# Iceland Responsible Fisheries (IRF) Certification Programme

## Re-assessment Report

***For The***

# Icelandic Golden Redfish *(Sebastes norvegicus)* Commercial Fisheries

***Facilitated By***

**Iceland Responsible Fisheries Foundation (IRFF)**


**Assessors:** **Vito Romito, Lead Assessor**
**Conor Donnelly, Assessor**
**Dankert Skagen, MD, Assessor**
**Gísli Svan Einarsson, Assessor**



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**SAI Global/Global Trust Certification Ltd.**
3rd Floor, Block 3,
Quayside Business Park,
Mill Street, Dundalk,
Co. Louth, Ireland.
**T:** + 353 42 932 0912
www.saiglobal.com


ICELAND RESPONSIBLE FISHERIES CERTIFIED

## Glossary

| | |
|---|---|
| AIS | Automatic Identification System |
| $B_{4+}$ | Biomass of 4 years and older fish |
| $B_{lim}$ | The biomass limit reference point below which there is a high risk that recruitment will be impaired and that the stock could collapse |
| $B_{loss}$ | The biomass below which there is no historical record of recruitment |
| $B_{MSY}$ | SSB that is associated with Maximum Sustainable Yield (MSY) |
| $B_{pa}$ | Precautionary reference point designed to have a low probability of being below $B_{lim}$ |
| EEZ | Exclusive Economic Zone |
| EU | European Union |
| ETP | Endangered, Threatened and Protected species* |
| FAO | United Nations Food and Agriculture Organization |
| $F_{lim}$ | Fishing mortality which in the long term will result in an average stock size at $B_{lim}$ |
| $F_{max}$ | Fishing mortality rate that maximizes equilibrium yield per recruit |
| $F_{MGT}$ | Management elected fishing mortality target/limit; usually specified in FMP |
| FMP | Fishery Management Plan |
| $F_{MSY}$ | Fishing mortality which in the long term will result in an average stock size at $B_{MSY}$ |
| $F_{pa}$ | Precautionary reference point for fishing mortality designed to avoid true fishing mortality being above $F_{lim}$ |
| HCR | Harvest Control rule |
| ICES | International Council for the Exploration of the Sea |
| ICG | Icelandic Coast Guard |
| IMA | Icelandic Maritime Administration |
| ITQ | Individual Transferable Quota |
| IUU | Illegal, Unreported and Unregulated fishing |
| IWC | International Whaling Commission |
| kt | kilo tonnes |
| MCS | Monitoring, Control and Surveillance |
| MII | Ministry of Industries and Innovation |
| MFRI | Marine and Freshwater Research Institute (formerly MRI) |
| MRI | Marine Research Institute (now MFRI) |
| MSY $B_{trigger}$ | ICES MSY framework parameter that triggers advice on a reduced fishing mortality relative to $F_{MSY}$ |
| MSY | Maximum Sustainable Yield; the largest average catch or yield that can continuously be taken from a stock under existing environmental conditions |
| NAFO | Northwest Atlantic Fisheries Organisation |
| NAMMCO | North Atlantic Marine Mammal Commission |
| NEAFC | North East Atlantic Fisheries Commission |
| NPA | National Program Action |
| NWWG | North-Western Working Group (within ICES) |
| SSB | Spawning stock biomass; total weight of all sexually mature fish in the stock |
| $SSB_{MGT}$ | Management elected SSB target/limit; usually specified in FMP |
| $SSB_{trigger}$ | SSB level that acts as a trigger when the stock fall below a certain level |
| TAC | Total Allowable Catch |
| UN | United Nations |
| VMEs | Vulnerable Marine Ecosystems |
| VMS | Vessel Monitoring System |

*Species recognised by Icelandic legislation and/or binding intemational agreements to which the Icelandic authorities are party. Binding intemational agreements as applicable in Icelandic jurisdiction.

  

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# i. Summary and Recommendations

The Fisheries Association of Iceland on behalf of the Federation of Icelandic Fishing Vessel Owners (LÍÚ), the Federation of Icelandic Fish Processing Plants (SF) and the National Association of Small Boat Owners, Iceland (NASBO) requested an assessment of the Icelandic golden redfish (*Sebastes norvegicus*) commercial fishery to the FAO Based Icelandic Responsible Fisheries Management (IRF) Certification Programme. The original Certification was granted on the 1st of May 2014. As part of this second re-assessment, the current clients for this fishery are Samtök fyrirtækja í sjávarútvegi (SFS) (Fisheries Iceland) and Landssamband smábátaeigenda (The National Association of Small Boat Owners, Iceland (NASBO)).

The purpose of the Programme is to provide the fishing industry with a "Certification of Responsible Fisheries Management" at the highest level of market acceptance. Certification to the Programme demonstrates a commitment that will communicate to customers and consumers the responsibility of fishermen and fisheries management authorities and the provenance of Icelandic fish. The Iceland Responsible Fisheries Foundation (IRFF), established in February 2011, owns and operates the brand of Iceland Responsible Fisheries (IRF).

