and other zooplankton species have been used to calculate the biomass of individual components in the Icelandic marine ecosystem (Astthorsson <i>et al.</i> 2007).</p> <p>SG 80: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters, and this information is used in multi species modelling (GADGET models; e.g. Stefánsson & Pálsson 1998, Stefánsson 2003) for MRI assessments. The models have been used to evaluate interactions between fisheries and key ecosystem elements. Information about these interactions has been taken into account for management purposes.</p> | | |
| b | Guidepost | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail. | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail. | Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated. |
| | Met? | Yes | Yes | No |

| | | | |
|-----------------|----------------------|---|--|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| | Justification | <p>SG60: Saithe is not a key ecosystem species and preys mainly on invertebrates. The DF database provides detailed information on catches of target and retained species. This provides information about the impact of the assessed fishery on the populations involved and would provide evidence if adverse impacts on any key ecosystem species occur.</p> <p>SG80: The main impacts of the fishery on key elements of the ecosystem such as key predators, prey and vulnerable habitats can be inferred. Information on mortality of key predators and prey is known and recorded (retained species).</p> <p>The DF database provides detailed information on catches of target and retained species (bycatch/discard is considered not significant). This provides information about the impact of the assessed fisheries on the populations involved.</p> <p>Information on vulnerable habitats in Icelandic waters has been documented, including the coral <i>Lophelia pertusa</i>. MRI has mapped the distribution of coral areas in relation to fishing efforts by bottom trawling and has gathered evidence of impacts caused by such fishery. Coral areas have been closed, based on this evidence, and it can be expected that more coral areas will be closed in the future, as the MRI continues its research project on the mapping of the habitats. The mapping will also support the recent strategic plan for the preservation of biodiversity in Icelandic waters. Furthermore, information on high catches of juvenile fish, gathered through the Directorate of Fisheries surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries.</p> <p>SG100: There is detailed information on the distribution of fishing efforts around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats. Evidence of detrimental impact on cold water corals by towed fishing gears have been compiled through scientific mapping (using ROV technique; Ministry of Fisheries 2004)</p> | |
| c | Guidepost | The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known. | The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood. |
| | Met? | Yes | Yes |
| | Justification | <p>SG80: The effect of the fishery on the target and the retained species are assessed annually. Bycatch is on a relatively small scale (see rationale for scoring bycatch). The feeding ecology of a number of demersal fish species has been documented, providing information on the ecological function of most of the species caught by the assessed fisheries. Information on vulnerable habitats in Icelandic waters has also been documented, including the coral <i>Lophelia pertusa</i>. MRI has mapped the distribution of coral areas in relation to fishing efforts by otter trawling and has gathered evidence of impacts caused by fishing activities. The importance of vulnerable habitats known to occur in Icelandic waters is generally understood (e.g. <i>Lophelia</i> reefs, sponge aggregations).</p> <p>SG100: The DF database provides quantitative information on retained species taken by the assessed fishery. There is good knowledge on the distribution of the different fisheries which can be used to indicate if and where it overlaps with vulnerable habitats. There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters (e.g. Astthorsson <i>et.al.</i> 2007; Marine Research Institute 1997; Stefánsson & Pálsson 1998; Stefánsson 2003; Valdimarsson & Jónsson 2007). Saithe is not a key ecosystem species.</p> | |

| | | | |
|-----------------|----------------------|---|---|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| d | Guidepost | Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred. | Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred. |
| | Met? | Yes | Yes |
| | Justification | <p>SG 80: Sufficient information is available on retained species, bycatch and catch of ETP species through log books, and monitoring of landings. Distribution of fishing in relation to vulnerable habitats is known. This information base is sufficient for inferring main consequences of fishing.</p> <p>SG100: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters. There is also detailed information on the catches taken from the system and spatial overlap of the fisheries with vulnerable habitats. This information base is sufficient for inferring main consequences of fishing.</p> | |
| e | Guidepost | Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | Information is sufficient to support the development of strategies to manage ecosystem impacts. |
| | Met? | Yes | Yes |
| | Justification | <p>SG 80: Data on individual landed catch is instantly entered in the DF database. The surveillance system carried out by the Directorate of Fisheries and the Coast Guard is constantly monitoring catch levels of juvenile fish and MRI provides information on the need for measures in order to reduce impacts by fisheries. All this information is used for implementing protection measures (e.g. area closure) if the management considers it necessary. The MRI also monitors and manages a large number of species and has monitored environmental conditions in the Icelandic waters for decades. Therefore any potential threats or adverse trends can be quickly identified and responded to.</p> <p>SG100: The strategy is provided by the Fisheries Management Act. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010). Coral areas have been closed, based on scientific evidence, and it can be expected that more coral areas will be closed in the future as MRI continues its research project on the mapping of the habitats.</p> <p>Information on high catches of juvenile fish, gathered through the DF surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries. Actions which are considered necessary in order to improve species recruitment (e.g. closure of spawning areas) are based on research information and recommendations from the MRI. The closure of coral areas, are also based on scientific evidence, and it can be expected that more coral areas will be closed in the future as the MRI continues research on the mapping of the habitats, their relationship with fisheries and other relevant environmental data. Collectively this information is sufficient to support development of strategies to manage ecosystem impacts.</p> | |

| | | |
|---|---|-----------|
| PI 2.5.3 | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| References | Anon. 2010; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson1997; Stefánsson 2003; Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thórarinsdóttir et al. 2010; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | 95 |
| CONDITION NUMBER (if relevant): | | |

Gillnet Principle 2: Retained species

Gillnet - Outcome (Retained species)

Evaluation Table for PI 2.1.1

| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | | |
|---------------|---------------|---|---|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below). | Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below). | There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points. |
| | Met? | Yes | Yes | No |
| | Justification | <p>There is one main retained species as defined by weight (>5%) are retained by Gillnets; cod. Cod is likely to be within biologically based limits.</p> <p>Atlantic cod: The reference biomass (age 4+) in 2013 is estimated as 1,170,000t and the spawning stock as 480,000t, compared to Blim=125 and Btrigger=220 thousand t (Anon 2013). Fishing mortality has declined significantly in the last decade and is presently at a historical low, below likely candidates for Fpa and Flim (Anon. 2012, ICES 2012a).</p> <p>One <u>vulnerable species</u> is retained by gillnets; the mackerel shark (<i>Lamna nasus</i>). The species is on the IUCN and/or OSPAR list of vulnerable species. Stock status for this species is not known.</p> | | |
| b | Guidepost | | | Target reference points are defined for retained species. |
| | Met? | | | No |
| | Justification | Target reference points are not defined for all retained species. | | |
| c | Guidepost | If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. | If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding. | |
| | Met? | Yes | Yes | |
| | Justification | Average catches of mackerel shark for the last 5 years was 0.024t per year. This negligible catch demonstrates that the fishery is not targeting this species and therefore do not hinder recovery. In addition, there are other measures in place, such as monitoring of landings, discard bans and area closures. | | |

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|---|----------------------|--|--|-----------|
| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | | |
| d | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery. | | |
| | Met? | Yes | | |
| | Justification | Stock status for most of the vulnerable species is poorly known. None of these species are targeted in the fishery and catches for all of these species are small and considered as a bycatch in the assessed fishery. In fact, all catches except grey skate are below 6t per year on average. There are measures in place such as monitoring and verification of all catches at landing, discards bans, and areas which have been closed for decades having a secondary effect of serving as MPAs. | | |
| References | | MRI 2013, ICES advice 2012. | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Gillnet - Management (Retained species)

Evaluation Table for PI 2.1.2

| | | | | |
|----------------------|------------------|--|--|---|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing retained species. |
| | Met? | Yes | Yes | No |

| | | | | |
|-----------------|----------------------|--|---|--|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
| | Justification | <p>The Fisheries Management Act requires that all catches shall be landed. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch. Masters of fishing vessels shall keep special log books of catch statistics (such as location, dates, gear and catch quantity) and inspectors from the DF have access to the log books.</p> <p>In addition, closure of fishing areas is an important part of the quota management system in order to protect spawning grounds and juvenile fish. These measures form a strategy to manage impact of the fishery on retained species.</p> <p>Many of the retained species are managed by the MRI through TACs and/or other appropriate measures. These include all of the species considered as main retained by weight and management measures would be considered as a strategy at the 100 level.</p> <p>However for other vulnerable species the measures in place include monitoring of landings, spatial and/or temporal closures and bans on discards. These measures form a partial strategy at the 80 level.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG80: Most of the retained species are monitored by the MRI surveys. Strategies for many of the retained species are therefore comparable to those for the target species. Information about the retained species can be directly obtained from the DF database. Information on retained species is based on landed catch and the MRI surveys as well as fishermen's logbooks. Fishing efforts are limited by quota, area closures to protect undersized fish, gear specific closures and minimum mesh size. Closures, mesh size, and minimum landing size are monitored by the Coast Guard. The availability of information about the fishery directly provides evidence that the strategy is working.</p> <p>The stock status and track record of the main retained species and many of the lesser retained species, show that the management strategy of these species is working. In addition, there are examples of species, such as cod, recovering from very low levels under the Icelandic Fisheries Management system.</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The quota system ensures implementation of the strategy. Information from the DF database, the Coast Guard and the logbook returns provide evidence that the partial strategy is being implemented successfully. The discard ban and official weighing has been in place for some decades. Discards have been decreasing (Pálsson et al. 2013). Area closures during spawning and closures to protect undersized fish have also been in place for decades.</p> | | |

| | | | | |
|---|----------------------|---|---|--|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |
| | Met? | | | No |
| | Justification | Many of the retained species stocks are well managed through the TAC's and other measures including surveillance, verified landings, and discard bans. However, MRI does not provide TAC advice on some of the lesser retained species which are not targeted. Therefore a score of 100 cannot be justified. | | |
| e | Guidepost | It is likely that shark finning is not taking place. | It is highly likely that shark finning is not taking place. | There is a high degree of certainty that shark finning is not taking place. |
| | Met? | Yes | Yes | Yes |
| | Justification | Various shark species are occasionally reported as retained species. Vessels are required to have VMS (although not video linked), and fishermen are required to land all species intact, with dockside verification of the catch. In Iceland there is a domestic market for shark flesh and sharks are landed whole. It is thus the flesh rather than the fins that is valuable. | | |
| References | | Pálsson et al. 2013 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Gillnet - Information (Retained species)

Evaluation Table for PI 2.1.3

| | | | | |
|----------------------|------------------|---|--|--|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Qualitative information is available on the amount of main retained species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery. | Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |

| | | | | |
|-----------------|----------------------|---|---|---|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| | Justification | <p>SG60: All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch.</p> <p>SG80: By law, all catch shall be landed and recorded by harbour officials and log books are mandatory. Therefore quantitative information on the amount of all retained species taken by the fishery is available.</p> <p>Although accurate and verifiable information is available for all retained species, the consequence for affected populations is not known in all cases.</p> | | |
| b | Guidepost | Information is adequate to qualitatively assess outcome status with respect to biologically based limits. | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: The MRI conducts several types of monitoring surveys annually. Most of the retained species are routinely monitored through several types of surveys (ground fish-, gill net-, and shrimp surveys extending into shallow and deep waters all around Iceland) conducted by MRI each year. They provide relevant information that can be used to assess changes in stock indices, distribution in age and length frequency and spatial distribution. As all main retained species (by weight) are routinely monitored, changes in stock levels can be monitored. For those species that are also monitored through recordings of landings, enough information exists for stock assessment.</p> <p>SG80: A comprehensive range of data is available for the outcome status of main retained species through MRI monitoring surveys each year. Survey data is used to evaluate changes in stock levels for TAC species and the data can also be used in this way for a number of other retained species which are not subject to TAC (Björnsson et al. 2007).</p> <p>SG100: Many of the retained species are routinely monitored during MRI surveys, which provide quality data fit for stock assessments, and information is sufficient to quantitatively estimate outcome status with a relatively high degree of certainty, if needed. However, not all retained species are part of the MRI monitoring surveys. Therefore information is not adequate in all cases.</p> | | |
| c | Guidepost | Information is adequate to support measures to manage main retained species. | Information is adequate to support a partial strategy to manage main retained species. | Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Information exists for stock assessments of main retained species by weight. All retained species are monitored through landing recordings.</p> <p>SG80: Monitoring of main retained species is performed during surveys and through statistical analysis of landed catch and information from logbooks. These procedures give a fair estimate of mortalities of most of the retained species and full information on fisheries removals.</p> <p>SG100: Some of the retained species are not part of the MRI monitoring surveys. Therefore, information is not adequate in all cases.</p> | | |

| | | | | |
|---|----------------------|--|---|---|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| d | Guidepost | | Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy) | Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG80: Monitoring of main retained species is performed during MRI surveys, through statistical analysis of landed catch and from information in logbooks. These procedures give a fair estimate of mortalities of these species and also a number of other retained species (TAC species) taken by the fishery. Monitoring of landed catches by the DF continues to be collected and information can detect any changes in risk to any of the retained species. There is a continued ban on discards and annual assessment of discard rates for the main species (see table 3.9) are carried out by the MRI (Pálsson 2013).</p> <p>SG100: Monitoring of landed catches is in place and recorded in sufficient detail to assess mortalities of all retained species within the fishery. This assumes that in this context mortality means fishery removal.</p> | | |
| References | | Björnsson et.al. 2007, Anon. 2013, Pálsson 2013 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Gillnet Principle 2: Bycatch Species

Gillnet– Outcome (Bycatch species)

Evaluation Table for PI 2.2.1

| | | | | |
|----------------------|------------------|---|--|--|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below). | Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below). | There is a high degree of certainty that bycatch species are within biologically based limits. |
| | Met? | Yes | Yes | No |

| | | | | |
|---------------|---------------|--|---|--|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| b | Justification | <p>SG60: Bycatch species are defined as those species that are not retained but which are discarded. There is no systematic monitoring of discard in place. However, research by MRI and measurements by the DF indicate that the main discards in the Icelandic fisheries are of cod and haddock. Estimated discards of cod and haddock have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) for cod and haddock were lower than previously recorded, 0.04% of total cod landings (Pálsson et al. 2013). Since cod and haddock are the main discard in Icelandic fisheries and their estimated discard rates are very low we conclude that the scale of discarding of other species is likely to be even smaller. Therefore there are no main bycatch species in the assessed fisheries.</p> <p>SG80: Discarding is not allowed. There are several features in the fisheries management system which reduces the incentive to discard (see chapter 3.4.3 Bycatch species). It is evident that in all the assessed fisheries catches of low commercial value were landed (e.g. dogfish, sea cucumber, black scabbard-fish, ribbonfish, and mackerel shark (Tables 3.2 to 3.7). 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 mortality by the fisheries. Catches representing <0.001% of total catch landed indicate that discarding is insignificant in the assessed fisheries, or at least not reaching the level of major bycatch species (5% of the total catch).</p> <p>Harbour porpoise can be considered as a vulnerable bycatch species. Harbor porpoise is the most commonly caught mammal species around Iceland (ICES 2011b). This whale is common in shallow waters all around Iceland from spring to autumn, but less during the winter months (Ólafsdóttir & Víkingsson 2005). Gillnets are used all around Iceland (Figure 3.27B) and most extensively during January to May (www.fisheries.is); targeting cod when it is migrating to the spawning grounds. This demonstrates that the assessed gillnet fishery is not operating in full during the season when harbor porpoise occurs in Icelandic waters (Figure 3.28).</p> <p>It has been estimated that more than 12.000 seabirds (more than one species) are drowned in gillnets each year (Petersen 2002). This is not a significant number compared to the estimated population size of seabirds around Iceland (see section 3.4.1, p. 19).</p> <p>Harmonisation (Gillnet): ISF cod/haddock score = 95. The ISF cod/haddock certifications defined bycatch species as retained species of less than 5%. For the current certification the team used the MSC definition of bycatch (CR Table AA1); and only discards are considered here.</p> | | |
| | Guidepost | If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. | If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding. | |
| | Met? | N/A | N/A | |
| Justification | | | | |

| | | | | |
|---|----------------------|--|--|-----------|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| c | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery. | | |
| | Met? | N/A | | |
| | Justification | | | |
| References | | ICES 2011b; Jennings <i>et al.</i> 2001; Pálsson <i>et al.</i> 2013; Ólafsdóttir & Víkingsson 2005; Petersen 2002; Umhverfisstjórnuneytið 2011; www.fisheries.is | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Gillnet– Management (Bycatch species)

Evaluation Table for PI 2.2.2

| | | | | |
|----------------------|------------------|---|---|---|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing and minimizing bycatch. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|---|---|--|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| | Justification | <p>SG60: The Fisheries Management Act requires that all catches shall be landed; therefore discarding is illegal. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported into a database operated by the DF. There are several measures included in the fisheries management system which should disincentive fishermen from discarding, e.g. 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 and up to 5% of the total landed catch can be classified as being of a low commercial value and is not subtracted from the quota allocated to the vessel.</p> <p>SG80: Large areas of Icelandic waters are closed for fishing in order to protect fish and habitats. The level of discarding in fisheries is assessed by the MRI. Fishers are required to keep fish logbooks. An observer system is operated by the DF, both at landing sites and on board vessels. Breach of regulations leads to a warning or a fine. Repeated offenses lead to heavy fines, revocation of the vessel's license to fish and possibly a prison sentence.</p> <p>SG100: 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) (Figure 3.11), which decreases the likelihood of large catches of juvenile fish. Areas are usually closed for fishing by means of bottom trawl and longline because of the presence of large amounts of juvenile fish or in order to protect spawning fish, but also vulnerable benthic habitats. The Icelandic Coast Guard monitors fishing activities in Icelandic waters, e.g. via VMS, including surveillance of areas closed for fishing.</p> <p>There are strict requirements for the keeping of fish logbooks which must be made available to the DF. Following a random inspection on landings, inspectors from the DF can directly join a vessel to visit the same fishing ground the vessel visited during the previous fishing trip, in order to examine their fishing practices and compare catch composition between fishing trips. Also, the system of instant recording of landings allows use of the 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.</p> <p>A vessel owner which is found to have acted in breach of some regulations gets a warning and sometimes a fine. Repeated offenses lead to heavy fines, revocation of the vessel's license to fish and possibly to prison sentences.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|---|----------------------|--|---|--|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| | Justification | <p>SG60: Discarding is illegal. There are a number of measures that aim to ensure compliance with the law. Annual assessment on discarding by the MRI indicates that discarding is at the least very limited.</p> <p>SG80: Following discussions with the MRI, DF, the MII and the client during the site visit the assessment team concluded that there was a consensus among all parties on very low rate of discarding in the assessed fisheries. Estimated discards have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) were lower than recorded over the period 2001-2011 (Pálsson et al. 2013).</p> <p>SG100: From 2001-2010, mean cod discards were highest in the Danish seine fishery (2.70%) and in the gill net fishery (1.34%), but lower in the demersal trawl fishery (0.77%), and in the long line fishery (0.38%) (Pálsson et al. 2012). Mean haddock discards were highest in the Danish seine, (4.30%), and the demersal trawl (2.47%) fisheries, and lowest in the long line fishery (0.40%). Cod discards in all gear combined were 0.90% of landed catch (1680 tonnes), and haddock discards 2.02% (1488 tonnes).</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG80-SG100: It is evident that retained species from the assessed fisheries were landed even though they are of low commercial value (e.g. dogfish, long rough dab) (Table 4.2). This, together with the fact that the main discards in Icelandic fisheries are of cod and haddock and that the MRI has estimated the discard rates to be less than 1% of landings, suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it does not reach the level of main bycatch species (5% of the total catch). Discard studies have been in place for over 10 years with well established procedures in place by the MRI, DF and the coast guard. Therefore, the bycatch/discarding management is successfully implemented.</p> | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |
| | Met? | | | Yes |
| | Justification | Assessment by the MRI indicates that the discard rates have declined since 2001 and were lowest in 2011. | | |
| References | | Pálsson et al. 2012& 2013; Stakeholder consultation | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Gillnet– Information (Bycatch species)

Evaluation Table for PI 2.2.3

| | | | | |
|----------------------|----------------------|--|---|---|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Qualitative information is available on the amount of main bycatch species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery. | Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: Research by the MRI and measurements by the DF, including on board surveillance, indicate that the main discards in the Icelandic fisheries are of cod and haddock.</p> <p>SG100: While scientific studies indicate that discarding exists at a low level, there is no systematic monitoring of discard in place in Iceland.</p> <p>Harmonisation: The ISF cod/haddock (ISF C/H) assessment scores 100 for this PI. Scoring is not separated by SI, it is thus difficult to explain differences for each SI. However, there is a difference in the species considered. The ISF cod/haddock certifications defined bycatch species as retained species of less than 5%. For the current certification the team used the MSC definition of bycatch (CR Table AA1); and only discards are considered here. The ISF C/H assessments also do not mention the extensive discard studies done in Icelandic waters.</p> | | |
| b | Guidepost | Information is adequate to broadly understand outcome status with respect to biologically based limits | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The main discards in Icelandic fisheries are of cod and haddock. The MRI has estimated the discard rate to be less than 1% of landings, which suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it has not reached the level of main bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG80-100: Standardized annual groundfish surveys have been conducted by MRI since 1985 including biological sampling of large numbers of demersal fish species. This information should make it possible to estimate outcome status of a number of retained/bycatch species, but not all.</p> <p>The population size of seabirds in Iceland is commonly more than 300.000 pairs and can be up to more than three million pairs (see section 3.4.1, p. 19). Bycatch estimates suggest that tens of thousands seabirds are drowned in gillnets each year (Petersen 2002) which is an insignificant number compared to the overall population sizes of seabirds around Iceland.</p> <p>Harmonisation: see comment in SI a.</p> | | |

| | | | | |
|--|----------------------|---|--|--|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | | |
| c | Guidepost | Information is adequate to support measures to manage bycatch. | Information is adequate to support a partial strategy to manage main bycatch species. | Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: The main discards in Icelandic fisheries are of cod and haddock. The MRI has estimated the discard rate to be less than 1% of landings, which suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it has not reached the level of major bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG100: It can be inferred that bycatch/discarding is a minor problem in the assessed fisheries. However, since comprehensive monitoring is not in place, the level of bycatch/discarding cannot be evaluated with a high degree of certainty.</p> <p>Harmonisation: see comment in SI a.</p> | | |
| d | Guidepost | | Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy). | Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The fishery is a part of the logbook and observer system operated by DF and surveillance of the fishery is in operation. The Directorate's database provides instant quantitative information on landings of all retained species. The database is also used in assessment work by the MRI. Annual discard estimates by the MRI is ongoing.</p> <p>SG100: While scientific studies on discarding are ongoing, there is no systematic monitoring of discards in place in Iceland.</p> <p>Harmonisation: see comment in SI a.</p> | | |
| References | | Pálsson et al. 2012& 2013; Petersen 2002; Stakeholder consultation | | |
| OVERALL PERFORMANCE INDICATOR SCORE: All gear | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Gillnet Principle 2: ETP Species

Gillnet - Outcome (ETP species)

Evaluation Table for PI 2.3.1

| | | | | |
|---------------|---------------|--|--|---|
| PI 2.3.1 | | The fishery meets national and international requirements for the protection of ETP species | | |
| | | The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species. | The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. | There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>None of the species caught by the fishery are included in Appendix I of CITES. Atlantic halibut (<i>Hippoglossus hippoglossus</i>) is an ETP species recognized by Icelandic authorities which is affected by the saithe fishery.</p> <p>SG60-80: On 1st January 2012 a regulation was implemented stipulating a ban on targeting halibut and demanding fishers to release all viable halibut back to the sea if by-caught. The effects of the fishery on the halibut stock are known through recordings of landings and it operates under regulation 1164/2011, on halibut fishing.</p> <p>SG100: The ban on halibut fishing has only been recently introduced, and the effectiveness of the strategy cannot be determined yet. A decrease in total landings of halibut indicates that the ban is working. However, the survival rate of viable halibut returned to sea is not known.</p> | | |
| b | Guidepost | Known direct effects are unlikely to create unacceptable impacts to ETP species. | Direct effects are highly unlikely to create unacceptable impacts to ETP species. | There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The assessed saithe fishery is not targeting Atlantic halibut. The catch of halibut has decreased since the ban on targeting halibut was introduced.</p> <p>SG80: In the period 2007-2013 the landed catch of Atlantic halibut by the saithe fishery by fishing gear was 0.01 to 0.26% (Table 3.11). None of the assessed fishing gear was targeting halibut and in all gears the lowest annual catch was for the fishing year when the regulation was implemented (2011/12). Catch numbers until May 2013 indicate an even further reduction in landed catch (see Table 3.11).</p> <p>During the period 2007-2011 the landed catch of Atlantic halibut the highest annual catch of halibut was 47 tonnes and by 2012 it has declined to around 2 tonnes. The landed catch from September 2012 to May 2013 was less than a ton.</p> <p>The current landed catch levels indicate that direct mortality of halibut is significantly lower than it used to be. Furthermore, the figures for the period September 2012 to May 2013 (45 tonnes total landed catch) suggest that the direct fishing mortality is decreasing even further.</p> <p>SG100: The decline in catch of halibut in 2012-13 indicates that the fishery is complying with the regulations which ban targeting halibut. However, it has only been in operation for short time and it remains to be seen whether it will lead to recovery of the Atlantic halibut stock.</p> | | |

| | | | |
|--------------------------------------|---------------|---|--|
| PI 2.3.1 | | The fishery meets national and international requirements for the protection of ETP species | |
| | | The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species | |
| c | Guidepost | Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts. | There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species. |
| | Met? | Yes | No |
| | Justification | <p>SG80: The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is not targeted and that viable specimens are released and returned to sea. However, there is no information on how much halibut was released in 2012 or its survival rate following discarding. The release mortality rate of Atlantic halibut has not been estimated. On a global scale, release mortality estimates of halibut species are highly variable, commonly ranging between 10-50% (Alverson et al. 1996; Meyer 2007).</p> <p>SG100: The release mortality rate of Atlantic halibut has not been estimated.</p> | |
| References | | Alverson et al. 1996; Meyer 2007; Regulation 1164/2011. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Gillnet - Management (ETP species)

Evaluation Table for PI 2.3.2

| | | | | |
|---------------|-----------|---|---|---|
| PI 2.3.2 | | The fishery has in place precautionary management strategies designed to: | | |
| | | <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are <u>measures</u> in place that <u>minimise mortality</u> of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a <u>strategy</u> in place for managing the fishery's impact on ETP species, <u>including measures to minimise mortality</u> , which is designed to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve <u>above</u> national and international requirements for the protection of ETP species. |
| | Met? | Yes | Yes | No |

| | | | | |
|----------|---------------|--|--|---|
| PI 2.3.2 | | <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| | Justification | <p>SG60: All the catch landed in Iceland must be weighed and reported. Port authorities are responsible for the correct weighing and recording of the catch. Landings are monitored by the Directorate of Fisheries. Area closure for fishing is an integrated part of the management, both for fish species and habitats. The MII issued a regulation imposing a ban on targeting halibut and demanding fishers to release all viable halibut back to the sea if caught.</p> <p>SG80: 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 these conventions a number of mechanisms have been developed to detect and reduce impacts. For example the OSPAR has identified a number of key species and habitats which are considered threatened or declining (OSPAR Commission 2008a&b). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine species and ecosystems, and (b) protect vulnerable benthic ecosystems. The MII issued regulations where a ban was set on a direct fishery for halibut and that all viable halibut must be released in other fisheries.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). | There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved. | The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Area closure for fishing and restrictions on mesh size are an integrated part of the fishery management system, in order to reduce catch of juvenile fish (Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands). This is likely to reduce catches of juvenile halibut.</p> <p>SG80: The management strategy is enforced by the Directorate of Fisheries and Icelandic Coast Guard. Data on halibut catch will indicate whether the ban on targeting halibut is working.</p> <p>SG100: The ban on halibut fishing has not been in operation long enough to evaluate its effectiveness, since this is a long lived species.</p> | | |
| c | Guidepost | | There is evidence that the strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: A decrease in landed catches since the ban was implemented, indicates that the strategy is being successfully implemented.</p> <p>SG100: A decreasing trend in landed catch indicates modification of fishing practices. However, no study has been made on the survival rate of viable halibut when released back to sea.</p> | | |

| | | | | |
|---|---------------|--|--|---|
| PI 2.3.2 | | The fishery has in place precautionary management strategies designed to: <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| d | Guidepost | | | There is evidence that the strategy is achieving its objective. |
| | Met? | | | No |
| | Justification | SG100: The ban on direct halibut fishing has not been in operation long enough to evaluate its effectiveness. | | |
| References | | Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands, Anon. 2012a; Ministry for the Environment 2010;OSPAR Commission 2008a&b | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Gillnet - Information (ETP species)

Evaluation Table for PI 2.3.3

| | | | | |
|---------------|---------------|--|--|---|
| PI 2.3.3 | | Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| I | Guidepost | Information is sufficient to qualitatively estimate the fishery related mortality of ETP species. | Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species. | Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty. |
| | Met? | Yes | Yes | Yes |
| | Justification | SG60: The DF database provides quantitative information on retained species taken by the assessed fishery. The Atlantic halibut stock is monitored annually by the MRI. The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is released from the fishery and back to sea. No direct estimate on release mortality rate is available for Atlantic halibut. SG80: Quantitative information on the amount of viable halibut released from the fishery and back to sea and its survival rate is not available. Although, release numbers and - mortalities cannot be directly determined, full information is available on landings of halibut for all gears in the fishery. SG100: Information available for halibut includes survey data, catch composition and age/length data. This information can be regarded as sufficient to determine the stock status relative to reference point. | | |

| | | | | |
|---|----------------------|--|---|---|
| PI 2.3.3 | | Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • 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. | | |
| b | Guidepost | Information is adequate to broadly understand the impact of the fishery on ETP species. | Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. | Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut.</p> <p>SG80: Historically, halibut has mainly been taken as bycatch (retained species) in the bottom trawl and longline fisheries in Iceland, and catch by other gear is relatively insignificant. In recent years the proportional catch by bottom trawl has decreased and the majority of the landed halibut catch has been by longline (Figure 3.29). Since 2000 the main fishing grounds of halibut have been on the Reykjanes ridge and NW of the ridge (Figure 3.29). Since the ban on targeting halibut was introduced the landed catch has decreased considerably (Table 3.12).</p> <p>SG100: The DF database provides quantitative information on retained species taken by the assessed fishery. However, quantitative information on the amount of halibut released following the issuing of the ban on targeting halibut is not available, nor is the survival rate of discarded halibut. Therefore, not all mortalities can be accounted for and hence not the magnitude of all impacts.</p> | | |
| c | Guidepost | Information is adequate to support measures to manage the impacts on ETP species. | Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species. | Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut. The halibut stock status is monitored by MRI and used to be managed by TAC.</p> <p>SG80: Data from the DF and MRI are used to assess the stock status and trends in the catches and biomass index for Atlantic halibut. The information is sufficient to measure the response of the depleted halibut stock and to evaluate whether the stock will recover following the ban on halibut target fisheries.</p> <p>SG100: Information on the amount of released viable halibut and its survival rate is lacking. Therefore, it cannot be evaluated with a high degree of certainty whether the strategy is achieving its objectives.</p> | | |
| References | | Alverson et al 1996; Umhverfissráðuneytið 2011 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Gillnet Principle 2: Habitat

Gillnet - Outcome (Habitat)

Evaluation Table for PI 2.4.1

| | | | | |
|---|------------------|--|---|--|
| PI 2.4.1 | | The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |
| | | <p>SG60: Static fishing gear, such as set nets, handline and longlines do not affect large areas of seabed and are not thought to cause serious or irreversible harm to habitat structures (Jennings <i>et al.</i>, 2001).</p> <p>SG80-100: Scientific evidence indicates that it is highly unlikely that gillnets, handline, longlines, Danish seine and <i>Nephrops</i> trawl reduce habitat structure and function to a point where there would be serious or irreversible harm (Ball <i>et al.</i> 2000, Jennings <i>et al.</i> 2001, Thórarinsdóttir <i>et al.</i> 2010).</p> | | |
| References | | Anon. 2004; Ball <i>et al.</i> 2000; Garcia <i>et.al.</i> 2006; Jennings <i>et al.</i> 2001; Ministry of the Environment 2010; Ministry of Fisheries 2004; OSPAR Commission 2008a&b; Thórarinsdóttir <i>et al.</i> 2010; Ólafsdóttir & Burgos 2012; Steingrímsson & Einarsson 2004 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Gillnet - Management (Habitat)

Evaluation Table for PI 2.4.2

| | | | | |
|----------------------|------------------|--|---|---|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. | There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. | There is a strategy in place for managing the impact of the fishery on habitat types. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|--|---|---|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | | |
| | Justification | <p>SG60: In Icelandic waters, large areas are closed for fishing, some of them temporarily (hours per day, days or seasonal) and others permanently (years) which protects bottom habitats from being damaged by fishing activities (Figure 3.11). The Icelandic Coast Guard monitors fishing activities in Icelandic waters in real time through VMS, including surveillance of areas closed for fishing.</p> <p>SG80: 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 Commission 2008a&b).</p> <p>SG 100: Ten coral areas with <i>L. pertusa</i> off S and SE Iceland have been closed for all fisheries using bottom contact gear (Ólafsdóttir & Burgos 2012). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine ecosystems, and (b) protect vulnerable benthic ecosystems.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats). | There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Area closure for fishing is an integrated part of the fishery management system, in order to reduce catch of juvenile and spawning fish. This measure has a secondary effect, i.e. protecting bottom habitats. Furthermore, the Act 97/1997 (“um veiðar í fiskveiðilandhelgi Íslands”) allows managers to close vulnerable habitats for fishing. Several vulnerable habitats areas have been closed for fishing.</p> <p>SG80: The management strategy is enforced by the Icelandic Coast Guard including vulnerable habitat areas which are closed for fishing. Operation of all Icelandic fishing vessels is monitored by VMS and the MRI has access to electronic logbooks for scientific purposes (high resolution data). During a site visit the DF confirmed that no vessel has violated the closure of coral areas.</p> <p>SG100: The effectiveness of habitat area closures has not been evaluated, therefore clear evidence cannot be provided to show that the strategy is successfully implemented and is achieving its objectives.</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | Yes |

| | | | |
|---|--|---|--|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | |
| | Justification | <p>SG 80: The Icelandic Coast Guard is responsible for law enforcement at sea and monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing.</p> <p>SG100: Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). One of the key strategies is intended to protect vulnerable benthic ecosystems. Ten coral areas off SE Iceland have been closed for all fisheries using bottom contact gear based on the Act 97/1997 (Ólafsdóttir & Burgos 2012).</p> | |
| d | Guide post | | There is some evidence that the strategy is achieving its objective. |
| | Met? | | Yes |
| | Justification | The significance of closed areas off Iceland in protecting juvenile cod has been evaluated. It provides evidence that closures of nursery grounds can be useful in protecting immature cod (Schopka et.al. 2010). | |
| References | Anon. 2012a; Regulation 97/1997; Ministry for the Environment 2010; OSPAR Commission 2008a&b; Ólafsdóttir & Burgos 2012; Schopka et al. 2010 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 95 |
| CONDITION NUMBER (if relevant): | | | |

Gillnet – Information (Habitat)

Evaluation Table for PI 2.4.3

| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
|---------------|---------------|--|---|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There is basic understanding of the types and distribution of main habitats in the area of the fishery. | The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery. | The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG 60-80: The BIOICE programme has provided basic inventory of benthic fauna within the Icelandic territorial waters (Figure 3.6). Benthic samples have been collected from a variety of habitats, ranging widely in depth (<100 to 3100 m) and in temperature conditions (12° to -0.9°C). Also, the Marine Research Institute (MRI) has identified areas of vulnerable benthic habitats in Icelandic waters (cold water corals, areas with aggregation of large sponge, maerl beds; Figures 3.7-3.10) in relation to bottom trawl fishing activities (Steingrímsson & Einarsson 2004, Garcia et al. 2006). The MRI is currently carrying out research programmes in order to map benthic habitats in Icelandic waters (biology and geology, using multibeam echo sounder), including mapping cold water corals (<i>Lophelia pertusa</i>) and studying the interaction between fish and cold water coral habitats (CoralFISH project, http://www.eu-fp7-coralfish.net/).</p> <p>Through VMS there is detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats.</p> <p>SG 100: Information is available on the distribution of invertebrate species and habitats in Icelandic waters, as well as data on important environmental parameters. The distribution of main vulnerable habitats in Icelandic waters has been documented and the detail of knowledge is at a relevant scale. The habitat mapping by MRI is ongoing in addition to studies on the ecological function of vulnerable habitats (e.g. CoralFISH).</p> | | |
| b | Guidepost | Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. | Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear. | The physical impacts of the gear on the habitat types have been quantified fully. |
| | Met? | Yes | Yes | No |

| | | | | |
|---|----------------------|--|--|--|
| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
| | Justification | <p>SG 60: Static fishing gear, such as set nets, handline and longlines do not affect large areas of seabed and are not thought to cause serious or irreversible harm to habitat structures (Jennings <i>et al.</i>, 2001).</p> <p>SG 80: Through VMS there is detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. The VMS data is available for scientific purposes. Information is available on the distribution of invertebrate species and habitats in Icelandic waters. Therefore, there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear under assessment.</p> <p>SG 100: Although gillnets are unlikely to impact bottom habitats; no studies have been conducted in Iceland.</p> | | |
| c | Guidepost | | Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | Changes in habitat distributions over time are measured. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The area coverage of the assessed fisheries is monitored through logbooks and VMS, thus their spatial distribution is known in relation to vulnerable habitats. The habitat mapping by MRI is ongoing in addition to studies on the ecological function of vulnerable habitats (e.g. the CoralFISH project).</p> <p>SG100: The MRI research program aims to map benthic habitats in Icelandic waters but not to measure the changes in habitat distribution over time.</p> | | |
| References | | Bell <i>et al.</i> 2000; Eiríksson 1993; Garcia <i>et al.</i> 2006; Jennings <i>et al.</i> , 2001; Ministry of Fisheries 2004; Ólafsdóttir & Burgos 2012; Ragnarsson & Lindegarth 2009; Steingrímsson & Einarsson 2004; Jennings <i>et al.</i> 2001; Thórarinsdóttir <i>et al.</i> 2010 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Gillnet Principle 2: Ecosystem

Gillnet – Outcome (Ecosystem)

Evaluation Table for PI 2.5.1

| PI 2.5.1 | | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function | | |
|---------------|---------------|--|--|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: Extensive studies on the feeding ecology of a large number of demersal fish species, marine mammals and seabirds have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic marine ecosystems. Cod is a major fish predator in the marine ecosystems around Iceland, which preys mainly on capelin and shrimp (<i>Pandalus borealis</i>).</p> <p>Saithe preys on pelagic prey items, typically capelin (<i>Mallotus villosus</i>) and krill (Euphausiacea).</p> <p>None of the assessed fisheries is likely to affect key ecosystem species to a point where there would be serious or irreversible harm.</p> <p>SG80-100: Saithe is not considered to be a key prey species in the Icelandic ecosystem, and preys on pelagic items, typically capelin and krill.</p> <p>Cod is one of the main predators in Icelandic waters. In all of the assessed fishing gear, cod was one of the main retained species. It contributed approximately 50-70% to the total catch in the assessed gillnet, handline and longline fisheries but less in bottom trawl, Danish seine and Nephrops trawl (around 30%). The stock biomass of cod has been increasing and is now larger than observed in the last three decades. This is believed to be the result of a decrease in harvest rate. None of the other retained species are considered as key species in the ecosystem of Icelandic waters. Also, the assessed fisheries do not directly affect the most important prey species in the ecosystem, capelin. There is evidence that the main driving factor for ecosystem change in Icelandic waters is abiotic (Valdimarsson <i>et.al.</i> 2012).</p> <p>Cod has been shown to directly affect the biomass of the (offshore) shrimp population (<i>Pandalus borealis</i>). This is currently taken into account in the MRI assessments (using GADGET models) as has the effect of the capelin on cod growth (using regression models). All of these models indicate that the cod fishery as a whole has negligible negative effects. If the fishery targeting the key ecosystem predator in Icelandic waters is not having a significant impact, it is unlikely that the saithe fishery will. The assessed fishery is highly unlikely to disrupt any key elements of the ecosystem structure or function.</p> <p>Saithe is commonly associated with deep water coral reefs and they appear to be an important part of the ecosystem surrounding the species.</p> <p>The DF database provides relatively good evidence that none of the assessed fisheries catch key ecosystem species. The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure.</p> | | |
| References | | Anon. 2010; Anon. 2012b; Anon. 2011b; Astthorsson et al. 2007; Auster 2005; Barbaro et al. 2008; Foley et.al 2010; Garcia et al. 2006; Jaworski & Ragnarsson 2006; Jónsson 1997; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson 1997; Stefánsson 2003; Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; | | |

| | |
|---|--|
| PI 2.5.1 | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function |
| | Valdimarsson & Jónsson 2007; Valdimarsson <i>et.al.</i> 2012; Vilhjálmsson 2002. |
| OVERALL PERFORMANCE INDICATOR SCORE: | |
| | 100 |
| CONDITION NUMBER (if relevant): | |
| | |

Gillnet – Management (Ecosystem)

Evaluation Table for PI 2.5.2

| | | | | |
|---------------|---|--|---|--|
| PI 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | | |
| Scoring Issue | SG 60 | SG 80 | SG 100 | |
| a | Guidepost | There are measures in place, if necessary. | There is a partial strategy in place, if necessary. | There is a strategy that consists of a plan, in place. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The Directorate of Fisheries database would provide evidence if the assessed fisheries were to catch a significant amount of key ecosystem species.</p> <p>SG80-100: Key ecosystem fish species (e.g. capelin and cod) are subject to the quota system, as is saithe. Large areas are closed for fishing in Icelandic waters in order to protect juvenile fish or spawning fish but also vulnerable habitats. These closures are stipulated in the Fisheries Management Act. 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. There is a strategy with a plan, if it so happened that the saithe fishery should pose a risk or harm to ecosystem structure and function (Ministry of the Environment 2010).</p> | | |
| b | Guidepost | The measures take into account potential impacts of the fishery on key elements of the ecosystem. | The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. | The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|---|--|--|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | |
| | Justification | <p>SG60-80: The DF database would provide evidence if the assessed fisheries were to catch significant amounts of key ecosystem species. 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. MRI is monitoring key elements of the ecosystem and the monitoring would indicate if fisheries are having impact on key elements of the ecosystem.</p> <p>The MRI carries out wide ranging and extensive research on the status and productivity of the 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 the fish stocks (e.g. Anon. 2011a, Anon. 2012a). 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 aims protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>SG100: General measures include monitoring the status of the key ecosystem elements in Icelandic waters (e.g. the capelin stock). In addition, routine monitoring includes biological sampling from catches, which also include non-commercial catch information, as well as verification of log-book records. Capelin and some other key ecosystem species are regulated by TAC. The quota system has been demonstrated to work. Impacts are e.g. restrained by TAC, and area closure in addition to surveillance by the Directorate of Fisheries and Icelandic Coast Guard. Inspectors may accompany fishing vessels on voyages or board 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. Cases of serious or repeated deliberate violation shall furthermore be liable to imprisonment for up to six years. 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 aims to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> | | |
| c | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved. |
| | Met? | Yes | Yes | Yes |

| | | | |
|-------------------|----------------------|--|---|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | |
| | Justification | <p>SG60: There is evidence that the monitoring and surveillance by the DF and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing licenses.</p> <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. The measures are considered highly likely to work.</p> <p>SG 100: Closure of coral areas to fishing off South Iceland, demonstrates that measures to protect the ecosystem are in place and implemented successfully. 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 aim to protect vulnerable benthic ecosystems. (Ministry for the Environment 2010).</p> <p>The fishery has no demonstrable effects on key predator or prey species. If such effects were discovered they would be mitigated with available measures, such as the quota system and area closures. Inspectors may accompany fishing vessels on voyages or board vessels to check their cargo and fishing gear. 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. Violations of the provisions of the Fisheries Management Act are liable to fines, regardless of whether committed deliberately or through negligence. Cases of serious or repeated deliberate violation are liable to imprisonment for up to six years. Violation of the act has resulted in penalties (DF site visit).</p> | |
| d | Guidepost | There is some evidence that the measures comprising the partial strategy are being implemented successfully. | There is evidence that the measures are being implemented successfully. |
| | Met? | Yes | Yes |
| | Justification | <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. There is evidence that the monitoring and surveillance by the DF and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing license.</p> <p>SG 100: The strategy is provided by the Fisheries Management Act and government policies. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>Measures have been implemented successfully, including area closures (fish and habitats), fishing bans (Atlantic halibut), discard bans, and ongoing work to increase the awareness of DF observers to bycatch of birds and mammals.</p> <p>Long-term changes in trophic patterns of Icelandic cod demonstrate the importance of capelin, northern shrimp, and euphausiids in the diet of the key fish predator in the ecosystem; cod (Pálsson & Björnsson 2011). Capelin and some other key ecosystem species are regulated by TAC and their importance in the ecosystem is accounted for in management strategies (e.g. Stefánsson 2003, Anon. 2013).</p> | |
| References | | Anon. 2010; Anon. 2012b; Anon. 2011b; Anon. 2013; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Ministry of the Environment 2010; Pálsson 1997; Schopka <i>et.al.</i> 2010; Stefánsson 2003; | |

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| PI 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function |
| | Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. |
| OVERALL PERFORMANCE INDICATOR SCORE: | |
| | 100 |
| CONDITION NUMBER (if relevant): | |
| | |

Gillnet – Information (Ecosystem)

Evaluation Table for PI 2.5.3

| | | | | |
|---------------|---------------|---|--|---|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity). | Information is adequate to broadly understand the key elements of the ecosystem. | |
| | Met? | Yes | Yes | |
| | Justification | <p>SG60: Extensive studies have been conducted on the marine ecosystems of Icelandic waters (e.g. Astthorsson <i>et al.</i> 2007, Valdimarsson & Jónsson 2007). Studies on the feeding ecology of a large number of fish species, marine mammals and seabirds has provided information on the ecological function of most of the species caught by the assessed fisheries. These studies have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic waters ecosystems (Marine Research Institute 1997). Biomass estimates for stocks of fish, whales and seabirds in Icelandic waters and production estimates of <i>Calanus finmarchicus</i> and other zooplankton species have been used to calculate the biomass of individual components in the Icelandic marine ecosystem (Astthorsson <i>et al.</i> 2007).</p> <p>SG 80: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters, and this information is used in multi species modelling (GADGET models; e.g. Stefánsson & Pálsson 1998, Stefánsson 2003) for MRI assessments. The models have been used to evaluate interactions between fisheries and key ecosystem elements. Information about these interactions has been taken into account for management purposes.</p> | | |
| b | Guidepost | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail. | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail. | Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated. |
| | Met? | Yes | Yes | No |

| | | | |
|-----------------|----------------------|---|--|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| | Justification | <p>SG60: Saithe is not a key ecosystem species and preys mainly on invertebrates. The DF database provides detailed information on catches of target and retained species. This provides information about the impact of the assessed fishery on the populations involved and would provide evidence if adverse impacts on any key ecosystem species occur.</p> <p>SG80: The main impacts of the fishery on key elements of the ecosystem such as key predators, prey and vulnerable habitats can be inferred. Information on mortality of key predators and prey is known and recorded (retained species).</p> <p>The DF database provides detailed information on catches of target and retained species (bycatch/discard is considered not significant). This provides information about the impact of the assessed fisheries on the populations involved.</p> <p>Information on vulnerable habitats in Icelandic waters has been documented, including the coral <i>Lophelia pertusa</i>. MRI has mapped the distribution of coral areas in relation to fishing efforts by bottom trawling and has gathered evidence of impacts caused by such fishery. Coral areas have been closed, based on this evidence, and it can be expected that more coral areas will be closed in the future, as MRI continues its research project on the mapping of the habitats. The mapping will also support the recent strategic plan for the preservation of biodiversity in Icelandic waters. Furthermore, information on high catches of juvenile fish, gathered through the Directorate of Fisheries surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries.</p> <p>SG100: There is detailed information on the distribution of fishing efforts around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats. Evidence of detrimental impact on cold water corals by towed fishing gears have been compiled through scientific mapping (using ROV technique; Ministry of Fisheries 2004)</p> | |
| c | Guidepost | The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known. | The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood. |
| | Met? | Yes | Yes |
| | Justification | <p>SG80: The effect of the fishery on the target and the retained species are assessed annually. Bycatch is on a relatively small scale (see rationale for scoring bycatch). The feeding ecology of a number of demersal fish species has been documented, providing information on the ecological function of most of the species caught by the assessed fisheries. Information on vulnerable habitats in Icelandic waters has also been documented, including the coral <i>Lophelia pertusa</i>. The MRI has mapped the distribution of coral areas in relation to fishing efforts by otter trawling and has gathered evidence of impacts caused by fishing activities. The importance of vulnerable habitats known to occur in Icelandic waters is generally understood (e.g. <i>Lophelia</i> reefs, sponge aggregations).</p> <p>SG100: The DF database provides quantitative information on retained species taken by the assessed fishery. There is good knowledge on the distribution of the different fisheries which can be used to indicate if and where it overlaps with vulnerable habitats. There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters (e.g. Astthorsson <i>et.al.</i> 2007; Marine Research Institute 1997; Stefánsson & Pálsson 1998; Stefánsson 2003; Valdimarsson & Jónsson 2007). Saithe is not a key ecosystem species.</p> | |