The Certification Programme is accredited to the international standard ISO/IEC 17065, confirming that consistent, competent and independent certification practices are applied. Formal ISO/IEC 17065 accreditation by an IAF (International Accreditation Forum) Accreditation body gives the Programme formal recognition (since September 2014) and a credibility position in the international marketplace and ensures that products certified under the Programme are identified at a recognised level of assurance. Demonstration of compliance is verified through a rigorous assessment by a competent, third party, accredited certification body, SAI Global. The assessment was conducted by a team of SAI Global appointed Assessors comprising of internal staff and externally contracted fishery experts. Details of the assessment team are provided in Appendix 1.

The Unit of Certification comprises the Icelandic Golden redfish (*Sebastes norvegicus*) commercial fishery, under state management by the Icelandic Ministry of Industries and Innovation, fished directly by demersal trawl (principal gear), long-line, gill net, Danish seine net, and hook and line by small vessel gear, and indirectly with Nephrops trawls, shrimp trawls, pelagic trawls and purse seines within Iceland's 200 nautical miles Exclusive Economic Zone (EEZ).

This is the 2019 Re-Assessment Report of the Icelandic Golden redfish commercial fishery. It comprises a full assessment of the fishery against the requirements of the current IRF standard, to evaluate whether current practices in the management of the Golden redfish fishery remain consistent with criteria contained in the IRF Standard. The assessment was conducted according to the Global Trust procedures for FAO-Based IRFM certification using Revision 2.0 of the Icelandic Responsible Fisheries Management (IRFM) Standard (July 2016)[1].

The key outcomes of this Assessment have been summarized in Section 5. Assessment Outcome Summary and Recommendations of the Assessment Team.

[1] https://www.responsiblefisheries.is/media/1/irfm-standard-revision-2.0-final-2.pdf

  

### 1.1.1. Conformance against the IRFF Standard V2

During this audit all clauses but one were found to be in full conformance. In this respect, one minor non-conformance was identified against clause 2.3.2.4 of the IRFM Standard (V2), relating to the appropriate recording of marine mammal and seabird bycatch data in fishing logbooks:

**Clause 2.3.2.4.** *Catch amounts by species and fishing area shall be estimated and continually recorded in fishing logbooks on-board the fishing vessels.*

As a result, in February 2019, the Client provided a corrective action plan to address the gap identified - which the Audit Team accepted. Accordingly, projected future surveillance actions are detailed below.

| Clause No. | Surveillance Action |
|---|---|
| 2.3.2.4. Catch amounts by species and fishing area shall be estimated and continually recorded in fishing logbooks on-board the fishing vessels | According to the corrective action plan stating that such work will be carried out in the "next (coming) months", and considering that clause 2.3.2.4 is a *Fishing Vessel Monitoring and Control System* clause dealing with the continuous recording of catch amounts by species and fishing area in logbooks (as opposed to data collection generated by research programs), the Client shall provide, in time for the next audit, measurable evidence of corrective action towards the appropriate recording of marine mammal and seabirds catches in fishing logbooks on-board of fishing vessels, as per regulation no.126/2014 [2]. |

Further to the Minor Non-Conformance identified, five Recommendations have been recorded.

**Recommendation #1 (relating to clause 1.1.9.2).** The Assessment Team recommends that the golden redfish FMP should specify that if SSB falls below Blim, additional management action should be taken, depending on the conditions prevailing, with the objective of bringing the stock back to more sustainable levels above the Blim threshold, within an appropriate timeframe, given that the Icelandic government is in the position to take action as and if needed. This is aligned to and mirrors the ICES recommendation that a safety rule should be added (to the FMP) should SSB falls well below Blim (ICES 2014 Golden Redfish Special Request).

**Recommendation #2 (relating to clause 1.3.1.3).** The Assessment Team recommends that the issue of TAC overshooting (due to flexibility measures in Iceland as well as the Faroese catches to a smaller degree) is addressed at the next management plan revision in 2020 and that the harvest control rule is evaluated through simulation by addressing the implementation bias in the order of magnitude experienced in recent years.

**Recommendation #3 (relating to clause 1.5.4).** The Assessment Team recommends that the Faroes catches of golden redfish be taken more formally into account through a formal catch sharing agreement, as it currently exist (i.e. in 2019) between Iceland and Greenland, or equivalent, and evaluated through simulations as part of the next golden redfish benchmark evaluation scheduled for 2020.

[2] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967

  

**Recommendation #4 (relating to clause 3.1.1 and 3.1.2)**

Several fisheries management plans (e.g. those for cod, haddock, saithe and redfish) state that it is the policy of the Icelandic government to protect vulnerable marine ecosystems (VMEs). VMEs of particular importance within Iceland include cold water coral communities and hydrothermal vent areas, but also deep sea sponge aggregations (a threatened and declining habitat, according to OSPAR[3]) and sea-pen fields[4]. Currently, there are explicit conservation measures for cold water corals and hydrothermal vents (i.e. area closures) but nothing explicit for either deep sea sponge aggregations or sea pen fields. The assessment team recommends that more formal conservation plans/measures are formulated for these VMEs.