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|-----------------|----------------------|---|---|---|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | | |
| d | Guidepost | | Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred. | Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG 80: Sufficient information is available on retained species, bycatch and catch of ETP species through log books, and monitoring of landings. Distribution of fishing in relation to vulnerable habitats is known. This information base is sufficient for inferring the main consequences of fishing.</p> <p>SG100: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters. There is also detailed information on the catches taken from the system and the spatial overlap of the fisheries with vulnerable habitats. This information base is sufficient for inferring the main consequences of fishing.</p> | | |
| e | Guidepost | | Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | Information is sufficient to support the development of strategies to manage ecosystem impacts. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG 80: Data on individual landed catch is instantly entered in the DF database. The surveillance system carried out by the DF and the Coast Guard is constantly monitoring catch levels of juvenile fish and MRI provides information on the need for measures in order to reduce impacts by fisheries. All this information is used for implementing protection measures (e.g. area closure) if the management considers it necessary. The MRI also monitors and manages a large number of species and has monitored environmental conditions in the Icelandic waters for decades. Therefore any potential threats or adverse trends can be quickly identified and responded to.</p> <p>SG100: The strategy is provided by the Fisheries Management Act. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010). Coral areas have been closed, based on scientific evidence, and it can be expected that more coral areas will be closed in the future as MRI continues its research project on the mapping of the habitats.</p> <p>Information on high catches of juvenile fish, gathered through the Directorate of Fisheries surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries. Actions which are considered necessary in order to improve species recruitment (e.g. closure of spawning areas) are based on research information and recommendations from the MRI. The closure of coral areas, are also based on scientific evidence, and it can be expected that more coral areas will be closed in the future as MRI continues research on the mapping of the habitats, their relationship with fisheries and other relevant environmental data. Collectively this information is sufficient to support development of strategies to manage ecosystem impacts.</p> | | |

| | | |
|---|---|-----------|
| PI 2.5.3 | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| References | Anon. 2010; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson1997; Stefánsson 2003; Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thórarinsdóttir et al. 2010; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | 95 |
| CONDITION NUMBER (if relevant): | | |

Nephrops trawl Principle 2: Retained species

Nephrops trawl - Outcome (Retained species)

Evaluation Table for PI 2.1.1

| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | | |
|---------------|---------------|--|---|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main retained species are likely to be within biologically based limits (if not, go to scoring issue c below). | Main retained species are highly likely to be within biologically based limits (if not, go to scoring issue c below). | There is a high degree of certainty that retained species are within biologically based limits and fluctuating around their target reference points. |
| | Met? | Yes | Yes | No |
| | Justification | <p>The following main retained species as defined by weight (>5%) are retained by Nephrops trawl: cod, golden redfish, ling, Norway lobster, gray sole and anglerfish. All species, except gray sole can be said to be highly likely to be within biologically based limits.</p> <p>Atlantic cod: The reference biomass (age 4+) in 2013 is estimated as 1,170,000t and the spawning stock as 480,000t, compared to Blim=125 and Btrigger=220 thousand t (Anon 2013). Fishing mortality has declined significantly in the last decade and is presently at a historical low, below likely candidates for Fpa and Flim (Anon. 2012, ICES 2012a).</p> <p>Golden Redfish: The current biomass index is 2x the TRP of Upa and 5x the LRP of Ulim. The stock is highly likely to be within biological limits.</p> <p>Ling: The biomass index has been increasing since 2005. In 2007 the biomass index was the highest since 1985 and it has been rising ever since. Recruitment has decreased from the high numbers between 2004 –2010, and is now closer to the average for years 1985-2004. Exploitation rate for 2012 is close the average for 2004-2007, when exploitation was lowest. Analysis indicates that these catches are close to FMSY.</p> <p>Norway lobster: The highest recorded biomass index was in 2008 but it has been dropping and is currently under the long-term average. Increasing stock biomass from 2003-2009 is considered to be a combined result of large year classes and a sustainable management strategy. However, new year classes are estimated to be small and consequently the fishable stock has decreased in recent years.</p> <p>Anglerfish: Surveys indicated a large fishable stock, due to very good recruitment in 1998–2007. Biomass indices declined in 2012 and stabilised in 2013. The fishable stock will decline in coming years due to decreasing recruitment during the last five years. However, catches have increased substantially in recent years due to an expansion in the anglerfish population size and distribution for (Figure 3.17). It was most common south of Iceland but in recent years it is more common to the west of Iceland, coinciding with the warming of Icelandic waters.</p> <p>Gray Sole (see SI c below) is not considered to be within biologically based limits. Biomass index increased from 1995-2005 but has declined to a fairly constant level over the last six years. The juvenile index has been declining for a long time and was below average for the last three years. Recent surveys indicate that recruitment to the fishable stock will be low in the years to come.</p> <p>Other species considered as <u>vulnerable</u> are on either the IUCN red list or the OSPAR list.</p> <p>Grey skate (<i>Raja Dipturus batis</i>) is considered to be depleted around Iceland and is listed as critically endangered. Stock status for grey skate is not known.</p> | | |
| b | Guidepost | | | Target reference points are defined for retained species. |

| | | | | |
|---|----------------------|---|---|-----------|
| PI 2.1.1 | | The fishery does not pose a risk of serious or irreversible harm to the retained species and does not hinder recovery of depleted retained species | | |
| | Met? | | | No |
| | Justification | Target reference points are not defined for all retained species. | | |
| c | Guidepost | If main retained species are outside the limits there are measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding of the depleted species. | If main retained species are outside the limits there is a partial strategy of demonstrably effective management measures in place such that the fishery does not hinder recovery and rebuilding. | |
| | Met? | Yes | Yes | |
| | Justification | <p>Gray Sole (Witch): The MRI recommended a TAC of no more than 1,100 t for 2013/14. Gray sole is part of the Icelandic fisheries management system. Regular stock assessments are done and it is managed by TAC and/or other measures such as temporal and/or spatial closures. All advice from the MRI has been adopted by the Ministry for setting TACs and/or other regulations for the 2013/14 quota year. The assessed fishery operates within the ITQ system and is subject to monitoring of landings and surveillance, which ensures effective management of TAC's and other measures such as area closures. These measures are expected to prevent the fishery from hindering recovery of the stock.</p> <p>Average catches of Grey skate for the last 5 years was 9t per year. This low catch demonstrates that the fishery is not targeting this species and therefore does not hinder recovery. In addition, there are other measures in place, such as monitoring of landings, discard bans and areas closures applicable to the fishery.</p> | | |
| d | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the retained species to be outside biologically based limits or hindering recovery. | | |
| | Met? | Yes | | |
| | Justification | Stock status of grey skate is considered to be depleted and stock status is poorly known. However, the average catch in this fishery is only 9t per year demonstrating that it is not targeted. There are measures in place such as monitoring and verification of all catches at landing, discards bans, and areas which have been closed for decades having a secondary effect of serving as MPAs. | | |
| References | | MRI 2013, ICES advice 2012; Anon 2012b, www.fisheries.is . | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Nephrops trawl - Management (Retained species)

Evaluation Table for PI 2.1.2

| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
|---------------|----------------------|--|--|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main retained species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing retained species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>The Fisheries Management Act requires that all catches shall be landed. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch. Masters of fishing vessels shall keep special log books of catch statistics (such as location, dates, gear and catch quantity) and inspectors from the Directorate of Fisheries have access to the log books.</p> <p>In addition, closure of fishing areas is an important part of the quota management system in order to protect spawning grounds and juvenile fish. These measures form a strategy to manage impact of the fishery on retained species.</p> <p>Many of the retained species are managed by the MRI through TACs and/or other appropriate measures. These include all of the species considered as main retained by weight and management measures would be considered as a strategy at the 100 level.</p> <p>However for other vulnerable species the measures in place include monitoring of landings, spatial and/or temporal closures and bans on discards. These measures form a partial strategy at the 80 level.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | No |

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|-------------------|----------------------|--|---|--|
| PI 2.1.2 | | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species | | |
| | Justification | <p>SG80: Most of the retained species are monitored by the MRI surveys. Strategies for many of the retained species are therefore comparable to those for the target species. Information about the retained species can be directly obtained from the DF database. Information on retained species is based on landed catch, the MRI surveys and fishermen's logbooks. Fishing efforts are limited by quota, area closures to protect undersized fish, gear specific closures, minimum mesh size and regulated use of sorting grids. Closures, mesh size, sorting grids and minimum landing size are monitored by the Coast Guard. The availability of information about the fishery directly provides evidence that the strategy is working.</p> <p>The stock status and track record of the main retained species and many of the lesser retained species, show that the management strategy of these species is working. In addition, there are examples of species, such as cod, recovering from very low levels under the Icelandic Fisheries Management system.</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The quota system ensures implementation of the strategy. Information from the DF database, the Coast Guard and the logbook returns provide evidence that the partial strategy is being implemented successfully. The discard ban and official weighing has been in place for some decades. Discards have been decreasing (Pálsson et al. 2013). Area closures during spawning and closures to protect undersized fish have also been in place for decades.</p> | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |
| | Met? | | | No |
| | Justification | <p>Many of the retained species stocks are well managed through the TAC's and other measures including surveillance, verified landings, and discard bans. However, MRI does not provide TAC advice on some of the lesser retained species which are not targeted. Therefore a score of 100 cannot be justified.</p> | | |
| e | Guidepost | It is likely that shark finning is not taking place. | It is highly likely that shark finning is not taking place. | There is a high degree of certainty that shark finning is not taking place. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>Various shark species are occasionally reported as retained species. Vessels are required to have VMS (although not video linked), and fishermen are required to land all species intact, with dockside verification of the catch. In Iceland there is a domestic market for shark flesh and sharks are landed whole. It is thus the flesh rather than the fins that is valuable.</p> | | |
| References | | Pálsson et al. 2013 | | |

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|---|---|
| PI 2.1.2 | There is a strategy in place for managing retained species that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to retained species |
| OVERALL PERFORMANCE INDICATOR SCORE: | 85 |
| CONDITION NUMBER (if relevant): | |

Nephrops trawl - Information (Retained species)

Evaluation Table for PI 2.1.3

| | | | | |
|----------------------|---|---|--|--|
| PI 2.1.3 | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | | |
| Scoring Issue | SG 60 | SG 80 | SG 100 | |
| a | Guidepost | Qualitative information is available on the amount of main retained species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main retained species taken by the fishery. | Accurate and verifiable information is available on the catch of all retained species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported in Iceland. Port authorities are responsible for the correct weighing and recording of the catch.</p> <p>SG80: By law, all catch shall be landed and recorded by harbour officials and log books are mandatory. Therefore quantitative information on the amount of all retained species taken by the fishery is available.</p> <p>Although accurate and verifiable information is available for all retained species, the consequence for affected populations is not known in all cases.</p> | | |
| b | Guidepost | Information is adequate to qualitatively assess outcome status with respect to biologically based limits. | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with a high degree of certainty. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: The MRI conducts several types of monitoring surveys annually. Most of the retained species are routinely monitored through several types of surveys (ground fish-, gill net-, and shrimp surveys extending into shallow and deep waters all around Iceland) conducted by MRI each year. They provide relevant information that can be used to assess changes in stock indices, distribution in age and length frequency and spatial distribution. As all main retained species (by weight) are routinely monitored, changes in stock levels can be monitored. For those species that are also monitored through recordings of landings, enough information exists for stock assessment.</p> <p>SG80: A comprehensive range of data is available for the outcome status of main retained species through MRI monitoring surveys each year. Survey data is used to evaluate changes in stock levels for TAC species and the data can also be used in this way for a number of other retained species which are not subject to TAC (Björnsson et al. 2007).</p> <p>SG100: Many of the retained species are routinely monitored during MRI surveys, which provide quality data fit for stock assessments, and information is sufficient to quantitatively estimate outcome status with a relatively high degree of certainty, if needed. However, not all retained species are part of the MRI monitoring surveys. Therefore information is not adequate in all cases.</p> | | |

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|---|----------------------|--|---|---|
| PI 2.1.3 | | Information on the nature and extent of retained species is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage retained species | | |
| c | Guidepost | Information is adequate to support measures to manage main retained species. | Information is adequate to support a partial strategy to manage main retained species. | Information is adequate to support a strategy to manage retained species, and evaluate with a high degree of certainty whether the strategy is achieving its objective. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Information exists for stock assessments of main retained species by weight. All retained species are monitored through landing recordings.</p> <p>SG80: Monitoring of main retained species is performed during surveys, statistical analysis of landed catch and information from logbooks. These procedures give a fair estimate of mortalities of most of the retained species and full information on fisheries removals.</p> <p>SG100: Some of the retained species are not part of the MRI monitoring surveys. Therefore, information is not adequate in all cases.</p> | | |
| d | Guidepost | | Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator score or the operation of the fishery or the effectiveness of the strategy) | Monitoring of retained species is conducted in sufficient detail to assess ongoing mortalities to all retained species. |
| | Met? | | Yes | Yes |
| | Justification | <p>SG80: Monitoring of main retained species is performed during MRI surveys, through statistical analysis of landed catch and from information in logbooks. These procedures give a fair estimate of mortalities of these species and also a number of other retained species (TAC species) taken by the fishery. Monitoring of landed catches by the DF continues to be collected and information can detect any changes in risk to any of the retained species. There is a continued ban on discards and annual assessment of discard rates for the main species (see table 3.9) are carried out by the MRI (Pálsson 2013).</p> <p>SG100: Monitoring of landed catches is in place and recorded in sufficient detail to assess mortalities of all retained species within the fishery. This assumes that in this context mortality means fishery removal.</p> | | |
| References | | Björnsson et.al. 2007, Anon. 2013, Pálsson 2013 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Nephrops trawl Principle 2: Bycatch Species

Nephrops trawl – Outcome (Bycatch species)

Evaluation Table for PI 2.2.1

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|----------------------|----------------------|---|---|--|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Main bycatch species are likely to be within biologically based limits (if not, go to scoring issue b below). | Main bycatch species are highly likely to be within biologically based limits (if not, go to scoring issue b below). | There is a high degree of certainty that bycatch species are within biologically based limits. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Bycatch species are defined as those species that are not retained but which are discarded. There is no systematic monitoring of discard in place. However, research by MRI and measurements by the DF indicate that the main discards in the Icelandic fisheries are of cod and haddock. Estimated discards of cod and haddock have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) for cod and haddock were lower than previously recorded; 0.04% of total cod landings (Pálsson et al. 2013). Since cod and haddock are the main discard in Icelandic fisheries and their estimated discard rates are very low we conclude that the scale of discarding of other species is likely to be even smaller. Therefore there are no main bycatch species in the assessed fisheries.</p> <p>SG80: Discarding is not allowed. There are several features in the fisheries management system which reduces the incentive to discard (see chapter 3.4.3 Bycatch species). It is evident that in all the assessed fisheries catches of low commercial value were landed (e.g. dogfish, sea cucumber, black scabbard-fish, ribbonfish, and mackerel shark (Tables 3.2 to 3.7). 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 mortality by the fisheries. Catches representing <0.001% of total catch landed indicate that discarding is insignificant in the assessed fisheries, or at least not reaching the level of major bycatch species (5% of the total catch).</p> | | |
| b | Guidepost | If main bycatch species are outside biologically based limits there are mitigation measures in place that are expected to ensure that the fishery does not hinder recovery and rebuilding. | If main bycatch species are outside biologically based limits there is a partial strategy of demonstrably effective mitigation measures in place such that the fishery does not hinder recovery and rebuilding. | |
| | Met? | N/A | N/A | |
| | Justification | | | |

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|---|----------------------|--|--|-----------|
| PI 2.2.1 | | The fishery does not pose a risk of serious or irreversible harm to the bycatch species or species groups and does not hinder recovery of depleted bycatch species or species groups | | |
| c | Guidepost | If the status is poorly known there are measures or practices in place that are expected to result in the fishery not causing the bycatch species to be outside biologically based limits or hindering recovery. | | |
| | Met? | N/A | | |
| | Justification | | | |
| References | | ICES 2011b; Jennings <i>et al.</i> 2001; Pálsson <i>et al.</i> 2013; Umhverfissráðuneytið 2011 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Nephrops trawl– Management (Bycatch species)

Evaluation Table for PI 2.2.2

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|----------------------|----------------------|---|---|---|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a partial strategy in place, if necessary, that is expected to maintain the main bycatch species at levels which are highly likely to be within biologically based limits, or to ensure the fishery does not hinder their recovery and rebuilding. | There is a strategy in place for managing and minimizing bycatch. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The Fisheries Management Act requires that all catches shall be landed; therefore discarding is illegal. All the catch landed in Iceland by the Icelandic fishing fleet must be weighed and reported into a database operated by the DF. There are several measures included in the fisheries management system which should disincentive fishermen from discarding, e.g. 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 and up to 5% of the total landed catch can be classified as being of a low commercial value and is not subtracted from the quota allocated to the vessel.</p> <p>SG80: Large areas of Icelandic waters are closed for fishing in order to protect fish and habitats. The level of discarding in fisheries is assessed by the MRI. Fishers are required to keep fish logbooks. An observer system is operated by the DF, both at landing sites and on board vessels. Breach of regulations leads to a warning or a fine. Repeated offenses lead to heavy fines, revocation of the vessel’s license to fish and possibly a prison sentence.</p> <p>SG100: 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) (Figure 3.11), which decreases the likelihood of large catches of juvenile fish. Areas are usually closed for fishing by means of bottom trawl and longline because of the presence of large amounts of juvenile fish or in order to protect spawning fish, but also vulnerable benthic habitats. The Icelandic Coast Guard monitors fishing activities in Icelandic waters, e.g. via VMS, including surveillance of areas closed for fishing.</p> <p>There are strict requirements for the keeping of fish logbooks which must be made available to the DF. Following a random inspection on landings, inspectors from the DF can directly join a vessel to visit the same fishing ground the vessel visited during the previous fishing trip, in order to examine their fishing practices and compare catch composition between fishing trips. Also, the system of instant recording of landings allows 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.</p> <p>A vessel owner which is found to have acted in breach of some regulations gets a warning and sometimes a fine. Repeated offenses lead to heavy fines, revocation of the vessel’s license to fish and possibly to prison sentences.</p> | | |

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|-----------------|----------------------|--|---|--|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). | There is some objective basis for confidence that the partial strategy will work, based on some information directly about the fishery and/or species involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or species involved. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Discarding is illegal. There are a number of measures that aim to ensure compliance with the law. Annual assessment on discarding by MRI indicates that discarding is at the least very limited.</p> <p>SG80: Following discussions with the MRI, DF, the MII and the client during the site visit the assessment team concluded that there was a consensus among all parties on very low rate of discarding in the assessed fisheries. Estimated discards have declined in recent years and were at a minimum in 2011 in all gears, and total discard rates (weight discarded/weight landed) were lower than recorded over the period 2001-2011 (Pálsson et al. 2013).</p> <p>SG100: From 2001-2010, mean cod discards were highest in the Danish seine fishery (2.70%) and in the gill net fishery (1.34%), but lower in the demersal trawl fishery (0.77%), and in the long line fishery (0.38%) (Pálsson et al. 2012). Mean haddock discards were highest in the Danish seine, (4.30%), and the demersal trawl (2.47%) fisheries, and lowest in the long line fishery (0.40%). Cod discards in all gear combined were 0.90% of landed catch (1680 tonnes), and haddock discards 2.02% (1488 tonnes).</p> | | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80-SG100: It is evident that retained species from the assessed fisheries were landed even though they are of low commercial value (e.g. dogfish, long rough dab) (Table 4.2). This, together with the fact that the main discards in Icelandic fisheries are of cod and haddock and that the MRI has estimated the discard rates to be less than 1% of landings, suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it does not reach the level of main bycatch species (5% of the total catch). Discard studies have been in place for over 10 years with well established procedures in place by the MRI, DF and the coast guard. Therefore, the bycatch/discarding management is successfully implemented.</p> | | |
| d | Guidepost | | | There is some evidence that the strategy is achieving its overall objective. |
| | Met? | | | No |

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|---|----------------------|---|-----------|
| PI 2.2.2 | | There is a strategy in place for managing bycatch that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to bycatch populations | |
| | Justification | Assessment by the MRI indicates that the discard rates have declined since 2001 and were lowest in 2011. | |
| References | | Pálsson et al. 2012& 2013; Stakeholder consultation | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 85 |
| CONDITION NUMBER (if relevant): | | | |

Nephrops trawl– Information (Bycatch species)

Evaluation Table for PI 2.2.3

| | | | | |
|----------------------|----------------------|---|---|---|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Qualitative information is available on the amount of main bycatch species taken by the fishery. | Qualitative information and some quantitative information are available on the amount of main bycatch species taken by the fishery. | Accurate and verifiable information is available on the catch of all bycatch species and the consequences for the status of affected populations. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: Research by the MRI and measurements by the DF, including on board surveillance, indicate that the main discards in the Icelandic fisheries are of cod and haddock.</p> <p>SG100: While scientific studies indicate that discarding exists at a low level, there is no systematic monitoring of discard in place in Iceland.</p> | | |
| b | Guidepost | Information is adequate to broadly understand outcome status with respect to biologically based limits | Information is sufficient to estimate outcome status with respect to biologically based limits. | Information is sufficient to quantitatively estimate outcome status with respect to biologically based limits with a high degree of certainty. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The main discards in Icelandic fisheries are of cod and haddock. The MRI has estimated the discard rate to be less than 1% of landings, which suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it has not reached the level of main bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG80-100: Standardized annual groundfish surveys have been conducted by MRI since 1985 including biological sampling of large numbers of demersal fish species. This information should make it possible to estimate outcome status of a number of retained/bycatch species, but not all.</p> | | |

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|--|----------------------|---|--|--|
| PI 2.2.3 | | Information on the nature and the amount of bycatch is adequate to determine the risk posed by the fishery and the effectiveness of the strategy to manage bycatch | | |
| c | Guidepost | Information is adequate to support measures to manage bycatch. | Information is adequate to support a partial strategy to manage main bycatch species. | Information is adequate to support a comprehensive strategy to manage bycatch, and evaluate with a high degree of certainty whether a strategy is achieving its objective. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60-80: The main discards in Icelandic fisheries are of cod and haddock. The MRI has estimated the discard rate to be less than 1% of landings, which suggests that bycatch/discarding is a minor problem in the assessed fisheries, or that it has not reached the level of major bycatch species (5% of the total catch). Therefore, the management scheme appears to be successfully implemented.</p> <p>SG100: It can be inferred that bycatch/discarding is a minor problem in the assessed fisheries. However, since comprehensive monitoring is not in place, the level of bycatch/discarding cannot be evaluated with a high degree of certainty.</p> | | |
| d | Guidepost | | Sufficient data continue to be collected to detect any increase in risk to main bycatch species (e.g., due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy). | Monitoring of bycatch data is conducted in sufficient detail to assess ongoing mortalities to all bycatch species. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: The fishery is a part of the logbook and observer system operated by DF and surveillance of the fishery is in operation. The Directorate's database provides instant quantitative information on landings of all retained species. The database is also used in assessment work by the MRI. Annual discard estimates by the MRI is ongoing.</p> <p>SG100: While scientific studies on discarding are ongoing, there is no systematic monitoring of discards in place in Iceland.</p> | | |
| References | | Pálsson et al. 2012 & 2013; Stakeholder consultation | | |
| OVERALL PERFORMANCE INDICATOR SCORE: All gear | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Nephrops trawl Principle 2: ETP Species

Nephrops trawl - Outcome (ETP species)

Evaluation Table for PI 2.3.1

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|---------------|---------------|--|--|---|
| PI 2.3.1 | | The fishery meets national and international requirements for the protection of ETP species | | |
| | | The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Known effects of the fishery are likely to be within limits of national and international requirements for protection of ETP species. | The effects of the fishery are known and are highly likely to be within limits of national and international requirements for protection of ETP species. | There is a high degree of certainty that the effects of the fishery are within limits of national and international requirements for protection of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>None of the species caught by the fishery are included in Appendix I of CITES. Atlantic halibut (<i>Hippoglossus hippoglossus</i>) is an ETP species recognized by Icelandic authorities.</p> <p>SG60-80: On 1st January 2012 a regulation was implemented stipulating a ban on targeting halibut and demanding fishers to release all viable halibut back to the sea if by-caught. The effects of the fishery on the halibut stock are known through recordings of landings and it operates under regulation 1164/2011 on halibut fishing.</p> <p>SG100: The ban on halibut fishing has only been recently introduced, and the effectiveness of the strategy cannot be determined yet. A decrease in total landings of halibut indicates that the ban is working. However, the survival rate of viable halibut returned to sea is not known.</p> | | |
| b | Guidepost | Known direct effects are unlikely to create unacceptable impacts to ETP species. | Direct effects are highly unlikely to create unacceptable impacts to ETP species. | There is a high degree of confidence that there are no significant detrimental direct effects of the fishery on ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The assessed saithe fishery is not targeting Atlantic halibut. The catch of halibut has decreased since the ban on targeting halibut was introduced.</p> <p>SG80: In the period 2007-2013 the landed catch of Atlantic halibut by the saithe fishery by fishing gear was 0.01 to 0.26% (Table 3.11). None of the assessed fishing gear was targeting halibut and in all gears the lowest annual catch was for the fishing year when the regulation was implemented (2011/12). Catch numbers until May 2013 indicate an even further reduction in landed catch (see Table 3.11).</p> <p>During the period 2007-2011 the landed catch of Atlantic halibut ranged from 10 to 15 tonnes. In 2012 the catch was 6 tonnes. The landed catch from September 2012 to May 2013 was 2 tonnes.</p> <p>The current landed catch levels indicate that direct mortality of halibut is significantly lower than it used to be. Furthermore, the figures for the period September 2012 to May 2013 (45 tonnes total landed catch) suggest that the direct fishing mortality is decreasing even further.</p> <p>SG100: The decline in catch of halibut in 2012-13 indicates that the fishery is complying with the regulations which ban targeting halibut. However, it has only been in operation for short time and it remains to be seen whether it will lead to recovery of the Atlantic halibut stock.</p> | | |

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|--------------------------------------|---------------|---|--|
| PI 2.3.1 | | The fishery meets national and international requirements for the protection of ETP species | |
| | | The fishery does not pose a risk of serious or irreversible harm to ETP species and does not hinder recovery of ETP species | |
| c | Guidepost | Indirect effects have been considered and are thought to be unlikely to create unacceptable impacts. | There is a high degree of confidence that there are no significant detrimental indirect effects of the fishery on ETP species. |
| | Met? | Yes | No |
| | Justification | <p>SG80: The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is not targeted and that viable specimens are released and returned to sea. However, there is no information on how much halibut was released in 2012 or its survival rate following discarding. The release mortality rate of Atlantic halibut has not been estimated. On a global scale, release mortality estimates of halibut species are highly variable, commonly ranging between 10-50% (Alverson et al. 1996; Meyer 2007).</p> <p>SG100: The release mortality rate of Atlantic halibut has not been estimated.</p> | |
| References | | Alverson et al. 1996; Meyer 2007; Regulation 1164/2011. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 80 |
| CONDITION NUMBER (if relevant): | | | |

Nephrops trawl - Management (ETP species)

Evaluation Table for PI 2.3.2

| | | | | |
|---------------|-----------|---|---|---|
| PI 2.3.2 | | The fishery has in place precautionary management strategies designed to: | | |
| | | <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are <u>measures</u> in place that <u>minimise mortality</u> of ETP species, and are expected to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a <u>strategy</u> in place for managing the fishery's impact on ETP species, <u>including measures to minimise mortality</u> , which is designed to be highly likely to achieve national and international requirements for the protection of ETP species. | There is a comprehensive strategy in place for managing the fishery's impact on ETP species, including measures to minimise mortality, which is designed to achieve <u>above</u> national and international requirements for the protection of ETP species. |
| | Met? | Yes | Yes | No |

| | | | | |
|----------|---|--|--|---|
| PI 2.3.2 | <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | | |
| | Justification | <p>SG60: All the catch landed in Iceland must be weighed and reported. Port authorities are responsible for the correct weighing and recording of the catch. Landings are monitored by the DF. Area closure for fishing is an integrated part of the management, both for fish species and habitats. The MII issued a regulation imposing a ban on targeting halibut and demanding fishers to release all viable halibut back to the sea if caught.</p> <p>SG80: 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 these conventions a number of mechanisms have been developed to detect and reduce impacts. For example the OSPAR has identified a number of key species and habitats which are considered threatened or declining (OSPAR Commission 2008a&b). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine species and ecosystems, and (b) protect vulnerable benthic ecosystems. The Ministry of Industries and Innovation issued regulations where a ban was set on a direct fishery for halibut and that all viable halibut must be released in other fisheries.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/species). | There is an objective basis for confidence that the strategy will work, based on information directly about the fishery and/or the species involved. | The strategy is mainly based on information directly about the fishery and/or species involved, and a quantitative analysis supports high confidence that the strategy will work. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: Area closure for fishing and restrictions on mesh size are an integrated part of the fishery management system, in order to reduce catch of juvenile fish (Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands). This is likely to reduce catches of juvenile halibut.</p> <p>SG80: The management strategy is enforced by the Directorate of Fisheries and Icelandic Coast Guard. Data on halibut catch will indicate whether the ban on targeting halibut is working.</p> <p>SG100: The ban on halibut fishing has not been in operation long enough to evaluate its effectiveness, since this is a long lived species.</p> | | |
| c | Guidepost | | There is evidence that the strategy is being implemented successfully. | There is clear evidence that the strategy is being implemented successfully. |
| | Met? | | Yes | No |
| | Justification | <p>SG80: A decrease in landed catches since the ban was implemented, indicates that the strategy is being successfully implemented.</p> <p>SG100: A decreasing trend in landed catch indicates modification of fishing practices. However, no study has been made on the survival rate of viable halibut when released back to sea.</p> | | |

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|---|---------------|--|--|---|
| PI 2.3.2 | | <p>The fishery has in place precautionary management strategies designed to:</p> <ul style="list-style-type: none"> • Meet national and international requirements; • Ensure the fishery does not pose a risk of serious harm to ETP species; • Ensure the fishery does not hinder recovery of ETP species; and • Minimise mortality of ETP species. | | |
| d | Guidepost | | | There is evidence that the strategy is achieving its objective. |
| | Met? | | | No |
| | Justification | <p>SG100: The ban on direct halibut fishing has not been in operation long enough to evaluate its effectiveness.</p> | | |
| References | | Act 97/1997 um veiðar í fiskveiðilandhelgi Íslands, Anon. 2012a; Ministry for the Environment 2010;OSPAR Commission 2008a&b | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Nephrops trawl - Information (ETP species)

Evaluation Table for PI 2.3.3

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|----------------------|----------------------|--|--|--|
| PI 2.3.3 | | Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • Information for the development of the management strategy; • Information to assess the effectiveness of the management strategy; and • Information to determine the outcome status of ETP species. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| I | Guidepost | Information is sufficient to qualitatively estimate the fishery related mortality of ETP species. | Sufficient information is available to allow fishery related mortality and the impact of fishing to be quantitatively estimated for ETP species. | Information is sufficient to quantitatively estimate outcome status of ETP species with a high degree of certainty. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The Directorate of Fisheries database provides quantitative information on retained species taken by the assessed fishery. The Atlantic halibut stock is monitored annually by the MRI. The drop in landed catch in 2012, following the issuing of regulations by the Ministry of Fisheries, indicates that viable halibut is released from the fishery and back to sea. No direct estimate on release mortality rate is available for Atlantic halibut.</p> <p>SG80: Quantitative information on the amount of viable halibut released from the fishery and back to sea and its survival rate is not available. Although, release numbers and - mortalities cannot be directly determined, full information is available on landings of halibut for all gears in the fishery.</p> <p>SG100: Information available for halibut includes survey data, catch composition and age/length data. This information can be regarded as sufficient to determine the stock status relative to reference point.</p> | | |
| b | Guidepost | Information is adequate to broadly understand the impact of the fishery on ETP species. | Information is sufficient to determine whether the fishery may be a threat to protection and recovery of the ETP species. | Accurate and verifiable information is available on the magnitude of all impacts, mortalities and injuries and the consequences for the status of ETP species. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut.</p> <p>SG80: Historically, halibut has mainly been taken as bycatch (retained species) in the bottom trawl and longline fisheries in Iceland, and catch by other gear is relatively insignificant. In recent years the proportional catch by bottom trawl has decreased and the majority of the landed halibut catch has been by longline (Figure 3.29). Since 2000 the main fishing grounds of halibut have been on the Reykjanes ridge and NW of the ridge (Figure 3.29). Since the ban on targeting halibut was introduced the landed catch has decreased considerably (Table 3.12).</p> <p>SG100: The DF database provides quantitative information on retained species taken by the assessed fishery. However, quantitative information on the amount of halibut released following the issuing of the ban on targeting halibut is not available, nor is the survival rate of discarded halibut. Therefore, not all mortalities can be accounted for and hence not the magnitude of all impacts.</p> | | |

| | | | | |
|---|----------------------|--|---|---|
| PI 2.3.3 | | Relevant information is collected to support the management of fishery impacts on ETP species, including: <ul style="list-style-type: none"> • 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. | | |
| c | Guidepost | Information is adequate to support measures to manage the impacts on ETP species. | Information is sufficient to measure trends and support a full strategy to manage impacts on ETP species. | Information is adequate to support a comprehensive strategy to manage impacts, minimize mortality and injury of ETP species, and evaluate with a high degree of certainty whether a strategy is achieving its objectives. |
| | Met? | Yes | Yes | No |
| | Justification | <p>SG60: The DF database provides quantitative information on retained species taken by the assessed fishery, including Atlantic halibut. The halibut stock status is monitored by MRI and used to be managed by TAC.</p> <p>SG80: Data from the DF and MRI are used to assess the stock status and trends in the catches and biomass index for Atlantic halibut. The information is sufficient to measure the response of the depleted halibut stock and to evaluate whether the stock will recover following the ban on halibut target fisheries.</p> <p>SG100: Information on the amount of released viable halibut and its survival rate is lacking. Therefore, it cannot be evaluated with a high degree of certainty whether the strategy is achieving its objectives.</p> | | |
| References | | Alverson et al 1996; Umhverfisstjórnuneytið 2011 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 85 |
| CONDITION NUMBER (if relevant): | | | | |

Nephrops trawl Principle 2: Habitat

Nephrops trawl - Outcome (Habitat)

Evaluation Table for PI 2.4.1

| | | | | |
|---|----------------------|---|---|--|
| PI 2.4.1 | | The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The fishery is unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. | There is evidence that the fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The habitat of <i>Nephrops norvegicus</i> is characterized by fine sand and mud. Typically, such habitat does not foster vulnerable fauna. Furthermore, studies on the impact of <i>Nephrops</i> trawling indicate that fishing intensity is the major factor controlling long-term negative trends in the benthos, rather than the direct impact from passage of the gear (Ball et al. 2000). The Nephrops trawl used in Icelandic waters has a groundrope but is not fitted with bobbins or tickler chain (www.fisheries.is). The main Nephrops fishing grounds are in the muddy deeps and banks off South Iceland (Garcia et.al. 2006) and a good distance away from vulnerable habitats typically occurring close to the continental shelf break (e.g. Steingrímsson & Einarsson 2004, Garcia et.al. 2006). Therefore, it is highly unlikely that the fishery will reduce key habitat forming species to a point where there would be serious or irreversible harm.</p> <p>SG80-100: Scientific evidence indicates that it is highly unlikely that gillnets, handline, longlines, Danish seine and <i>Nephrops</i> trawl reduce habitat structure and function to a point where there would be serious or irreversible harm (Ball et al. 2000, Jennings et al. 2001, Thórarinsdóttir et al. 2010).</p> | | |
| References | | Anon. 2004; Ball <i>et al.</i> 2000; Garcia <i>et.al.</i> 2006; Jennings et al. 2001; Ministry of the Environment 2010; Ministry of Fisheries 2004; OSPAR Commission 2008a&b; Thórarinsdóttir et al. 2010; Ólafsdóttir & Burgos 2012; Steingrímsson & Einarsson 2004 | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Nephrops trawl - Management (Habitat)

Evaluation Table for PI 2.4.2

| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | | |
|---------------|----------------------|---|---|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are measures in place, if necessary, that are expected to achieve the Habitat Outcome 80 level of performance. | There is a partial strategy in place, if necessary, that is expected to achieve the Habitat Outcome 80 level of performance or above. | There is a strategy in place for managing the impact of the fishery on habitat types. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: In Icelandic waters, large areas are closed for fishing, some of them temporarily (hours per day, days or seasonal) and others permanently (years) which protects bottom habitats from being damaged by fishing activities (Figure 3.11). The Icelandic Coast Guard monitors fishing activities in Icelandic waters in real time through VMS, including surveillance of areas closed for fishing.</p> <p>SG80: 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 Commission 2008 a&b).</p> <p>SG 100: Ten coral areas with <i>L. pertusa</i> off S and SE Iceland have been closed for all fisheries using bottom contact gear (Ólafsdóttir & Burgos 2012). Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). Two of the key strategies are intended to (a) develop fishing methods with less impact on marine ecosystems, and (b) protect vulnerable benthic ecosystems.</p> | | |
| b | Guidepost | The measures are considered likely to work, based on plausible argument (e.g. general experience, theory or comparison with similar fisheries/habitats). | There is some objective basis for confidence that the partial strategy will work, based on information directly about the fishery and/or habitats involved. | Testing supports high confidence that the strategy will work, based on information directly about the fishery and/or habitats involved. |
| | Met? | Yes | Yes | No |

| | | | |
|---|----------------------|---|---|
| PI 2.4.2 | | There is a strategy in place that is designed to ensure the fishery does not pose a risk of serious or irreversible harm to habitat types | |
| | Justification | <p>SG60: Area closure for fishing is an integrated part of the fishery management system, in order to reduce catch of juvenile and spawning fish. This measure has a secondary effect, i.e. protecting bottom habitats. Furthermore, the Act 97/1997 (“um veiðar í fiskveiðilandhelgi Íslands”) allows managers to close vulnerable habitats for fishing. Several vulnerable habitats areas have been closed for fishing.</p> <p>SG80: The management strategy is enforced by the Icelandic Coast Guard including vulnerable habitat areas which are closed for fishing. Operation of all Icelandic fishing vessels is monitored by VMS and the MRI has access to electronic logbooks for scientific purposes (high resolution data). During a site visit the DF confirmed that no vessel has violated the closure of coral areas.</p> <p>SG100: The effectiveness of habitat area closures has not been evaluated, therefore clear evidence cannot be provided to show that the strategy is successfully implemented and is achieving its objectives.</p> | |
| c | Guidepost | | There is some evidence that the partial strategy is being implemented successfully. |
| | Met? | | Yes |
| | Justification | <p>SG 80: The Icelandic Coast Guard is responsible for law enforcement at sea and monitors fishing activities in Icelandic waters, including surveillance of areas closed for fishing.</p> <p>SG100: Recently the government of Iceland has presented a national strategic plan for preservation of biological diversity (Ministry for the Environment 2010). One of the key strategies is intended to protect vulnerable benthic ecosystems. Ten coral areas off SE Iceland have been closed for all fisheries using bottom contact gear based on the Act 97/1997 (Ólafsdóttir & Burgos 2012).</p> | |
| d | Guidepost | | There is some evidence that the strategy is achieving its objective. |
| | Met? | | Yes |
| | Justification | The significance of closed areas off Iceland in protecting juvenile cod has been evaluated. It provides evidence that closures of nursery grounds can be useful in protecting immature cod (Schopka et.al. 2010). | |
| References | | Anon. 2012a; Regulation 97/1997; Ministry for the Environment 2010; OSPAR Commission 2008a&b; Ólafsdóttir & Burgos 2012; Schopka et al. 2010 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 95 |
| CONDITION NUMBER (if relevant): | | | |

Nephrops trawl – Information (Habitat)

Evaluation Table for PI 2.4.3

| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | | |
|---------------|----------------------|--|---|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There is basic understanding of the types and distribution of main habitats in the area of the fishery. | The nature, distribution and vulnerability of all main habitat types in the fishery are known at a level of detail relevant to the scale and intensity of the fishery. | The distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG 60-80: The BIOICE programme has provided basic inventory of benthic fauna within the Icelandic territorial waters (Figure 3.6). Benthic samples have been collected from a variety of habitats, ranging widely in depth (<100 to 3100 m) and in temperature conditions (12° to -0.9°C). Also, the Marine Research Institute (MRI) has identified areas of vulnerable benthic habitats in Icelandic waters (cold water corals, areas with aggregation of large sponge, maerl beds; Figures 3.7-3.10) in relation to bottom trawl fishing activities (Steingrímsson & Einarsson 2004, Garcia et al. 2006). The MRI is currently carrying out research programmes in order to map benthic habitats in Icelandic waters (biology and geology, using multibeam echo sounder), including mapping cold water corals (<i>Lophelia pertusa</i>) and studying the interaction between fish and cold water coral habitats (CoralFISH project, http://www.eu-fp7-coralfish.net/).</p> <p>Through VMS there is detailed information on the distribution of fishing effort around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats.</p> <p>SG 100: Information is available on the distribution of invertebrate species and habitats in Icelandic waters, as well as data on important environmental parameters. The distribution of main vulnerable habitats in Icelandic waters has been documented and the detail of knowledge is at a relevant scale. The habitat mapping by MRI is ongoing in addition to studies on the ecological function of vulnerable habitats (e.g. CoralFISH).</p> | | |
| b | Guidepost | Information is adequate to broadly understand the nature of the main impacts of gear use on the main habitats, including spatial overlap of habitat with fishing gear. | Sufficient data are available to allow the nature of the impacts of the fishery on habitat types to be identified and there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear. | The physical impacts of the gear on the habitat types have been quantified fully. |
| | Met? | Yes | Yes | No |

| | | | |
|---|----------------------|---|--|
| PI 2.4.3 | | Information is adequate to determine the risk posed to habitat types by the fishery and the effectiveness of the strategy to manage impacts on habitat types | |
| | Justification | <p>SG 60: The habitat of <i>Nephrops norvegicus</i> is characterized by fine sand and mud (Eiríksson 1993). Typically, such habitat does not foster vulnerable fauna. Furthermore, studies on the impact of <i>Nephrops</i> trawling indicate that fishing intensity per se constitutes the major factor controlling long-term negative trends in the benthos; rather than the direct impact from passage of the gear (Bell <i>et al.</i> 2000). It is unlikely that <i>Nephrops</i> trawling will reduce habitat structure and function to a point where there will be serious or irreversible harm.</p> <p>Evidence of detrimental impact on cold water corals by towed fishing gears has been compiled through scientific mapping using ROV techniques (Ministry of Fisheries 2004, Ólafsdóttir & Burgos 2012). There is good knowledge on the distribution of the different fisheries in assessment which can be used to show if and where fishing overlaps with vulnerable habitats.</p> <p>SG 80: Through VMS there is detailed information on the distribution of fishing efforts around Iceland by all the assessed fishing gears. The VMS data is available for scientific purposes. Information is available on the distribution of invertebrate species and habitats in Icelandic waters. Therefore, there is reliable information on the spatial extent of interaction, and the timing and location of use of the fishing gear under assessment.</p> <p>SG 100: Impacts of <i>Nephrops</i> trawl on bottom habitats in Iceland have not been quantified.</p> | |
| c | Guidepost | Sufficient data continue to be collected to detect any increase in risk to habitat (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | Changes in habitat distributions over time are measured. |
| | Met? | Yes | No |
| | Justification | <p>SG80: The area coverage of the assessed fisheries is monitored through logbooks and VMS, thus their spatial distribution is known in relation to vulnerable habitats. The habitat mapping by MRI is ongoing in addition to studies on the ecological function of vulnerable habitats (e.g. the CoralFISH project).</p> <p>SG100: The MRI research program aims to map benthic habitats in Icelandic waters but not to measure the changes in habitat distribution over time.</p> | |
| References | | Bell <i>et al.</i> 2000; Eiríksson 1993; Garcia <i>et al.</i> 2006; Jennings <i>et al.</i> , 2001; Ministry of Fisheries 2004; Ólafsdóttir & Burgos 2012; Ragnarsson & Lindegarth 2009; Steingrímsson & Einarsson 2004; Jennings <i>et al.</i> 2001; Thórarinsdóttir <i>et al.</i> 2010 | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | 85 |
| CONDITION NUMBER (if relevant): | | | |

Nephrops trawl Principle 2: Ecosystem

Nephrops trawl – Outcome (Ecosystem)

Evaluation Table for PI 2.5.1

| PI 2.5.1 | | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function | | |
|---------------|---------------|--|--|---|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The fishery is unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. | There is evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be a serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: Extensive studies on the feeding ecology of a large number of demersal fish species, marine mammals and seabirds have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic marine ecosystems. Cod is a major fish predator in the marine ecosystems around Iceland, which preys mainly on capelin and shrimp (<i>Pandalus borealis</i>).</p> <p>Saithe preys on pelagic prey items, typically capelin (<i>Mallotus villosus</i>) and krill (Euphausiacea).</p> <p>None of the assessed fisheries is likely to affect key ecosystem species to a point where there would be serious or irreversible harm.</p> <p>SG80-100: Saithe is not considered to be a key prey species in the Icelandic ecosystem, and preys on pelagic items, typically capelin and krill.</p> <p>Cod is one of the main predators in Icelandic waters. In all of the assessed fishing gear, cod was one of the main retained species. It contributed approximately 50-70% to the total catch in the assessed gillnet, handline and longline fisheries but less in bottom trawl, Danish seine and Nephrops trawl (around 30%). The stock biomass of cod has been increasing and is now larger than observed in the last three decades. This is believed to be the result of a decrease in harvest rate. None of the other retained species are considered as key species in the ecosystem of Icelandic waters. Also, the assessed fisheries do not directly affect the most important prey species in the ecosystem, capelin. There is evidence that the main driving factor for ecosystem change in Icelandic waters is abiotic (Valdimarsson <i>et.al.</i> 2012).</p> | | |
| | | <p>Cod has been shown to directly affect the biomass of the (offshore) shrimp population (<i>Pandalus borealis</i>). This is currently taken into account in the MRI assessments (using GADGET models) as has the effect of the capelin on cod growth (using regression models). All of these models indicate that the cod fishery as a whole has negligible negative effects. If the fishery targeting the key ecosystem predator in Icelandic waters is not having a significant impact, it is unlikely that the saithe fishery will. The assessed fishery is highly unlikely to disrupt any key elements of the ecosystem structure or function.</p> <p>Saithe is commonly associated with deep water coral reefs and they appear to be an important part of the ecosystem surrounding the species.</p> <p>The DF database provides relatively good evidence that none of the assessed fisheries catch key ecosystem species. The fishery is highly unlikely to disrupt the key elements underlying ecosystem structure.</p> | | |
| References | | Anon. 2010; Anon. 2012b; Anon. 2011b; Astthorsson et al. 2007; Auster 2005; Barbaro et al. 2008; Foley et.al 2010; Garcia et al. 2006; Jaworski & Ragnarsson 2006; Jónsson 1997; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson 1997; Stefánsson 2003; Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; | | |

| | |
|---|--|
| PI 2.5.1 | The fishery does not cause serious or irreversible harm to the key elements of ecosystem structure and function |
| | Valdimarsson & Jónsson 2007; Valdimarsson <i>et.al.</i> 2012; Vilhjálmsson 2002. |
| OVERALL PERFORMANCE INDICATOR SCORE: | 100 |
| CONDITION NUMBER (if relevant): | |

Nephrops trawl – Management (Ecosystem)

Evaluation Table for PI 2.5.2

| | | | | |
|----------------------|---|--|---|--|
| PI 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | | |
| Scoring Issue | SG 60 | SG 80 | SG 100 | |
| a | Guidepost | There are measures in place, if necessary. | There is a partial strategy in place, if necessary. | There is a strategy that consists of a plan, in place. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>SG60: The DF database would provide evidence if the assessed fisheries were to catch a significant amount of key ecosystem species.</p> <p>SG80-100: Key ecosystem fish species (e.g. capelin and cod) are subject to the quota system, as is saithe. Large areas are closed for fishing in Icelandic waters in order to protect juvenile fish or spawning fish but also vulnerable habitats. These closures are stipulated in the Fisheries Management Act. 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. There is a strategy with a plan, if it so happened that the saithe fishery should pose a risk or harm to ecosystem structure and function (Ministry of the Environment 2010).</p> | | |
| b | Guidepost | The measures take into account potential impacts of the fishery on key elements of the ecosystem. | The partial strategy takes into account available information and is expected to restrain impacts of the fishery on the ecosystem so as to achieve the Ecosystem Outcome 80 level of performance. | The strategy, which consists of a plan, contains measures to address all main impacts of the fishery on the ecosystem, and at least some of these measures are in place. The plan and measures are based on well-understood functional relationships between the fishery and the Components and elements of the ecosystem. This plan provides for development of a full strategy that restrains impacts on the ecosystem to ensure the fishery does not cause serious or irreversible harm. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|-----------------|----------------------|---|--|--|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | | |
| | Justification | <p>SG60-80: The DF database would provide evidence if the assessed fisheries were to catch significant amounts of key ecosystem species. 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. MRI is monitoring key elements of the ecosystem and the monitoring would indicate if fisheries are having impact on key elements of the ecosystem.</p> <p>The MRI carries out wide ranging and extensive research on the status and productivity of the 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 the fish stocks (e.g. Anon. 2011a, Anon. 2012a). 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 aims protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>SG100: General measures include monitoring the status of the key ecosystem elements in Icelandic waters (e.g. the capelin stock). In addition, routine monitoring includes biological sampling from catches, which also include non-commercial catch information, as well as verification of log-book records. Capelin and some other key ecosystem species are regulated by TAC. The quota system has been demonstrated to work. Impacts are e.g. restrained by TAC, and area closure in addition to surveillance by the Directorate of Fisheries and Icelandic Coast Guard. Inspectors may accompany fishing vessels on voyages or board 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. Cases of serious or repeated deliberate violation shall furthermore be liable to imprisonment for up to six years. 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 aims to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> | | |
| c | Guidepost | The measures are considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The partial strategy is considered likely to work, based on plausible argument (e.g., general experience, theory or comparison with similar fisheries/ecosystems). | The measures are considered likely to work based on prior experience, plausible argument or information directly from the fishery/ecosystems involved. |
| | Met? | Yes | Yes | Yes |

| | | | |
|-------------------|----------------------|--|---|
| PI 2.5.2 | | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function | |
| | Justification | <p>SG60: There is evidence that the monitoring and surveillance by the DF and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing licenses.</p> <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. The measures are considered highly likely to work.</p> <p>SG 100: Closure of coral areas to fishing off South Iceland, demonstrates that measures to protect the ecosystem are in place and implemented successfully. 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 aim to protect vulnerable benthic ecosystems. (Ministry for the Environment 2010).</p> <p>The fishery has no demonstrable effects on key predator or prey species. If such effects were discovered they would be mitigated with available measures, such as the quota system and area closures. Inspectors may accompany fishing vessels on voyages or board vessels to check their cargo and fishing gear. 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. Violations of the provisions of the Fisheries Management Act are liable to fines, regardless of whether committed deliberately or through negligence. Cases of serious or repeated deliberate violation are liable to imprisonment for up to six years. Violation of the act has resulted in penalties (DF site visit).</p> | |
| d | Guidepost | There is some evidence that the measures comprising the partial strategy are being implemented successfully. | There is evidence that the measures are being implemented successfully. |
| | Met? | Yes | Yes |
| | Justification | <p>SG80: The strategy is provided by the Fisheries Management Act. The objective of the Act is to promote conservation and efficient utilization of marine stocks. There is evidence that the monitoring and surveillance by the Directorate of Fisheries and the Icelandic Coast Guard is effective. Violations against the Fisheries Management Act have been enforced with fines and temporal deprivation of fishing license.</p> <p>SG 100: The strategy is provided by the Fisheries Management Act and government policies. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>Measures have been implemented successfully, including area closures (fish and habitats), fishing bans (Atlantic halibut), discard bans, and ongoing work to increase the awareness of DF observers to bycatch of birds and mammals.</p> <p>Long-term changes in trophic patterns of Icelandic cod demonstrate the importance of capelin, northern shrimp, and euphausiids in the diet of the key fish predator in the ecosystem; cod (Pálsson & Björnsson 2011). Capelin and some other key ecosystem species are regulated by TAC and their importance in the ecosystem is accounted for in management strategies (e.g. Stefánsson 2003, Anon. 2013).</p> | |
| References | | Anon. 2010; Anon. 2012b; Anon. 2011b; Anon. 2013; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Ministry of the Environment 2010; Pálsson 1997; Schopka <i>et.al.</i> 2010; Stefánsson 2003; | |

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|---|---|
| PI 2.5.2 | There are measures in place to ensure the fishery does not pose a risk of serious or irreversible harm to ecosystem structure and function |
| | Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. |
| OVERALL PERFORMANCE INDICATOR SCORE: | |
| | 100 |
| CONDITION NUMBER (if relevant): | |
| | |

Nephrops trawl – Information (Ecosystem)

Evaluation Table for PI 2.5.3

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|---------------|---------------|---|--|---|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Information is adequate to identify the key elements of the ecosystem (e.g., trophic structure and function, community composition, productivity pattern and biodiversity). | Information is adequate to broadly understand the key elements of the ecosystem. | |
| | Met? | Yes | Yes | |
| | Justification | <p>SG60: Extensive studies have been conducted on the marine ecosystems of Icelandic waters (e.g. Astthorsson <i>et al.</i> 2007, Valdimarsson & Jónsson 2007). Studies on the feeding ecology of a large number of fish species, marine mammals and seabirds has provided information on the ecological function of most of the species caught by the assessed fisheries. These studies have shown that capelin (<i>Mallotus villosus</i>) is a key prey species in the Icelandic waters ecosystems (Marine Research Institute 1997). Biomass estimates for stocks of fish, whales and seabirds in Icelandic waters and production estimates of <i>Calanus finmarchicus</i> and other zooplankton species have been used to calculate the biomass of individual components in the Icelandic marine ecosystem (Astthorsson <i>et al.</i> 2007).</p> <p>SG 80: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters, and this information is used in multi species modelling (GADGET models; e.g. Stefánsson & Pálsson 1998, Stefánsson 2003) for MRI assessments. The models have been used to evaluate interactions between fisheries and key ecosystem elements. Information about these interactions has been taken into account for management purposes.</p> | | |
| b | Guidepost | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information, and have not been investigated in detail. | Main impacts of the fishery on these key ecosystem elements can be inferred from existing information and some have been investigated in detail. | Main interactions between the fishery and these ecosystem elements can be inferred from existing information, and have been investigated. |
| | Met? | Yes | Yes | No |

| | | | |
|-----------------|----------------------|---|--|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| | Justification | <p>SG60: Saithe is not a key ecosystem species and preys mainly on invertebrates. The DF database provides detailed information on catches of target and retained species. This provides information about the impact of the assessed fishery on the populations involved and would provide evidence if adverse impacts on any key ecosystem species occur.</p> <p>SG80: The main impacts of the fishery on key elements of the ecosystem such as key predators, prey and vulnerable habitats can be inferred. Information on mortality of key predators and prey is known and recorded (retained species).</p> <p>The DF database provides detailed information on catches of target and retained species (bycatch/discard is considered not significant). This provides information about the impact of the assessed fisheries on the populations involved.</p> <p>Information on vulnerable habitats in Icelandic waters has been documented, including the coral <i>Lophelia pertusa</i>. MRI has mapped the distribution of coral areas in relation to fishing efforts by bottom trawling and has gathered evidence of impacts caused by such fishery. Coral areas have been closed, based on this evidence, and it can be expected that more coral areas will be closed in the future, as the MRI continues its research project on the mapping of the habitats. The mapping will also support the recent strategic plan for the preservation of biodiversity in Icelandic waters. Furthermore, information on high catches of juvenile fish, gathered through the Directorate of Fisheries surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries.</p> <p>SG100: There is detailed information on the distribution of fishing efforts around Iceland by all the assessed fishing gears. Therefore it can be inferred where the fisheries overlap with vulnerable habitats. Evidence of detrimental impact on cold water corals by towed fishing gears have been compiled through scientific mapping (using ROV technique; Ministry of Fisheries 2004)</p> | |
| c | Guidepost | The main functions of the Components (i.e., target, Bycatch, Retained and ETP species and Habitats) in the ecosystem are known. | The impacts of the fishery on target, Bycatch, Retained and ETP species are identified and the main functions of these Components in the ecosystem are understood. |
| | Met? | Yes | Yes |
| | Justification | <p>SG80: The effect of the fishery on the target and the retained species are assessed annually. Bycatch is on a relatively small scale (see rationale for scoring bycatch). The feeding ecology of a number of demersal fish species has been documented, providing information on the ecological function of most of the species caught by the assessed fisheries. Information on vulnerable habitats in Icelandic waters has also been documented, including the coral <i>Lophelia pertusa</i>. The MRI has mapped the distribution of coral areas in relation to fishing efforts by otter trawling and has gathered evidence of impacts caused by fishing activities. The importance of vulnerable habitats known to occur in Icelandic waters is generally understood (e.g. <i>Lophelia</i> reefs, sponge aggregations).</p> <p>SG100: The DF database provides quantitative information on retained species taken by the assessed fishery. There is good knowledge on the distribution of the different fisheries which can be used to indicate if and where it overlaps with vulnerable habitats. There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters (e.g. Astthorsson <i>et.al.</i> 2007; Marine Research Institute 1997; Stefánsson & Pálsson 1998; Stefánsson 2003; Valdimarsson & Jónsson 2007). Saithe is not a key ecosystem species.</p> | |

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|-----------------|----------------------|---|---|
| PI 2.5.3 | | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| d | Guidepost | Sufficient information is available on the impacts of the fishery on these Components to allow some of the main consequences for the ecosystem to be inferred. | Sufficient information is available on the impacts of the fishery on the Components and elements to allow the main consequences for the ecosystem to be inferred. |
| | Met? | Yes | Yes |
| | Justification | <p>SG 80: Sufficient information is available on retained species, bycatch and catch of ETP species through log books, and monitoring of landings. Distribution of fishing in relation to vulnerable habitats is known. This information base is sufficient for inferring the main consequences of fishing.</p> <p>SG100: There is a comprehensive understanding about the key elements of the ecosystems of Icelandic waters. There is also detailed information on the catches taken from the system and the spatial overlap of the fisheries with vulnerable habitats. This information base is sufficient for inferring the main consequences of fishing.</p> | |
| e | Guidepost | Sufficient data continue to be collected to detect any increase in risk level (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the measures). | Information is sufficient to support the development of strategies to manage ecosystem impacts. |
| | Met? | Yes | Yes |
| | Justification | <p>SG 80: Data on individual landed catch is instantly entered in the DF database. The surveillance system carried out by the DF and the Coast Guard is constantly monitoring catch levels of juvenile fish and MRI provides information on the need for measures in order to reduce impacts by fisheries. All this information is used for implementing protection measures (e.g. area closure) if the management considers it necessary. The MRI also monitors and manages a large number of species and has monitored environmental conditions in the Icelandic waters for decades. Therefore any potential threats or adverse trends can be quickly identified and responded to.</p> <p>SG100: The strategy is provided by the Fisheries Management Act. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010). Coral areas have been closed, based on scientific evidence, and it can be expected that more coral areas will be closed in the future as MRI continues its research project on the mapping of the habitats.</p> <p>Information on high catches of juvenile fish, gathered through the DF surveillance system, is used for implementing area closure (temporal or long term closure) aimed at specific fisheries. Actions which are considered necessary in order to improve species recruitment (e.g. closure of spawning areas) are based on research information and recommendations from the MRI. The closure of coral areas, are also based on scientific evidence, and it can be expected that more coral areas will be closed in the future as MRI continues research on the mapping of the habitats, their relationship with fisheries and other relevant environmental data. Collectively this information is sufficient to support development of strategies to manage ecosystem impacts.</p> | |

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|---|---|-----------|
| PI 2.5.3 | There is adequate knowledge of the impacts of the fishery on the ecosystem | |
| References | Anon. 2010; Astthorsson et al. 2007; Barbaro et al. 2008. Garcia et al. 2006; Marine Research Institute 1997; Ministry of Fisheries 2004; Pálsson1997; Stefánsson 2003; Stefánsson & Pálsson 1998; Steingrímsson & Einarsson 2004; Thórarinsdóttir et al. 2010; Thorsteinsson, 1996; Valdimarsson & Jónsson 2007; Vilhjálmsón 2002. | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | 95 |
| CONDITION NUMBER (if relevant): | | |

Principle 3

Evaluation Table for PI 3.1.1

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|---------------|---------------|--|--|--|
| PI 3.1.1 | | <p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There is an effective national legal system and a <u>framework for cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2 | There is an effective national legal system and <u>organised and effective cooperation</u> with other parties, where necessary, to deliver management outcomes consistent with MSC Principles 1 and 2. | There is an effective national legal system and <u>binding procedures governing cooperation with other parties</u> which delivers management outcomes consistent with MSC Principles 1 and 2. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>All commercial fishing in Iceland is subject to a management system that is obliged by law to aim for the “sustainable utilization (of the stock) which ensures in the long run maximum benefits for the Icelandic nation.” There is no illegal, unreported and unregulated (IUU) fishing in the Icelandic EEZ. All landings of fish from vessels that engage in IUU fishing is forbidden, as is the servicing of such vessels.</p> <p>There are no controversial exemptions to international agreements.</p> <p>Fisheries in Iceland are subject to a comprehensive regulatory framework. The management system is demonstrably compliant with national legislation, and has a clear legal basis. Secondary legislation providing for regulations and enforcement provisions has been built on overarching fisheries laws.</p> <p>The Ministry of Industries and Innovation (formerly the Ministry of Fisheries and Agriculture), which manages all fisheries in the Icelandic EEZ, is obliged to deal with concerns from those active in the fishery as well as other interested parties.</p> | | |
| b | Guidepost | The management system incorporates or is subject by law to a mechanism for the resolution of legal disputes arising within the system. | The management system incorporates or is subject by law to a transparent mechanism for the resolution of legal disputes which is considered to be effective in dealing with most issues and that is appropriate to the context of the fishery. | The management system incorporates or subject by law to a transparent mechanism for the resolution of legal disputes that is appropriate to the context of the fishery and has been tested and proven to be effective. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|---|---------------|--|--|--|
| PI 3.1.1 | | <p>The management system exists within an appropriate legal and/or customary framework which ensures that it:</p> <ul style="list-style-type: none"> • Is capable of delivering sustainable fisheries in accordance with MSC Principles 1 and 2; and • Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood; and • Incorporates an appropriate dispute resolution framework. | | |
| | Justification | <p>Disputes can be resolved in the first instance by negotiations within the system. Some issues can be solved with the help of the Directorate of Fisheries or the Ministry of Industries and Innovation. Further disputes can be resolved through the courts. These mechanisms are transparent, tested and proven to be effective. Any Icelandic citizen or organization can take legal action to the high court in Iceland and ultimately to the Council of Europe Court. This system meets the requirement of a <u>transparent mechanism</u> for the resolution of legal disputes and it has been tested and <u>proven to be effective</u>.</p> | | |
| d | Guidepost | <p>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.</p> | <p>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.</p> | <p>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.</p> |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>The management system in Iceland is comprehensive and encompasses all fishing in Icelandic waters and those participating in it. Management is considered to be consistent with the cultural context, scale and intensity of the fishery. The access rights of different fishers are clearly codified in the legislation. As with all other legislation in Iceland, the legislation on fisheries management has been developed through a legally based, democratic process where various stakeholder groups are consulted and given ample opportunity to protect their interests and argue their points of view and interests. In most cases the management system tries to avoid legal disputes. It implements binding judicial decisions arising from legal challenges in a fairly rapid manner. This was e.g. the case when the high court ruled in 1998 that the ban on the licensing of a fishing vessel without removal from the fleet of vessels of equal capacity was unconstitutional.</p> <p>Icelandic legislation allows all citizens to fish in Icelandic waters providing that fishing is for their own consumption.</p> | | |
| References | | | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Evaluation Table for PI 3.1.2

| | | | | |
|----------------------|----------------------|---|--|--|
| PI 3.1.2 | | <p>The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</p> | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are generally understood. | Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction. | Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for all areas of responsibility and interaction. |
| | Met? | Yes | Yes | Yes |
| | Justification | The legal framework for fisheries management in Iceland explicitly defines the role of organisations and individuals in the management process. The Ministry of Industries and Innovation (MII, formerly the Ministry of Fisheries and Agriculture) issues regulations that further define these roles. Some of the consultation process is organized by the MII and some comes through stakeholder initiative. Roles of stakeholders, such as fishermen’s organisations and/or research institutes have defined roles within the management system. These roles are <u>well understood</u> and respected for <u>all areas</u> of responsibility and interaction. | | |
| b | Guidepost | The management system includes consultation processes that obtain relevant information from the main affected parties, including local knowledge, to inform the management system. | The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information obtained. | The management system includes consultation processes that regularly seek and accept relevant information, including local knowledge. The management system demonstrates consideration of the information and explains how it is used or not used. |
| | Met? | Yes | Yes | Yes |

| | | | | |
|---|---|---|---|---|
| PI 3.1.2 | <p>The management system has effective consultation processes that are open to interested and affected parties.</p> <p>The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties</p> | | | |
| | Justification | <p>The management system in Iceland includes a comprehensive consultative process where stakeholders are invited to have their say regarding regulations and the regulatory approach. Many organizations working in the fishing sector hold discussions on various aspects of the fisheries management system. These include, The Federation of Icelandic Fishing Vessel Owners (Landssamband islenskra utvegsmanna, LIU), The Federation of Owners of Small Fishing Vessels (Landssamband smabataeigenda), the Federation of Captains and Mates (Farmanna- og fiskimannasamband Islands, FFSI), the Icelandic Union of Marine Engineers and Metal Technicians (Felag velstjora og malmtaeknimanna, VM) and the Federation of Seamen (Sjomannasamband Islands), as well as organisations of those working in fish processing (in Iceland fishing and fish processing are frequently conducted within the same company) The leaders of these organisations meet for regular consultations with the MII, the Althing's Permanent Committee on Fisheries and Agriculture and with individual members of the Althing. A number of local authorities take a strong interest in matters related to fisheries management and regulations. Icelandic law mandates that hearings are held when new legislation is prepared for fishing management. This process allows the fishing industry and other stakeholders to influence new legislation. Thus the management system regularly seeks and accepts relevant information, including local knowledge and explains to some extent how it is used or not used.</p> | | |
| c | Guidepost | | The consultation process provides opportunity for all interested and affected parties to be involved. | The consultation process provides opportunity and encouragement for all interested and affected parties to be involved, and facilitates their effective engagement. |
| | Met? | | Yes | No |
| | Justification | The consultation process provides an opportunity for all interested parties to affect new regulation and fishing management legislation, but some stakeholders will claim that they do not get much encouragement from the authorities. In some cases this claim is justified. | | |
| References | <p>Information on Parliament Standing Committees procedures (applies to the Fisheries and Agriculture Committee): http://www.althingi.is/pdf/Althingi2010_english.pdf Statement by the minister of fisheries 15. April 2009: http://www.fiskifrettir.is/frett/6857/?q=samr%C3%A1%C3%B0 Annual consultation meeting on the status of the cod stock (MRI and fisheries stakeholders): http://www.hafro.is/undir.php?ID=19&REF=3&fID=11886&nanar=1.</p> | | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 95 |
| CONDITION NUMBER (if relevant): | | | | |

Evaluation Table for PI 3.1.3

| | | | | |
|--------------------------------------|---------------|--|--|---|
| PI 3.1.3 | | The management policy has clear long-term objectives to guide decision-making that are consistent with MSC Principles and Criteria, and incorporates the precautionary approach | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Long-term objectives to guide decision-making, consistent with the MSC Principles and Criteria and the precautionary approach, are implicit within management policy | Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach are explicit within management policy. | Clear long-term objectives that guide decision-making, consistent with MSC Principles and Criteria and the precautionary approach, are explicit within and required by management policy. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>Clear long-term overall goals for fisheries management are set out in legislation. These objectives include sustainable management, maximizing benefits to the nation and efficiency. Environmental objectives are in place and observed, e.g. in relation to protection of coral reefs and geographically defined sea-based management plans. Ecological quality objectives are also developed through the OSPAR cooperation, to which Iceland is a contracting party, but fully developed plans to measure environmental performance are not yet in place.</p> <p>Specific environmental control measures are in place, e.g. those preventing discarding of key commercial species. Discarding is estimated to be very small, at most 2-3% in terms of weight, but somewhat larger in terms of number of fish. MRI advice for saithe is reviewed through the ICES structure which is based upon precautionary approaches. MRI's advice has contained explicit references to the principles behind the precautionary approach.</p> <p>Harmonisation: Scoring in the ISF haddock certification seems to refer to species specific management, i.e. concerning haddock only. During scoring for the current certification the team considered management policy at a higher level than the fishery-specific management system (CR CB4.4.1).</p> | | |
| References | | | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Evaluation Table for PI 3.1.4

| | | | | |
|---|----------------------|---|---|--|
| PI 3.1.4 | | The management system provides economic and social incentives for sustainable fishing and does not operate with subsidies that contribute to unsustainable fishing | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2. | The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and seeks to ensure that perverse incentives do not arise. | The management system provides for incentives that are consistent with achieving the outcomes expressed by MSC Principles 1 and 2, and explicitly considers incentives in a regular review of management policy or procedures to ensure they do not contribute to unsustainable fishing practices. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>All major fisheries in Iceland are closed in the sense that no fishing takes place except by fishermen that have specified access rights, mostly through catch quotas. A system of sanctions is designed to deter illegal activities. The Directorate of Fisheries is responsible for monitoring the fisheries and gets assistance from the Coast guard in monitoring gear, fishing locations and discarding. It also co-operates closely with Harbour Authorities. Offenders have to pay fines, suffer withdrawal of their fishing licenses and in serious cases face prison sentences. All discarding has been explicitly banned in Iceland for many years. Despite incentives to discard in a catch quota system where fishing is highly profitable; discarding is limited in the major groundfish fisheries where it is regularly estimated.</p> <p>Subsidies were terminated in 1990 by an agreement between the European Free Trade Area signatories, which was negotiated in preparation for the EEA agreement. Since 2004 there has been a special resource tax, or quota tax, levied on Icelandic fisheries amounting to some percentages of the catch value. Laws passed in 2012 increased the resource tax and it is now estimated to be above 10% of catch value. This exceeds the cost of research on fish stocks by the Marine Research Institute and the surveyance and policing of fishing activities by the Directorate of Fisheries and the Coast Guard.</p> <p>It is difficult to engage in illegal landings or illegal fishing practices in Iceland’s many small fishing villages because the local population would notice it.</p> <p>The monitoring of landings in Iceland is assisted by the fact that practically all catches are intended for export and not for domestic consumption. The system of fisheries management is under regular review by the Althingi, local authorities, fishers and the general public.</p> | | |
| References | | | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Evaluation Table for PI 3.2.1

| | | | | |
|---|----------------------|--|--|---|
| PI 3.2.1 | | The fishery has clear, specific objectives designed to achieve the outcomes expressed by MSC's Principles 1 and 2 | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Objectives, which are broadly consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are implicit within the fishery's management system | Short and long-term objectives, which are consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system. | Well defined and measurable short and long-term objectives, which are demonstrably consistent with achieving the outcomes expressed by MSC's Principles 1 and 2, are explicit within the fishery's management system. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>There are well-defined and measurable short and long term objectives for the saithe fishery which are consistent with MSC Principles 1 and 2. Management objectives are met by setting of the annual TAC (which is divided between the fishers according to their quota rights), by various restrictions on gear and area closures to protect vulnerable habitats and juvenile fish. The management plan for saithe includes management measures relevant to the effects the fishery has on the ecosystem.</p> <p>The biological reference points used in the setting of the TAC are explicit and consistent with the outcomes expressed by MSC's Principle 1 and 2.</p> <p>The Icelandic fisheries management system has shown itself to be effective in ensuring that catches are kept within the predetermined limit.</p> <p>There are various implicit measures within the fishery to ensure that the saithe fishery does not have adverse effects on other species, e.g. monitoring of all retained species and management of many of them by the ITQ system. Other explicit measures include regulations on mesh sizes, mandatory use of sorting grids, area closures to protect habitats and juvenile fish and banning the use of certain gear (most often trawls) in areas where they might damage corals or cause other ecological damage.</p> <p>The Icelandic fisheries management system has shown itself to be effective in ensuring that catches are kept within the predetermined limit.</p> | | |
| References | | http://www.fisheries.is/main-species/codfishes/saithe/management-plan/ | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Evaluation Table for PI 3.2.2

| | | | | |
|----------------------|----------------------|--|---|---|
| PI 3.2.2 | | The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment. | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | There are some decision-making processes in place that result in measures and strategies to achieve the fishery-specific objectives. | There are established decision-making processes that result in measures and strategies to achieve the fishery-specific objectives. | |
| | Met? | Yes | Yes | |
| | Justification | The setting of a TAC for the saithe fishery uses reference points and strategies that have been successful in the past. It is based on research work done by the Marine Research Institute in Iceland. This work is subjected to review by ICES as is most of the work done by the MRI. The decision-making processes are transparent and timely. MRI's advice is given to the Minister, who informs and consults with organizations of vessel owners and crew. | | |
| b | Guidepost | Decision-making processes respond to serious issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take some account of the wider implications of decisions. | Decision-making processes respond to serious and other important issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions. | Decision-making processes respond to all issues identified in relevant research, monitoring, evaluation and consultation, in a transparent, timely and adaptive manner and take account of the wider implications of decisions. |
| | Met? | Yes | Yes | No |
| | Justification | The decision-making processes respond in a transparent, timely and adaptive manner to serious and other important issues identified via relevant research, monitoring, evaluation and consultation. Decision-making processes respond to all issues of major importance which have been identified in relevant research, but it is difficult to contend that it has responded to all issues in a timely manner. | | |
| c | Guidepost | | Decision-making processes use the precautionary approach and are based on best available information. | |
| | Met? | | Yes | |
| | Justification | The managers of the stock (the Ministry and the Minister) are obliged to consult the Marine Research Institute before deciding the TAC (or the effort quota) each year. This institute provides the best available information about the state of the stock. The precautionary approach is not formally part of the decision-making process, but the objectives set by law and the reference points and management strategy respects the basic principles of the precautionary approach. | | |

| | | | | |
|---|----------------------|---|---|---|
| PI 3.2.2 | | The fishery-specific management system includes effective decision-making processes that result in measures and strategies to achieve the objectives, and has an appropriate approach to actual disputes in the fishery under assessment. | | |
| d | Guidepost | Some information on fishery performance and management action is generally available on request to stakeholders. | Information on fishery performance and management action is available on request, and explanations are provided for any actions or lack of action associated with findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. | Formal reporting to all interested stakeholders provides comprehensive information on fishery performance and management actions and describes how the management system responded to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. |
| | Met? | Yes | Yes | No |
| | Justification | The management system will respond to findings and recommendations emerging from research, monitoring, evaluation and review activity. It will explain their decisions to fishermen's organizations or individual fishermen and scientists will note if important findings or recommendations are ignored. There is formal reporting on MRI advice and fishery performance. However, there is no formal reporting on the response of the management system to findings and relevant recommendations emerging from research, monitoring, evaluation and review activity. | | |
| e | Guidepost | Although the management authority or fishery may be subject to continuing court challenges, it is not indicating a disrespect or defiance of the law by repeatedly violating the same law or regulation necessary for the sustainability for the fishery. | The management system or fishery is attempting to comply in a timely fashion with judicial decisions arising from any legal challenges. | The management system or fishery acts proactively to avoid legal disputes or rapidly implements judicial decisions arising from legal challenges. |
| | Met? | Yes | Yes | No |
| | Justification | There are several examples where authorities have attempted to comply in a timely fashion with binding judicial decisions arising from legal challenges. The most noteworthy and important is the case when the Supreme Court in 1998 found special licensing of fishing vessels that were allowed to fish in the Icelandic EEZ to be unconstitutional. Perhaps the management system does not always act proactively enough to avoid legal disputes. | | |
| References | | | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 80 |
| CONDITION NUMBER (if relevant): | | | | |

Evaluation Table for PI 3.2.3

| PI 3.2.3 | | Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with | | |
|---------------|----------------------|---|---|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Monitoring, control and surveillance mechanisms exist, are implemented in the fishery under assessment and there is a reasonable expectation that they are effective. | A monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated an ability to enforce relevant management measures, strategies and/or rules. | A comprehensive monitoring, control and surveillance system has been implemented in the fishery under assessment and has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>There is a comprehensive monitoring, control and surveillance system for Icelandic vessels fishing for saithe. This system has demonstrated a consistent ability to enforce relevant management measures, strategies and/or rules.</p> <p>A comprehensive monitoring, control and surveillance system is in place, with inspections at sea and at landing sites. A satellite based vessel monitoring system is used to scrutinize the activities of all vessels.</p> <p>The DF receives logbook data and data on landings which are weighed on specially authorized and closely monitored scales. Data is transmitted electronically to the Directorate, in real time. Because most of the catch is exported there are additional ways to control reporting of catches by checking if the reported input of raw fish is consistent with the volume of production.</p> | | |
| b | Guidepost | Sanctions to deal with non-compliance exist and there is some evidence that they are applied. | Sanctions to deal with non-compliance exist, are consistently applied and thought to provide effective deterrence. | Sanctions to deal with non-compliance exist, are consistently applied and demonstrably provide effective deterrence. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>Sanctions to deal with non-compliance exist. These include fines, evocation of fishing licenses and some cases are brought to the courts and may lead to prison sentences. The sanctions are consistently applied. In their annual reports the Directorate of Fisheries publishes statistics on cases of non-compliance discovered and punishments during the year. The most common type of non-compliance is negligence of reporting logbook data to the Directorate. Out of 634 offenses detected in 2012, 386 were attributed to lack of reporting from log-books. Twenty vessels had their fishing licenses revoked and 41 offenses were sent to the police for possible prosecution.</p> <p>Misreporting is subject to strict penalties. All indications are that monitoring in Icelandic waters and the sanctions constitute an effective deterrence against non-compliance.</p> | | |
| c | Guidepost | Fishers are generally thought to comply with the management system for the fishery under assessment, including, when required, providing information of importance to the effective management of the fishery. | Some evidence exists to demonstrate fishers comply with the management system under assessment, including, when required, providing information of importance to the effective management of the fishery. | There is a high degree of confidence that fishers comply with the management system under assessment, including, providing information of importance to the effective management of the fishery. |

| | | | | |
|---|----------------------|---|--|------------|
| PI 3.2.3 | | Monitoring, control and surveillance mechanisms ensure the fishery's management measures are enforced and complied with | | |
| | Met? | Yes | Yes | Yes |
| | Justification | There is no significant evidence of systematic non-compliance. In cases of non-compliance, a range of penalties can be applied. A minor infringement leads to a warning and a second offence leads to temporary withdrawal of fishing licenses. Serious offenses are brought to the courts and can lead to prison sentences. Corrective actions are well established, codified, understood and tested. The number of incidents of non-compliance and imposition of sanctions are reported in the Directorate of Fisheries annual report which is accessible at the website, http://www.fiskistofa.is/umfiskistofu/starfsskyrslur/ . | | |
| d | Guidepost | | There is no evidence of systematic non-compliance. | |
| | Met? | | Yes | |
| | Justification | There is no evidence of systematic non-compliance with gear regulations, misreporting or catching in excess of quotas. The Directorate of Fisheries reports on offences and sanctions in their annual reports. Out of 634 registered offences in all fisheries in 2012 more than half concerned failure to report logbook data to the DF. | | |
| References | | | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Evaluation Table for PI 3.2.4

| PI 3.2.4 | | The fishery has a research plan that addresses the information needs of management | | |
|---|---------------|--|---|--|
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | Research is undertaken, as required, to achieve the objectives consistent with MSC's Principles 1 and 2. | A research plan provides the management system with a strategic approach to research and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. | A comprehensive research plan provides the management system with a coherent and strategic approach to research across P1, P2 and P3, and reliable and timely information sufficient to achieve the objectives consistent with MSC's Principles 1 and 2. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>The research plans of the MRI in Iceland are discussed in the institute's research and progress plan for 2012-2016 published in Anonymous 2011. All research projects at the MRI are reviewed on an annual basis, and TAC advice and assessment methodologies are reviewed by a TAC committee. MRI's advice on saithe is reviewed by ICES.</p> <p>The research plan for 2012-2016 stresses the importance of research on "sustainable exploitation of the most important stocks"-, as well as research on biological, ecological and environmental factors and their impact on the stocks, stock structure of the fish populations (stofngerð fiska, i.e. the genetic characteristics of the fish) and impacts of neighbouring waters (Greenland and Faroe Islands) on the stocks. It also stresses the need for research on the long-term effects of fishing on important stocks and the design of harvest rules for these stocks.</p> | | |
| b | Guidepost | Research results are available to interested parties. | Research results are disseminated to all interested parties in a timely fashion. | Research plan and results are disseminated to all interested parties in a timely fashion and are widely and publicly available. |
| | Met? | Yes | Yes | Yes |
| | Justification | The MRI has published its research plan for 2012-2016. The institute publishes its results on a regular basis and stakeholders can easily access this research, since most of it is posted on the web. | | |
| References | | MRI Research plan: http://www.hafro.is/images/langtima12-16.pdf ;; Stakeholder consultation | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Evaluation Table for PI 3.2.5

| | | | | |
|---|----------------------|---|---|--|
| PI 3.2.5 | | There is a system of monitoring and evaluating the performance of the fishery-specific management system against its objectives | | |
| | | There is effective and timely review of the fishery-specific management system | | |
| Scoring Issue | | SG 60 | SG 80 | SG 100 |
| a | Guidepost | The fishery has in place mechanisms to evaluate some parts of the management system. | The fishery has in place mechanisms to evaluate key parts of the management system | The fishery has in place mechanisms to evaluate all parts of the management system. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>There have been several external reviews made by international experts on the methods that the Marine Research Institute uses to assess fish stocks and on the advice it gives to government. There has not been a comparable external review of the work of the Directorate of Fisheries or of the Ministry of Fisheries and Agriculture. However these institutions are subject to regular reviews by the Althing's committees, especially the permanent committee on fisheries issues. As with other public institutions in Iceland these institutions are subjected to scrutiny by The Icelandic National Audit Office (Ríkisendurskodun). The performance of these institutions is also intensively debated in Iceland, especially in the many fishing communities.</p> <p>The MRI experts have published their research in peer reviewed scientific journals.</p> <p>The overall performance of the management regime for the resource is examined annually, including assessment of stock status and feeding ecology. Since 1970 the Marine Research Institute has carried out extensive environmental surveys up to four times per year in relation to oceanography and primary- and secondary production.</p> | | |
| b | Guidepost | The fishery-specific management system is subject to occasional internal review. | The fishery-specific management system is subject to regular internal and occasional external review. | The fishery-specific management system is subject to regular internal and external review. |
| | Met? | Yes | Yes | Yes |
| | Justification | <p>There have been several reviews of the management system in Iceland during the last 30 years since the introduction of the system of transferable quotas. In most cases those involved in these reviews were internal to the political process in Iceland and to the fishing industry. The external review processes has been beneficial to the work of the MRI.</p> <p>Assessment and advice relating to the saithe fishery is regularly reviewed internally by a TAC committee and externally by ICES. The management plan for saithe, including an HCR, was formally adopted by Icelandic authorities in April 2013 for a period of 5 fishing years, starting from the 2013/14. The harvest control rule will be reviewed by the end of this period.</p> | | |
| References | | http://www.fisheries.is/main-species/codfishes/saithe/management-plan/ , Stakeholder meetings | | |
| OVERALL PERFORMANCE INDICATOR SCORE: | | | | 100 |
| CONDITION NUMBER (if relevant): | | | | |

Appendix 1.2 Condition, Recommendations and Client Action Plan

The Client has submitted to Tún a plan of action to address the condition set, taking into account the milestones defined by the assessment team. The condition with the action plan incorporated, and the two recommendations set, are shown in the tables (A1.2.1-1.2.2) below.

| Table A1.2.1 Condition 1 | |
|------------------------------|---|
| Performance Indicator | PI 2.4.1 – Bottom trawl The fishery does not cause serious or irreversible harm to habitat structure, considered on a regional or bioregional basis, and function |
| Score | 60 |
| Rationale | <p><u>Scoring Issue a</u> “The fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm.” Is not met at the 80 level.</p> <p>Evidence of detrimental impact on cold water corals by towed fishing gears has been compiled through scientific mapping (using ROV technique; Ministry of Fisheries 2004, Ólafsdóttir & Burgos 2012). The Fisheries Management Act provides a strategy for protecting vulnerable benthic habitats. Based on the act and scientific evidence, coral areas have been closed, and it can be expected that more coral areas will be closed in the future as MRI continues its research project on the mapping of habitats. These measures are likely to prevent bottom trawling from doing further serious or irreversible harm to cold water corals. Other vulnerable benthic habitats around Iceland, such as areas with aggregation of large sponges, have not been closed for fishing. The Icelandic authorities also have a strategic plan to preserve biodiversity in Icelandic waters which includes measures designed to e.g. protect threatened species, develop fishing methods which have less impact on marine ecosystems, and aim to protect vulnerable benthic ecosystems. (Ministry of the Environment 2010).</p> <p>Iceland is a member of the Northwest Atlantic Fisheries Organization (NAFO) which manages the international fisheries in the Northwest Atlantic by establishing conservation and management measures (CEM). Such measures are to prevent significant adverse impacts of bottom fishing activities on vulnerable marine ecosystems (VME) known to occur or likely to occur in the NAFO area, based on the best available scientific information (NAFO 2013). VME indicator species include coral identified as gorgonians, <i>Lophelia</i>, and sea pen fields; crinoids; erect bryozoans; sea squirts; cerianthid anemone fields; and sponges that constitute sponge grounds or aggregations. Every Contracting Party shall ensure that fishing vessels comply with CEM and that the Master in command of each vessel performs the relevant duties set out by the CEM. These measures have been implemented by the Icelandic authorities (Regulation006/2012²¹). These regulations stipulate that in existing or unfished bottom fishing areas, vessels shall quantify each catch of VME indicator species and if it is beyond a set threshold the incident must be reported, fishing must cease and the vessel must move away. Similar measures have been established by the North East Atlantic Fisheries Commission (NEAFC) which manages fisheries in the North East Atlantic and implemented by the Icelandic authorities (Regulation 1221/2008²²). However, none of these management measures applies to fisheries in Icelandic waters. Coral areas off Iceland have been closed which will prevent further damage to such biogenic habitats. However, comparable efforts to protect other</p> |

²¹<http://reglugerd.is/interpro/dkm/webguard.nsf/2d8cdab9a540c73600256a0d0055eeb1/dac784ad5694a8890025799600054289?OpenDocument>

²²<http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/key2/1221-2008>

| | |
|----------------------------------|---|
| | <p>biogenic habitats, e.g. aggregation of large sponges ("ostur"), are not intended. Recording of VME indicator species on board fishing vessels is not required, although it is mandatory to Icelandic vessels operating within the NAFO and NEAFC areas. In the past, the bottom trawl fishery has reduced coral habitat structure off Iceland and the present day fishing patterns of the saithe fishery coincide with the occurrence of vulnerable habitats off Iceland, including corals and aggregation of large sponges. A single contact by the bottom trawl has a significant impact on VME indicator species, since their rate of recovery is very slow. Therefore, an adverse impact by bottom trawling is significant. It cannot be concluded that the assessed bottom trawl fishery is highly unlikely to reduce habitat structure and function to a point where there would be serious or irreversible harm (SG80).</p> |
| <p>Condition</p> | <p>Existing measures for the protection of vulnerable habitats shall be evaluated, with the aim of implementing conservation and management measures corresponding to those of the NAFO and the NEAFC. Scientific information on the extent of potential damage by fishing gear to areas of "ostur" shall be evaluated in addition to evaluating the need for closing such areas to potentially damaging fishing activities.</p> |
| <p>Milestones</p> | <p>At the End of Year 1 (first surveillance audit): There shall be evidence of the Client's engagement with the Marine Research Institute (MRI) with the goal of formally evaluating potential damage to "ostur" by fishing activities and addressing the need for closing such areas for the certification period and beyond. By the end of Year 1 the evaluation shall be ongoing, including an assessment on the need for area closure. Also by the end of Year 1 there shall be evidence of the Client's engagement with the Ministry of Industries and Innovation (MII) with the goal of formally evaluating existing vulnerable habitat protection measures. Score: 60.</p> <p>At the End of Year 2 (second surveillance audit): By the end of Year 2 the evaluation of potential damage to "ostur" shall be complete, including an assessment on the need for area closure. The client shall provide evidence of ongoing work towards implementing conservation and management measures to protect all vulnerable habitats in line with NAFO and NEAFC. If the evaluation by MRI demonstrates a need to protect areas of "ostur" and/or other habitats, the client shall continue consultation with the MRI and MII with the objective of closing vulnerable areas. Score: 60.</p> <p>At the End of Year 3 (third surveillance audit): By the end of Year 3 the evaluation of existing measures to protect all vulnerable habitats shall be completed and necessary conservation and management measures for vulnerable marine ecosystems shall be in place. If the need arises for protecting vulnerable areas of "ostur" and/or other habitats, protective measures shall be implemented by the end of Year 3. Score: 80.</p> |
| <p>Client Action Plan</p> | <p>Year 1</p> <ol style="list-style-type: none"> 1. Consult with the Marine Research Institute (MRI) with the objective of using available scientific information in order to evaluate the extent of potential damage to "ostur" by bottom trawls and the need for protecting areas of mass occurrences of sponges. 2. Engage with the Ministry of Industries and Innovation (MII) to promote the protection of all vulnerable habitats in Icelandic waters including areas with mass occurrence of sponges or "ostur". 3. Consult with the Directorate of Fisheries (DF) and the MII with the objective of implementing conservation and management measures for vulnerable marine ecosystems (VME indicator species) such as of NAFO and NEAFC (Regulations 1221/2008 and 006/2012). <p>Year 2</p> <ol style="list-style-type: none"> 1. Continue engagement with the MII and the DF to ensure implementation of conservation and management measures for VME indicator species. 2. If the evaluation by the MRI demonstrates a need to protect areas of "ostur", the client shall continue consultation with the MRI and the MII with the objective of closing vulnerable sponge areas for the certification period and |

| | |
|----------------------------------|--|
| | <p>beyond.</p> <p>Year 3</p> <p>1. Continue engagement with the MII and the DF to complete implementation of conservation and management measures for VME indicator species. If the evaluation by MRI shows a need to protect areas of “ostur” and/or other habitats, the client shall continue consultation with the MRI and the MII with the objective of implementing area closure for fishing by the end of Year 3.</p> |
| Consultation on condition | Ministry of Industries and Innovation; Directorate of Fisheries; Marine Research Institute |

**Table A 1.2.2:
Recommendations**

| No. | Recommendation | Performance Indicator |
|------------|--|------------------------------|
| 1 | Since Iceland is a signatory to various international conservation conventions it is recommended that all vessels in the client fleet be required to return live grey (common) skate, <i>Raja Dipturus batis</i> , to the sea after capture as soon as practically possible. | PI 2.1.1 |
| 2 | Skippers of all vessels in the client fleet should be required to record all bycatch and ETP species (ie. turtles, birds, marine mammals, elasmobranchs) caught, irrespective of whether they are landed or viable individuals returned back to sea. | PI 2.3.1 |

Appendix 2. Peer Review Reports

Appendix 2.1. Report by Peer Reviewer A and CAB Responses

Overall Opinion

| <i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i> | Yes/No | Conformity Assessment Body Response |
|---|--------|--|
| <p><u>Justification:</u> With only a few minor exceptions I fully support and agree with the scores awarded by the Assessment team and the supporting rationales which they have presented. I have disagreed with the score of 80 at PI 1.1.1 and conclude that all the available evidence supports a score of 100 for this PI. I have also suggested that the team should consider a higher score for all the gears at PI 2.4.3 and 2.5.3 and have given my reasons for that suggestion. However none of my comments on the scoring or my suggested changes materially affect the outcome of this certification process. I strongly agree with the main conclusion reached by the team that the fishery merits conditional certification with a single condition. That condition is related to the impact on the benthic habitat of just one of the six gears under consideration; the bottom trawl.</p> | | <p>P1: 1.1.1: Our interpretation of the criteria suggests that higher scores cannot be justified. The justification we submitted is consistent with the present score.</p> <p>P2: 2.4.3: The team felt that a score of 100 was not justified. Although it is generally accepted that some of the assessed gears are not destructive to habitats, the assessment team did not find references which quantified the impacts or monitored temporal changes.</p> <p>2.5.3: For all the fishing gears it can be inferred where the fisheries overlap with vulnerable habitats. However, studies in Iceland on the ecosystem impact have only been carried out for bottom trawl and Danish seine. Therefore bottom trawl and Danish seine score 100.</p> |

| <i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i> | Yes/No | Conformity Assessment Body Response |
|--|--------|-------------------------------------|
| <p><u>Justification:</u> The rationale in support of the condition is comprehensive. The condition is succinct and the expected outcome, and milestones to achieve it are clear and entirely appropriate targeted at raising the overall score to at least 80 by the third surveillance audit.</p> | | <p>No comment</p> |

If included:

| <i>Do you think the client action plan is sufficient to close the conditions raised?</i> | Yes/No | Conformity Assessment Body Response |
|---|--------|---|
| <p><u>Justification:</u> The client action plan inevitably focuses on consultation and cooperation with the MRI in the evaluation of plans to protect</p> | | <p>Information on the client's fishing activities is already available through the DF's</p> |

vulnerable areas. I feel that, in addition, the client could offer to provide information from their own fishing activities and even to offer practical support for any additional survey work which might be needed. This would confirm a strong commitment to resolving this issue, in relation to bottom trawling, and would involve a bit more effort on the part of the client.

database. The condition calls for action from the client to initiate interaction and cooperation with the MRI and the MII.

General Comments on the Assessment Report (optional)

This is a well written report full of useful relevant information. It is well structured and easy to follow in relation to the subsequent scoring performance indicators. Inevitably much of the text is the same as, or similar to that for, the Golden redfish in particular for the numerous common elements of Principles 2 and 3. The inevitable cutting and pasting across the reports has led to occasional errors and, in that context, the report needs to be thoroughly checked. In particular I noted the section headed Golden redfish on p 24 which should not be there. In Table 4.5, wrongly labelled as 4.3 the section relating to bait species is missing although they are mentioned in the text of the report under minor retained species p43. All other issues are clearly identified and discussed in my detailed justification comments on the scoring. In particular I have also had some problems in equating the details of Table 4.1 with the gears selected for harmonization in the scoring for PIs are 2.2.1, and 2.2.3.

CAB Response:

The document was proofread again and corrections made as needed.

Performance Indicator Review

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|---|
| 1.1.1 | Yes | No | N/A | <p>The argument against a high degree of certainty that the stock is above a point at which recruitment might be impaired is rather weak. Current SSB is over two times MSY B trigger in the management plan and well above the current biomass limit level based on Bloss. This scoring issue meets the SG 100 requirements. Similarly at scoring issue b a target reference point for SSB is likely to be more reliable than FMSY, indeed in the reference point Table at the end it is Bmsy which is quoted as the target reference point. This scoring issue should also be at SG 100 giving an overall score for this PI of 100 not 80. Incidentally I cannot find reference to BMSY at 80,000t in the ICES advice.</p> | <p>Our interpretation of the criteria suggests that higher scores cannot be justified. The justification we submitted is consistent with the present score.</p> |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|------------------------------|---|---|--|--|--|
| 1.1.2 | Yes | Yes | N/A | Score of 90 fully justified on the basis that the team have expressed some concern about the reliability of the the biomass limit level. | No comment |
| 1.1.3 | N/A | N/A | N/A | | |
| 1.2.1 | Yes | Yes | N/A | A robust management plan is now in place which has been independently evaluated by ICES and found to be fully in accordance with a precautionary approach and with the ICES MSY framework. As a consequence all scoring issues achieve their maximum and the overall score of 100 is fully justified. | No comment |
| 1.2.2 | Yes | Yes | N/A | The rules and tools, emanating from the harvest strategy, and used to manage this fishery are well defined in the report and scoring comments and are appropriate. The team has reasonably concluded that the design of the rules does not meet the rigorous requirements of SG 100 at scoring issue b and therefore the reduced score of 90 is justified. | No comment |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|-------------------------------------|
| 1.2.3 | Yes | Yes | N/A | The score of 90 is well supported both in the scoring comments and in the text of the report. As in 1.2.2 above the rigorous requirements at SG 100 b, which demands a high degree of certainty ($P > 0.95$) about all the information, is not met. | No comment |
| 1.2.4 | Yes | Yes | N/A | The assessment model and the data sources used by the working group have been independently accepted as appropriate and robust by ICES. The score of 95 is fully justified in the report and scoring comments. It fails to achieve 100 based only on the uncertainty in some elements of the assessment, in particular the reliability of some of the survey data used to tune the assessment and also the reliability of recruitment estimates. Estimating saithe recruitment is recognised as a problem in all the saithe stocks because of the inshore habitat of the juveniles. | No comment |
| | | | | | |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|-------------------------------------|
| 2.1.1 | Yes | Yes | N/A | <p>Comprehensive details of all the species taken in all the gears in the periods 2007/08 and 2011/12 are given in Tables 3.2 to 3.7 and conveniently summarised by gear in Table 3.8. This issue is also well covered in section 3.4.2 of the report including the identification of the catches of vulnerable species within each gear. Figures 3.14 to 3.25 provide details of the distribution, historical biomass estimates and fishing mortality for all the main retained species. Cod is the main retained species in all the gears and most of the other species are taken in the bottom trawl.</p> <p>Those species defined as depleted or vulnerable are clearly identified and it is accepted that their stock status is not known. However none of these species are targeted by any of the gears and catches are small and well monitored. Clearly none of the gears can be considered to seriously impact on those species and the scores for this PI are the same for all gears (80). This score for all the gears, and the rationale for potential impact of each gear type is well covered and justified in the scoring comments. Harmonisation comments, with the ISF cod/haddock certifications, for the handline fishery only are appropriate.</p> | No comment |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|---|
| 2.1.2 | Yes | Yes | N/A | <p>The main strategy, related to all the gears is the legally backed ban on discarding resulting in all catches of all species being landed and recorded. The strategy also includes closed areas and closed seasons to protect juveniles and spawning areas. This strategy also helps to protect vulnerable and at risk species which are not subject to TAC control. Scores of 80 would be most appropriate for this PI, based on the lack of clear evidence in some cases that the strategy is working. However it is accepted that, because the shark finning issue has been addressed and scores 100, this raises the overall scores to 85.</p> <p>Please note that the justification comments for scoring issue (d) SG100 have not been included for any of the gears.</p> | <p>The following rationale was added to SI(d) at SG100: Although the partial strategy is achieving its objectives for the main retained species and many of the lesser retained species; this is not the case for all retained species.</p> |
| 2.1.3 | Yes | Yes | N/A | <p>All the scores and rationales are the same for each of the six gears. The scoring comments for each scoring issue fully justify the scores of 85 by noting that all catches of all species are landed and recorded and that changes in species abundance are also picked up in the comprehensive MRI trawl surveys.</p> | <p>No comment</p> |
| | | | | | |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|---|
| 2.2.1 | | | | <p>Please note that, as for the Golden redfish, the Evaluation Table is wrongly labelled as 2.1.1 (box top left) for all the gears.</p> <p>All the scores and rationales are the same for each of the six gears. The scoring comments fully justify the scores of 80. Harmonisation comments are appropriate for the Gillnet fishery only but I note that they are wrongly included for the Longline fishery as well (see Table 4.1)</p> | <p>Labels of Table 2.2.1 were corrected and rationale for gillnet harmonisation was removed.</p> |
| 2.2.2 | Yes | Yes | N/A | <p>By-catch is defined, within the MSC certification process, as fish discarded. Discarding in all these fisheries is illegal although it is recognised that some discarding does occur but levels are considered to be very low. The score of 100 for most of these fisheries is justified on the basis of the strict monitoring of landings, at sea surveillance, observer trips and effective punitive measures in place for breaches of the regulation</p> <p>The absence of any verifiable estimates of discarding in the handline and Nephrops trawl fisheries does justify a reduction in the score to 85 for failing to meet SG100 for scoring issues b,c, and d. Harmonisation comments for the Handline fishery only are appropriate.</p> | <p>The score for the Nephrops trawl was corrected to 85. Note that correct scores were reported/used in Tables 6.1 and 6.2.</p> |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|--|
| 2.2.3 | Yes | Yes | N/A | The evidence in the report is well summarised in the scoring comments and confirms that quantitative information is available on the levels of discarding within all these fisheries. That information, continues to be collected and whilst not qualitative is sufficient to estimate the potential effect on the species and to detect any risk. The scoring comments for each fishery are the same and the unified score of 80 is fully justified. Table 4.1 seems to suggest that this PI should be harmonised for all gears except the Nephrops trawl against the ISF cod / haddock certification. | Harmonisation comments were added to all gears, except for Nephrops trawl. |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|------------------------------|---|---|--|--|--|
| 2.3.1 | Yes | Yes | N/A | The scores and scoring comments are almost the same for all the gears, with the exception of differences in the very small catches of Atlantic halibut which have decreased since the period up to 2011. These differences have no effect on the score for each gear type. All the evidence presented in the report indicates that none of the gears under consideration impact on any of the species listed in CITES. However, under national legislation, Iceland have listed Atlantic halibut as an ETP species and introduced a ban on targeted halibut fishing. This national consideration has rightly reduced the score for each of the scoring issues to 80, which requires harmonisation with the 100 score for the already certified ISF cod and haddock fisheries. That harmonisation has correctly explained the difference in the scores. The Gillnet and Nephrops trawl fishery have been correctly excluded from the harmonisation. | No comment |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|-------------------------------------|
| 2.3.2 | Yes | Yes | N/A | <p>The scores and scoring comments are the same for all the gears. There is firm evidence of an effective strategy to manage the impact of the fishery on ETP species both in the report and scoring comments. The evidence is reasonably based on the effectiveness of the regulations to record and land all the catch. This ensures that any ETP species caught are recorded and any potential impact evaluated. The rigorous requirements at SG 100 for all the scoring issues is not met as this requires a comprehensive strategy with quantitative analysis of the data. Furthermore the measures to protect Atlantic halibut have only operated for a short time and their effectiveness cannot be fully evaluated yet. Harmonisation with the ISF cod / haddock certifications is done for the handline fishery only and the justification is appropriate.</p> | No comment |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|-------------------------------------|
| 2.3.3 | Yes | Yes | N/A | The scores and scoring comments are the same for all the gears. The main issue is the potential impact on Atlantic halibut which in the past has been taken mainly in the trawl and longline fisheries. The catch data for all species is monitored by MRI but data on the quantity of viable halibut released or their survival rate is not available. As a result a score of 85 for each of the gears is appropriate. A harmonisation requirement with the ISF cod/haddock has been correctly addressed for the handline fishery only. | No comment |
| | | | | | |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|-------------------------------------|
| 2.4.1 | Yes | Yes | Yes | The bottom trawl fishery is the only one with the potential to seriously impact on the benthic habitat. The Nephrops trawl fishery operates on the less vulnerable mud and muddy sand substrates and has much lighter bottom contact. The bottom trawl fishery has rightly scored only 60 whilst the others have scored 100 for this single issue PI. A condition has been generated for the bottom trawl fishery with a requirement to further evaluate existing protective measures and their effectiveness. The score of 60 for the bottom trawl fishery compared with the ISF cod / haddock certification score of 90 required a harmonisation. The difference, and in particular the requirement for a condition has been well justified by the team. | No comment |
| 2.4.2 | Yes | Yes | N/A | The scores and scoring comments are the same for all the gears and provide sufficient evidence, in relation to a strategy to manage the impact of all the gears on various habitat types, in support of the scores of 95. This reflects the absence of evidence that the strategy has been fully evaluated. There is only indirect evidence that it is likely to work. | No comment |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|---|
| 2.4.3 | Yes | Yes? | N/A | The absence of sufficient quantitative information on the physical impacts of the gears on habitat types and the lack of information on habitat changes over time results in a score of 85 for this PI across all the gears. It could be argued that the fact that, other than the bottom trawl, it has been shown that the other gears have no impact on habitat types, they should score higher for this PI. I leave that for the team to re-consider. Where published information on specific gears is available, this has been noted in the report and scoring comments. | SI(b) at SG100 addresses the question whether the physical impacts of the gear involved on the habitat have been fully quantified. Although it is generally accepted that some of the assessed fishing gears are not habitat destructive, the assessment team did not find references which quantified the impacts. SI(c) at SG100 addresses the question whether temporal changes in habitat distribution are measured. This kind of information should be considered irrespective to impact. |
| | | | | | |
| 2.5.1 | Yes | Yes | N/A | Potential ecosystem effects have been identified and discussed in the report and summarised in scoring comments. The conclusion, that none of the gears in this fishery are likely to affect the underlying ecosystem structure or function, is a reasonable one. The evidence for each scoring issue fully supports the score of 100. | No comment |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|--|
| 2.5.2 | Yes | Yes | N/A | The scores and scoring comments for each scoring issue are the same for all the gears. The scoring comments are comprehensive in relation to a strategy to protect relevant elements of the ecosystem and they fully support the overall score of 100. | No comment |
| 2.5.3 | Yes | Yes? | N/A | The information provided in the report and scoring comments supports the conclusions in relation to the availability of information on ecosystem impact. For the bottom trawl and Danish seine there is sufficient information on potential ecosystem impact to justify the score of 100. I am not convinced that the score should be any less for the other four gears. They have dropped 5 points on the basis of a lack of information for these gears on the way that the fisheries overlap with vulnerable benthic communities. Yet at scoring issue (d) the SG 100 is supported on the basis that sufficient information <u>is available</u> on the impacts of these fisheries on the components and elements to allow the main consequences for the ecosystem to be inferred. This suggests to me that SG 100 at scoring issue (b) is also met. | SI(b) at SG100 assesses whether the main interactions between the fishery and relevant ecosystem elements can be inferred from existing information and if they have been investigated. For all the fishing gears in assessment, it can be inferred where the fisheries overlap with vulnerable habitats. However, studies in Iceland on the ecosystem impact have only been carried out for bottom trawl and Danish seine. Therefore bottom trawl and Danish seine score 100. |
| | | | | | |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|------------------------------|---|---|--|--|--|
| 3.1.1 | Yes | Yes | N/A | Section 4.1.2 of the report seems to suggest that harmonisation with the ISF cod/haddock certifications is required | Scores for the other fisheries are the same as for the assessed saithe fishery, therefore harmonisation is not required. |
| 3.1.2 | Yes | Yes | N/A | This is clearly a well managed fishery within Icelandic regulations and customs. Ample evidence is presented in the report and scoring comments of the inclusion of and consultation with all interested parties. A minor issue in relation to the claimed marginalisation of some groups has been identified under c) and has led to a reduced score. Section 4.1.2 of the report seems to suggest that harmonisation with the ISF cod/haddock certifications is required | Scores for the assessed saithe fishery is the same or less than 5 points difference from the other fisheries, therefore harmonisation is not required. |
| 3.1.3 | Yes | Yes | N/A | The score of 100 is fully justified in the report and scoring comments. Section 4.1.2 of the report seems to suggest that harmonisation with the ISF cod/haddock certifications is required and I note that it was for the Golden redfish fishery for this PI. | Harmonisation with the haddock fishery is required. Rationale was added to explain the difference between the fisheries. |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|---|--|
| 3.1.4 | Yes | Yes | N/A | A score of 100 is fully justified. This is a very well monitored fishery with strict surveillance of all related management measures and appropriate penalties for non compliance with the regulations. Section 4.1.2 of the report seems to suggest that harmonisation with the ISF cod/haddock certifications is required | Scores for the assessed satihe fishery is the same or less than 5 points difference from the other fisheries, therefore harmonisation is not required. |
| | | | | | |
| 3.2.1 | Yes | Yes | N/A | An excellent summary of the issues relevant to this PI which fully justifies a score of 100. Please note that the score in the overall performance indicator box is <u>wrongly recorded as 90</u> as all three SGs are met. | The score was corrected to 100. Note that the correct score was used in Tables 6.1 and 6.2. |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|--|
| 3.2.2 | Yes | Yes | N/A | The team has identified some problem areas in relation to this PI and have reasonably justified an overall score of just 80. I am not convinced that these issues have been clearly identified and discussed in the text of the report under Principle 3 comments. | SI(b) at SG100 reads “ <i>responds to all issues.... In a transparent, timely and adaptive manner.</i> ” It is easy to recall examples where a decision could have been timelier and the decision process more transparent, although some may disagree. E.g. when a working group set up by the Ministry recommended that the management rule for cod be changed, it took three years until the Minister decided to change the rule. In the meantime the MRI recommendation concerning cod was to change the harvest rule. By international standards three years is possibly not a big delay in altering a catch rule for the most important fish stock in an economy which is largely based on fishing. Our scoring is based on the consideration that we would rather give too low a score than too high a score. |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|-----------------------|--|--|---|--|---|
| | | | | | <p>SI(e) at SG100 assesses if the management “acts proactively to avoid legal disputes”. It is very difficult to know what is required here, and it is also not clear if it is always a good thing if managers try to avoid legal disputes. As In other PIs we decided to avoid scoring too high.</p> <p>The issues here are adequately discussed in the text of the report under Principle 3, but details that decide on the scoring are addressed here.</p> |
| 3.2.3 | Yes | Yes | N/A | The details of this issue in the report confirm that the Icelandic system for monitoring, control and surveillance of their fisheries is of the highest standard. There is evidence that, when necessary, effective penalties are imposed. This fully justifies a score of 100 for this PI. | No comment |
| 3.2.4 | Yes | Yes | N/A | For many MSC certified fisheries a comprehensive formal research plan does not exist and the fishery fails to meet the rigorous requirements at SG 100 a). However for the Icelandic fisheries that is not the case and the team have fully justified the overall score of 100 in the report and scoring comments. | No comment |

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|------------------------------|---|---|--|---|--|
| 3.2.5 | Yes | Yes | N/A | The team has presented good evidence in the report and scoring comments in support of the score of 100 for this PI. | No comment |

Any Other Comments

| Comments | Conformity Assessment Body Response |
|--|--|
| All aspects of the scoring comments and scores have been fully covered in the justification notes above. | No comment |

Appendix 2.2. Report by Peer Reviewer B and CAB Responses

Overall Opinion

| <i>Has the assessment team arrived at an appropriate conclusion based on the evidence presented in the assessment report?</i> | Yes/No | Conformity Assessment Body Response |
|---|---------------|--|
| <p><u>Justification:</u> Overall I believe this is a sustainable and well managed fishery which should be passed against all 3 MSC Principles, but with several conditions attached. Despite some uncertainty in the stock assessment surveys and methods, stocks of saithe around Iceland appear to be being maintained at healthy levels. The management system is highly responsive to stock fluctuations and therefore should ensure this continues to be the case into the future. A further strength of the fishery is that it is very well monitored and researched, and that management measures appear to be effectively applied and enforced. A number of strategies are in place to minimize effects of the fishery on the wider ecosystem, however, this remains the weakest element. The assessment team should be commended for conducting a more precautionary and realistic appraisal of these effects than was done for other similar fisheries in the area. The condition and action plan for increasing protection of sponge aggregations appears to be largely appropriate and realistic (see below). However, I am still concerned that the fishery retains a number of vulnerable species, in particular the critically endangered grey / common skate (<i>Dipturus batis</i>). This species is largely protected throughout the rest of its range¹. So as a condition of this certification and to bring this fishery into line with others, all viable grey skate captured in this fishery should be released alive (as is being done with Atlantic Halibut). As far as possible this strategy should be extended to other vulnerable species, in particular elasmobranchs such as dogfish (<i>Squalus acanthias</i>) which have a relatively high survival rate upon release and are largely protected elsewhere^{1,2}. Such an action would address most of the scoring issues I identified below. Other than that I did think the assessors were a bit over-generous with some scores (see below), but these should be relatively straightforward to address. Finally, there was a lack of information on potential issues with seabird and marine mammal by-catch in the scoring section. This information will not necessarily result in changing any scores, but it should be presented and discussed.</p> | | <p>P1: No comment</p> <p>P2: Recommendations regarding grey skate and the reporting of ETP and bycatch species were added to the report.</p> <p>Catches of vulnerable retained species, including grey skate and dogfish, are low and demonstrate that the fishery is not targeting these species and that the effects of fishing on their populations were considered to be negligible.</p> |

| <i>Do you think the condition(s) raised are appropriately written to achieve the SG80 outcome within the specified timeframe?</i> | Yes/No | Conformity Assessment Body Response |
|---|---------------|--|
| <p><u>Justification:</u> Yes the condition appears both appropriate and sufficient to address the identified issue. It will be challenging to complete all of the work and implement the management strategies within the stated timeframe – but this should be aspired to.</p> | | <p>No comment</p> |

If included:

| <i>Do you think the client action plan is sufficient to close the conditions raised?</i> | Yes/No | Conformity Assessment Body Response |
|---|---------------|--|
| <p><u>Justification:</u> Yes – see above</p> | | <p>No comment</p> |

General Comments on the Assessment Report (optional)

General comments:

In general I thought the report was well written, constructed and presented. There were still a few typographical errors and spelling mistakes. I don't see it as my place to detail all of these here, but I would encourage the authors to proof read the report once again. In particular, there was tendency to not leave spaces between words on occasion.

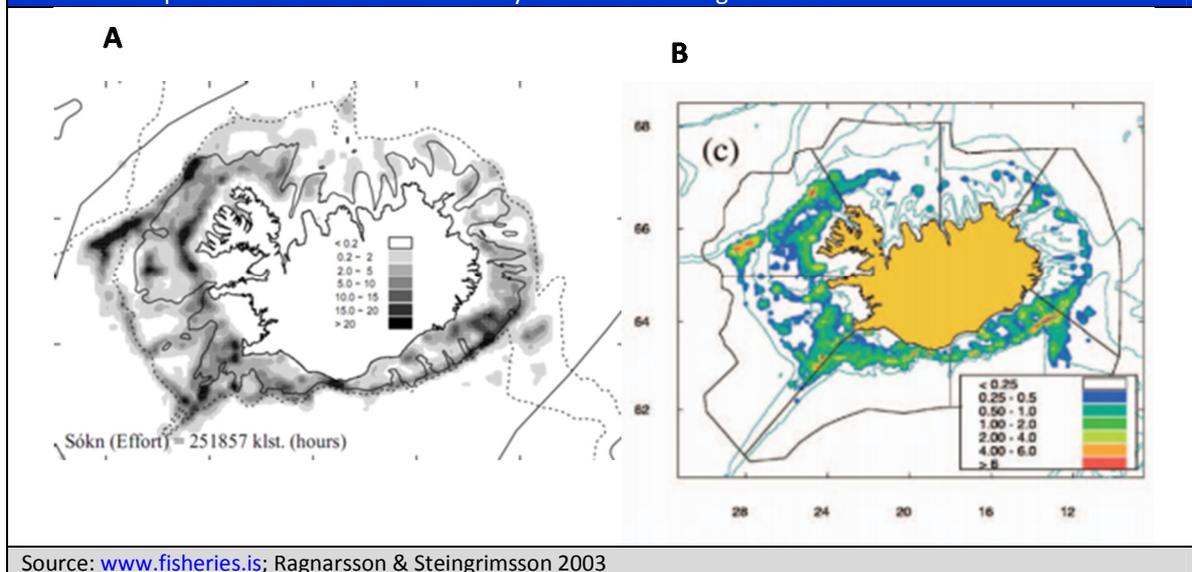
Specific comments:

Pg 21 & 22, Figures 3.7-3.9 (*CAB insertion: Now Figures 3.8-3.10*): These figures are good but the trawling data is nearly 10 years old. Is this the most recent available? If so are you confident that the distribution of trawling effort hasn't changed significantly?

CAB Response: More recent data for trawling is available, however, these figures mainly demonstrate the distribution of various vulnerable habitats. Bottom trawling effort in Icelandic waters has remained similar for decades (see figures below). This can be compared to the fishing distribution data for the fishery in Fig. 3.1.

Figure A2.1:

Distribution of otter trawling around Iceland in 2011. **B:** Distribution of total otter trawling effort from 1991 to 1997. Spatial distribution of otter trawl effort in Icelandic waters: comparison of measures of effort and implications for benthic community effects of trawling activities.



Pg 23: Only the permanent / long term closures will really protect seabed habitats

CAB Response: Agreed. However, many of the temporary closures have actually been closed for decades, effectively serving as MPA's

Pg 25: The paragraph after figure 3.12 (*CAB insertion: Now Figure 3.13*) repeats an earlier one

CAB Response: The paragraph was deleted.

Pg 43: If catches of common dolphin are a mis-reporting then what did they catch? Could it be another cetacean species? If so is this a concern?

CAB Response: It is probably another cetacean, however, the correct identification remains unsolved.

Pg 57: The start of the last paragraph repeats an earlier section

CAB Response: The report was proofread again

Performance Indicator Review

| Performance Indicator | Has all the relevant information available been used to score this Indicator? (Yes/No) | Does the information and/or rationale used to score this Indicator support the given score? (Yes/No) | Will the condition(s) raised improve the fishery's performance to the SG80 level? (Yes/No/NA) | Justification Please support your answers by referring to specific scoring issues and any relevant documentation where possible. Please attach additional pages if necessary. | Conformity Assessment Body Response |
|------------------------------|---|---|--|--|---|
| 1.1.1 | Yes | Yes | N/A | Despite some uncertainty in the stock assessment methods I am confident that the stock is at sustainable level and is being fished sustainably. Stock levels are relatively stable and fishing mortality is being kept at a low level, which correlates well with the moderate productivity / age at first maturity of saithe. Harvest rates are also highly responsive to changes in stock status. That said I am surprised there is not more mention of gear selectivity and how that might be adapted to control catches. At present a significant proportion of the catch must be below maturity. Increases to mesh size etc could improve yield per recruit and increase / better safeguard the spawning stock. | Apart from managing the stock through an HCR, there are various measures in place in the groundfish fishery, such as minimum mesh sizes and selectivity devices that are required in some areas. Problems of bycatch may still occur from time to time in some areas. There is an effective system of real-time closures in place when high catches of small fish are observed. |
| 1.1.2 | Yes | Yes | N/A | | |
| 1.1.3 | N/A | N/A | N/A | | |
| 1.2.1 | Yes | Yes | N/A | | |
| 1.2.2 | Yes | Yes | N/A | | |

| | | | | | |
|-------|-----|-----|-----|--|--|
| 1.2.3 | Yes | Yes | N/A | | |
| 1.2.4 | Yes | Yes | N/A | | |
| | | | | | |

| | | | | | |
|----------------|-----|----|-----|--|---|
| 2.1.1 | | | | <p>All gears: I don't see how this can score 80 at present. All gears retain a number of over-exploited and / or vulnerable species, e.g. wolffish, deepwater redfish, dogfish and grey skate. Greenland halibut also appears to be in a fairly perilous position. It could be argued that management measures are in place to help recover most of these species, however, for grey skate (<i>Dipturus batis</i>) at least, they should go further. Skate have relatively high survival rates after being caught², therefore I strongly urge that regulations are introduced to ensure that all viable skate are released alive rather than retained. This is already being done for Atlantic Halibut in Icelandic waters so there is a precedent. Likewise this would bring Iceland into line with EU regulations which already ban the landing of grey skate¹. Ideally such a ban would be extended to other vulnerable elasmobranchs (e.g. dogfish, mackerel sharks) as well, as is also the case in most EU waters¹. Just because catches of these various species are low, it doesn't necessarily mean the fishery isn't having an adverse effect on them. Catches are much more likely to be low because population sizes of these vulnerable species are low.</p> | <p>SG60 and 80 deal with main retained species (>5%) and vulnerable species are also included.</p> <p>The main retained species involved are part of the Icelandic fisheries management system, regular stock assessments are done and they are managed by TAC in addition to other measures such as temporal and/or spatial closures. The assessed fishery operates within the ITQ system and is subject to monitoring of landings and surveillance, which ensures effective management of TAC's and other measures such as area closures. Grey skate is not targeted and is primarily a bycatch in fisheries. Over the last five years grey skate landings amounted to 25t per year on average. Catches of other vulnerable species were 5t or less on average. These low catches demonstrate that the fishery is not targeting these species. Considering all the elements together, main retained species and vulnerable species, the CAB argues that, overall, it is highly likely that the species are within biologically based limits or that the fishery does not hinder recovery of these species.</p> <p>A recommendation regarding grey skate was added.</p> |
| Bottom trawl | Yes | No | N/A | | |
| Danish seine | Yes | No | N/A | | |
| Longline | Yes | No | N/A | | |
| Handline | Yes | No | N/A | | |
| Gillnet | Yes | No | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |

| | | | | | |
|----------------|-----|----|-----|-------------------------|--|
| 2.1.2 | | | | All gears: See above | SG80 require “partial strategy” to be in place. According to MSC guidance, a partial strategy represents a cohesive arrangement which may comprise one or more measures, an understanding of how it/they work to achieve an outcome and an awareness of the need to change the measures should they cease to be effective. It may not have been designed to manage the impact on that component specifically. The rationale mentions measures applicable to the assessed fisheries by the Fisheries Management Act (e.g. all catches shall be landed, closure of fishing areas, TAC). The measures include all of the species considered as main retained in the current assessment and would be considered as a strategy at the 100 level. However for other vulnerable species the measures in place include monitoring of landings, spatial and/or temporal closures and bans on discards. These measures form a partial strategy at the 80 level. There is a high degree of certainty that shark finning is not taking place, hence the score reached 85. |
| Bottom trawl | Yes | No | N/A | | |
| Danish seine | Yes | No | N/A | | |
| Longlines | Yes | No | N/A | | |
| Handline | Yes | No | N/A | | |
| Gillnet | Yes | No | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |

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|----------------|-----|----|-----|--|---|
| 2.1.3 | | | | <p>All gears: I don't agree with a score of 100 for scoring issue d). While I agree there is good information available on the quantity of different species retained, the consequences of these catches are not always known because the stock status of several the vulnerable species in question is unknown. I would not score this more than 80, giving an overall score of 80 for this performance indicator. This PI doesn't just refer to the main retained species.</p> | <p>Most of the retained species are monitored by MRI surveys, including e.g. grey skate (Björnsson et al. 2007). Information about the retained species could be directly obtained from the DF database and from MRI surveys. Furthermore, annual assessment of discard rates suggest that bycatch/discarding is a minor problem in Icelandic fisheries (Pálsson et al. 2013). Therefore, unobserved fishing mortality is likely to be insignificant and the landed catch is close to the total fishing mortality. All this information should be sufficient to allow stock status to be estimated and the impacts of the fishery to be assessed.</p> |
| Bottom trawl | Yes | No | N/A | | |
| Danish seine | Yes | No | N/A | | |
| Longlines | Yes | No | N/A | | |
| Handline | Yes | No | N/A | | |
| Gillnet | Yes | No | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |
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|----------------|-----|-----|-----|--|---|
| 2.2.1 | | | | | |
| Bottom trawl | Yes | Yes | N/A | <p>Longlines & Gillnets:</p> <p>Although I largely agree with the scores here on the basis of the material presented and a ban on discarding of fish, there is no mention here about seabird or marine mammal bycatch. I take on board the argument in the main text that marine mammal bycatch is unlikely to be a significant issue in this fishery (pg. 50). However, the case is less clear for seabirds. The only data presented are 20 years old which is not great. Furthermore, the total number of seabirds drowned in cod nets (I presume gillnets?) (see figure 3.24) was actually recorded as 12481 in the year studied. This sounds like a potentially significant number to me (although there is no mention of species and whether or not they are threatened). I really think this information needs to be updated (if available) and incorporated into the justification of scores given. In addition, for longlines it would be very helpful to see the information here about the mitigation measures used to minimise seabird bycatch. If seabird and marine mammal bycatch is not considered here it should be assessed in the ETP species section.</p> | <p>The text on seabirds has been improved (section 3.4.1) and accordingly the rationale regarding gillnet and longline.</p> <p>Additional rationale regarding mitigation devices to reduce bird bycatch was added to PI2.2.2 for longline where it is appropriate.</p> <p>The team also added a recommendation regarding recording of bycatch and ETP species in the catch.</p> |
| Danish seine | Yes | Yes | N/A | | |
| Longlines | No | No | N/A | | |
| Handline | Yes | Yes | N/A | | |
| Gillnet | No | No | N/A | | |
| Nephrops trawl | Yes | Yes | N/A | | |

| | | | | | |
|----------------|-----|-----|-----|------------------------------------|---|
| 2.2.2 | | | | Longlines & Gillnets: See above | The text on seabirds has been improved (section 3.4.1) and accordingly the rationale regarding gillnet and longline. Additional rationale regarding mitigation devices to reduce bird bycatch was added to PI2.2.2 for longlines. The team also added a recommendation regarding recording of bycatch and ETP species in the catch. |
| Bottom trawl | Yes | Yes | N/A | | |
| Danish seine | Yes | Yes | N/A | | |
| Longlines | No | No | N/A | | |
| Handline | Yes | Yes | N/A | | |
| Gillnet | No | No | N/A | | |
| Nephrops trawl | Yes | Yes | N/A | | |
| 2.2.3 | | | | Longlines & Gillnets: See above | PI2.2.3 considers information available on discards. The MRI conducts regular studies on discarding and adequate information exists for the main discards in the Icelandic fishery. The team also added a recommendation regarding the recording of bycatch and ETP species in the catch. |
| Bottom trawl | Yes | Yes | N/A | | |
| Danish seine | Yes | Yes | N/A | | |
| Longlines | No | No | N/A | | |
| Handline | Yes | Yes | N/A | | |
| Gillnet | No | No | N/A | | |
| Nephrops trawl | Yes | Yes | N/A | | |

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|----------------|-----|----|-----|---|---|
| 2.3.1 | | | | <p>All gears: Personally, I believe the ability to exclude species listed by the IUCN / OSPAR as ETP species represents a loophole in the MSC assessment system. The effect of the fishery on the critically endangered grey skate (<i>Dipturus batis</i>), in particular, really should be assessed here and should result in a condition that ensures management strategies are improved substantially (see above). However, regardless of how / where this species is defined or assessed, the key issue is that a strategy is introduced to aid the recovery of its populations. The same argument could be made for several other retained species which are considered vulnerable by the IUCN, particularly dogfish (<i>Squalus acanthias</i>) given reasonable amounts are taken in the fishery. On a more positive note the ban on targeted fishing for Atlantic halibut (and compulsory release of all viable individuals taken as bycatch) is to be commended. This provides an example of best practice which should be extended to all other vulnerable species taken in the fishery as far as possible.</p> | <p>The team defined ETP species as specified in the MSC Certification Requirements (CB3.11.1). Since grey skate and dogfish do not fall under these criteria, it was considered as vulnerable retained species.</p> <p>A recommendation regarding grey skate was added.</p> <p>The team added a recommendation regarding the recording of bycatch and ETP species in the catch.</p> |
| Bottom trawl | Yes | No | N/A | | |
| Danish seine | Yes | No | N/A | | |
| Longlines | Yes | No | N/A | | |
| Handline | Yes | No | N/A | | |
| Gillnet | Yes | No | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |

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|----------------|-----|----|-----|--|---|
| 2.3.2 | | | | All gears: See above | The team defined ETP species as specified in the MSC Certification Requirements (CB3.11.1). Since grey skate and dogfish do not fall under these criteria, it was considered as vulnerable retained species. |
| Bottom trawl | Yes | No | N/A | | |
| Danish seine | Yes | No | N/A | | |
| Longlines | Yes | No | N/A | | |
| Handline | Yes | No | N/A | | |
| Gillnet | Yes | No | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |
| 2.3.3 | | | | All gears: See above. Also, I don't agree with a score of 100 for what should be labelled as scoring issue (a) when there is no information on the survival of released halibut. This should score no more than 80, reducing the overall score for this PI to 80. | The information available for the halibut stock is sufficient to determine the outcome status of the species. This information includes survey data, catch composition and age/length data. Stock assessment on the stock is conducted annually. SI(a) is therefore met at SG100. The overall score remains 85. |
| Bottom trawl | Yes | No | N/A | | |
| Danish seine | Yes | No | N/A | | |
| Longlines | Yes | No | N/A | | |
| Handline | Yes | No | N/A | | |
| Gillnet | Yes | No | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |

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|----------------|-----|-----|-----|---|---|
| 2.4.1 | | | | | |
| Bottom trawl | Yes | Yes | Yes | <p>Bottom trawl: The assessment team are to be commended for taking a more precautionary / realistic approach to this issue than previous assessments of other similar fisheries in the same area.</p> <p>Danish seine: The key reference that Danish seines have limited impact on benthos (Porarinsdottir et al 2010) is not in the reference list</p> <p>Nephrops trawls: I really don't think nephrops trawls should be placed in the same category as static gear in terms of environmental impact. Although nephrops trawls operate over soft sediment, they have very high bycatch³ and have almost certainly affected vulnerable species. The paper by Ball et al (2000) admits that its conclusions are limited because the experimental areas examined had already been subject to a long history of trawling. In comparison, a global meta-analysis of experimental trawling studies by Kaiser et al (2006)⁴ established that trawling in soft sediments can indeed have long term ecosystem effects. It is difficult to assess the degree of these affects in Icelandic waters without scientific study, but this PI should certainly not score more than 80.</p> | <p>Danish seine: The reference should be Thórarinsdóttir et al. 2010. This has been corrected.</p> <p>Nephrops trawl: The reviewer points out inaccuracy in the provided rationale. Revised rationale will be as follows:</p> <p>The <i>Nephrops</i> trawl used in Icelandic waters has a groundrope but is not fitted with bobbins or tickler chain (www.fisheries.is). The main <i>Nephrops</i> fishing grounds are in the muddy deeps and banks off South Iceland (Garcia et al. 2006) and a good distance away from vulnerable habitats typically occurring close to the continental shelf break (e.g. Steingrímsson & Einarsson 2004, Garcia et al. 2006). Therefore, it is highly unlikely that the fishery will reduce key habitat forming species to a point where there would be serious or irreversible harm.</p> |
| Danish seine | No | No | N/A | | |
| Longlines | Yes | Yes | N/A | | |
| Handline | Yes | Yes | N/A | | |
| Gillnet | Yes | Yes | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |

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|----------------|-----|-----|-----|---|--|
| 2.4.2 | | | | | |
| Bottom trawl | Yes | No | N/A | Bottom trawl, Danish seine & Nephrops trawl : I would score this only 80 for a) and c) giving an overall score of 85 for this PI. There is a strategy in place but it is not yet fully implemented nor protecting all vulnerable habitat types. I have not included static gear types here as I have taken onboard the argument that they cause much less damage to vulnerable habitats and that therefore the current strategy is probably sufficient in those cases. I reserve judgement for Danish seine and nephrops trawl due to the issues above. | SI(a) at SG100 does not have to include all vulnerable habitat types. The current closure of coral areas is based on the Fisheries Management Act which provides a strategy to close areas for fishing in order to protect any type of vulnerable habitat. The strategy is, therefore, fully implemented. The rationale for SI(c) at SG100 demonstrates that the strategy is being implemented although it presently applies to coral areas. |
| Danish seine | No | No | N/A | | |
| Longlines | Yes | Yes | N/A | | |
| Handline | Yes | Yes | N/A | | |
| Gillnet | Yes | Yes | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |
| 2.4.3 | | | | | |
| Bottom trawl | Yes | No | N/A | Bottom trawl, Danish seine & Nephrops trawl : I would only give a score of 80 for a) and therefore an overall score of 80 for this PI. Mapping of vulnerable habitats is extensive, but not yet complete and still underway. I have accepted the original score for the static gears because I don't believe they would threaten any of the vulnerable habitat types. I reserve judgement for Danish seine and nephrops trawl due to the issues above. | The reviewer rightly points out that mapping of vulnerable habitats is extensive. The BIOICE programme covered a variety of habitats in Icelandic waters, ranging widely in depth (<100 to 3100m) and temperature conditions. Also, the MRI has identified areas of vulnerable benthic habitats in Icelandic waters and is currently running a project on mapping cold water corals and studying the interaction between fish and cold water coral habitats. Although mapping is still underway, the information is already extensive and it fully justifies the conclusion that the distribution of habitat types is known over their range, with particular attention to the occurrence of vulnerable habitat types. Habitat mapping can never be complete due to their non-static nature. |
| Danish seine | Yes | No | N/A | | |
| Longlines | Yes | Yes | N/A | | |
| Handline | Yes | Yes | N/A | | |
| Gillnet | Yes | Yes | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |

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|----------------|-----|-----|-----|---|--|
| 2.5.1 | | | | <p>All gears (except handline): I would argue that a score of 100 is overly generous here. Although the management systems in place are dealing with many issues, mapping and protection of vulnerable benthic habitats is not yet complete and there are still problems with retention of vulnerable species in the catch (see previous sections) which are not being addressed with current management plans. An overall score of 80 would be more appropriate for the above gear types. I have accepted the original score for handlines because I don't believe handlines would threaten any of the vulnerable habitat types and appear to catch almost no vulnerable species.</p> | <p>The following is considered to be evidence that the fishery is highly unlikely to disrupt the key elements underlying ecosystem structure and function to a point where there would be serious or irreversible harm. In Icelandic waters, cod and capelin are key predator and prey species, respectively. The assessed fisheries do not directly affect capelin. Apart from cod, none of the other retained species in the assessed fisheries are considered as key species in the ecosystem. The stock biomass of cod has been increasing and is now larger than observed in the last three decades. The Fisheries Management Act provides a strategy to close areas for fishing in order to protect any type of vulnerable habitat. Steps have been taken to protect vulnerable habitats and it is to be expected that further closures will follow in the coming years. Furthermore, a national strategic plan for preservation of biological diversity is intended to protect vulnerable benthic ecosystems (Ministry for the Environment 2010).</p> |
| Bottom trawl | Yes | No | N/A | | |
| Danish seine | Yes | No | N/A | | |
| Longlines | Yes | No | N/A | | |
| Handline | Yes | Yes | N/A | | |
| Gillnet | Yes | No | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |

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|----------------|-----|-----|-----|---|---|
| 2.5.2 | | | | All gear types (except handline): As above | The justification by the reviewer is unclear. The following is a summary of the rationale provided by the assessment team regarding measures to ensure the assessed fisheries do not pose a risk of serious or irreversible harm to ecosystem structure and function. Key ecosystem fish species (e.g. capelin and cod) are subject to the quota system. Area closures are in operation to protect fish and habitats. Monitoring and surveillance of the fisheries are provided by the Icelandic Coast Guard and the Directorate of Fisheries. The key ecosystem elements in Icelandic waters are regularly monitored by the Marine Research Institute. Capelin and some other key ecosystem species are regulated by the Icelandic quota system, which has been demonstrated to work. The stock biomass of cod has been increasing and is now larger than observed in the last three decades. Violation against the provisions of the Fisheries Management Act is liable to fines. |
| Bottom trawl | Yes | No | N/A | | |
| Danish seine | Yes | No | N/A | | |
| Longlines | Yes | No | N/A | | |
| Handline | Yes | Yes | N/A | | |
| Gillnet | Yes | No | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |

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|----------------|-----|----|-----|--|---|
| 2.5.3 | | | | | |
| Bottom trawl | Yes | No | N/A | <p>All gears: I would recommend an overall score of no more than 90 here because both b) and c) should only be scored 80. The main issue here is that the impact of the fishery on all retained species is not fully understood, nor is the role of deepwater coral habitats on the demography of fish species (as the authors report in 2.5.1 for bottom trawls). I would also argue the impact of nephrops trawling on the fishery is not fully understood. The scoring is not consistent between gear types e.g. at the moment bottom trawl scores 100 while other gears score less.</p> | <p>The performance indicator considers whether there is adequate knowledge of the impacts of the fishery on the ecosystem. In MSC Certification Requirements Guidance, Section GCB3.19.1, the following guidance is given: <i>“Key ecosystem elements may include trophic structure and function (in particular key prey, predators, and competitors), community composition, productivity pattern (e.g. upwelling or spring bloom, abyssal, etc.), and characteristics of biodiversity”</i>. Rationale on retained species are given in 2.1.3, regarding <i>Nephrops</i> fishery in 2.4.1. The assessment team considers enough evidence exists on total fishing mortality of all retained species, levels of discarding, effects on ETP species and the overlap between vulnerable habitats and fishing effort in the assessed fisheries. There is also adequate knowledge regarding effects of the fishery on key ecosystem fish species; cod and capelin. SI(b) at SG100 addresses the question whether main interactions between the fishery and relevant ecosystem elements can be inferred from existing information, and if they have been investigated. For all the fishing gears in assessment it can be inferred where the fisheries overlap with vulnerable habitats. However, studies in Iceland on the ecosystem impact has only been carried out for bottom trawl and Danish seine. Therefore bottom trawl and Danish seine score 100.</p> |
| Danish seine | Yes | No | N/A | | |
| Longlines | Yes | No | N/A | | |
| Handline | Yes | No | N/A | | |
| Gillnets | Yes | No | N/A | | |
| Nephrops trawl | Yes | No | N/A | | |
| | | | | | |

| | | | | | |
|-------|-----|-----|-----|--|---|
| 3.1.1 | Yes | Yes | N/A | | |
| 3.1.2 | Yes | Yes | N/A | | |
| 3.1.3 | Yes | Yes | N/A | | |
| 3.1.4 | Yes | Yes | N/A | | |
| | | | | | |
| 3.2.1 | Yes | No | N/A | I would score this section a little lower (perhaps 80 or 85) because management still needs to be improved with respect to retention of some vulnerable species (see previous section) | Guidance provided by the MSC is as follows (GCB4.0): <i>“The intent of P3 is to ensure that there is an insitutional and operational framework, appropriate to the size and scale of the fishery for implementing P1 and P2 that is capable of deliviering sustainable fisheries...”</i> . Although there is often room for improvement in any management system, the institutional and operational framework in Iceland is firmly in place and capable of delivering sustainable fisheries of which there are many examples. |
| 3.2.2 | Yes | Yes | N/A | | |
| 3.2.3 | Yes | Yes | N/A | | |
| 3.2.4 | Yes | Yes | N/A | | |
| 3.2.5 | Yes | Yes | N/A | | |

Any Other Comments

| Comments | Conformity Assessment Body Response |
|--|-------------------------------------|
| <p>References used above:</p> <ol style="list-style-type: none">1. MMO Guidance on the protection of sharks, skates and rays (October 2013) http://www.marinemanagement.org.uk/fisheries/monitoring/documents/elasmobranchs.pdf.2. Enever, R. et al (2010) Discard mitigation increases skate survival in the Bristol Channel. <i>Fisheries Research</i>.102: 9-15.3. Bergmann, M. et al (2002): Discard composition in the Clyde Sea Nephrops fishery. <i>Fisheries Research</i> 57 , pp. 169-183.4. Kaiser, M.J. et al (2006). Global analysis of response and recovery of benthic biota to fishing. <i>Marine Ecology Progress Series</i> 311:1-14. | |

Appendix 3. Stakeholder submissions

1. The report shall include:
 - a. All written submissions made by stakeholders during consultation opportunities listed in CR 27.15.3.1
 - b. All written and a detailed summary of verbal submissions received during site visits regarding issues of concern material to the outcome of the assessment (*Reference CR 27.15.3.2*)
 - c. Explicit responses from the team to stakeholder submissions included in line with above requirements (*Reference CR 27.15.3.3*)

(REQUIRED FOR FR AND PCR)

2. The report shall include all written submissions made by stakeholders about the public comment draft report in full, together with the explicit responses of the team to points raised in comments on the public comment draft report that identify:
 - a. Specifically what (if any) changes to scoring, rationales, or conditions have been made.
 - b. A substantiated justification for not making changes where stakeholders suggest changes but the team makes no change.

(*Reference: CR 27.15.4*)

Appendix 4. Surveillance Frequency

(REQUIRED FOR THE PCR ONLY)

1. The report shall include a rationale for determining the surveillance score.
2. The report shall include a completed fishery surveillance plan table using the results from assessments described in CR 27.22.1

Table A4: Fishery Surveillance Plan

| Score from CR Table C3 | Surveillance Category | Year 1 | Year 2 | Year 3 | Year 4 |
|------------------------|----------------------------|-----------------------------------|-----------------------------------|-----------------------------------|---|
| [e.g. 2 or more] | [e.g. Normal Surveillance] | [e.g. On-site surveillance audit] | [e.g. On-site surveillance audit] | [e.g. On-site surveillance audit] | [e.g. On-site surveillance audit & re-certification site visit] |

Appendix 5. Client Agreement

(REQUIRED FOR PCR)

The report shall include confirmation from the CAB that the Client has accepted the PCR. This may be a statement from the CAB, or a signature or statement from the client.

(Reference: CR: 27.19.2)

Appendix 5.1 Objections Process

(REQUIRED FOR THE PCR IN ASSESSMENTS WHERE AN OBJECTION WAS RAISED AND ACCEPTED BY AN INDEPENDENT ADJUDICATOR)

The report shall include all written decisions arising from an objection.

(Reference: CR 27.19.1)