**Recommendation #5 (relating to clause 3.2.2.3)**

The assessment team recommends that the population and status of harbour porpoise (*Phocoena phocoena)* and that of harbour seal (*Phoca vitulina*) in Iceland are appropriately monitored due to risk of significant depletion to both populations, specifically in regards to their performance in relation to current targets (i.e. FMRI management objective of 12,000 harbour seals) and annual replacement potential (e.g. ASCOBANS threshold of 1.7% for harbour porpoises [5]).

**It is noted that the issues highlighted in these recommendations will be reviewed in subsequent surveillance audits, and that some of these have the potential to develop into non-conformances if the issues persist or worsen.**

[3] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Ecosystem_overview-Icelandic_Waters_ecoregion.pdf

[4] https://novasarc.hafogvatn.is/project/

[5] http://www.ascobans.org/en/document/ospar-background-document-harbour-porpoise-phocoena-phocoena

  

### 1.1.2. Recommendation of the Assessment Team

**The assessment team recommends that the management system of the applicant fishery, the Icelandic Golden redfish (*Sebastes norvegicus*) commercial fishery under state management by the Icelandic Ministry of Industries and Innovation, fished directly by demersal trawl (principal gear), long-line, gill net, Danish seine net, and hook and line by small vessel gear, and indirectly with Nephrops trawls, shrimp trawls, pelagic trawls and purse seines within Iceland's 200 nautical miles Exclusive Economic Zone (EEZ), be granted re-certification to the Icelandic Responsible Fisheries Certification Programme.**

### 1.1.3. Certification Committee Determination

A Certification Committee met on the 12th of June 2019 to objectively review the Final Assessment Report for Determination and Recommendation of the Assessment Team. The Certification Committee comprised of two fishery experts and a certification expert, all independent from both the assessment team and the peer review team. The aim of the Certification Committee was to reach a determination to either award, defer (pending clarification) or reject certification. Upon careful review and consideration of the report, the Committee agreed with all the findings and scores, including the minor non-conformance applied (and related corrective action plan received from the client) as well as with the five recommendations recorded by the Assessment Team. The Committee also requested for some minor clarifications to be made within the report. The Assessment Team agreed and integrated these changes within this final certification report. The Committee decision was to award certification.

  

## ii. Schedule of Key Assessment Activities

| Assessment Activities | Date |
|---|---|
| Application date | July 2018 |
| Start of Initial Re-Assessment Review | August 2018 |
| Appointment of Full Assessment Team | October 2018 |
| On Site Visit | November 2018 |
| Draft Full Assessment Report | March 2019 |
| Client Review | March 2019 |
| Peer Review | May 2019 |
| Certification Committee review/decision | June 2019 |
| Final Re-Assessment Report | July 2019 |

  

## iii. Assessment Team Details

**Vito Romito, Lead Assessor**
SAI Global/Global Trust Certification Ltd.
Quayside Business Centre,
Dundalk, Co. Louth,
Ireland.
T: +353 (0)42 9320912
E-mail: vito.romito@saiglobal.com

**Conor Donnelly, Assessor**
SAI Global/Global Trust Certification Ltd.
Quayside Business Centre,
Dundalk, Co. Louth,
Ireland.
T: +353 (0)42 9320912
E-mail: conor.donnelly@saiglobal.com

**Dankert Skagen, MD, Assessor**
Fisheries Science Consultant
Fjellveien 96, 5019 Bergen,
Norway
Website: www.dwsk.net

**Gísli Svan Einarsson, Assessor**
VERIÐ Vísindagarðar/Science Park
Háeyri 1
550 Sauðárkrókur
Website: www.veridehf.is

  

# 2. Introduction

This re-assessment of the Icelandic golden redfish commercial fishery fulfills part of the procedure for the re-certification of the fishery to the Iceland Responsible Fisheries Programme (hereafter IRF Programme). The IRF Programme is a voluntary program for Icelandic fisheries initially established by the Fisheries Association of Iceland (FAI) and now owned and administered by the Iceland Responsible Fisheries Foundation (IRFF). The IRFF was established in February 2011 and operates on a cost basis, as a non-profit organisation.

IRFF wishes to provide the Icelandic fishing industry with a "Certification of Responsible Fisheries Management" at the highest level of market acceptance. The purpose of the Programme is to provide Certification to requirements under the Programme that demonstrates a commitment that will communicate to customers and consumers the responsibility of fishermen and fisheries management authorities and the provenance of Icelandic fish.

This is the 2019 Re-Assessment report for Icelandic golden redfish comprising a full assessment of the fishery against the requirements of the IRF standard version V2.0. Ultimately, this assessment evaluates whether current practices in the management of the golden redfish fishery remain consistent with criteria contained in Revision 2.0 of the IRF Standard.

The assessment was conducted according to the Global Trust procedures for FAO-Based IRFM certification using Revision 2.0 of the IRFM Standard (July 2016). The IRFM Standard is based on the 1995 FAO Code of Conduct for Responsible Fisheries and on the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries adopted in 2005 and amended/extended in 2009, which in turn are based on the current suite of agreed international instruments addressing fisheries.

The Assessment is based on the 3 major Sections of responsible fisheries management, as outlined in Revision 2.0 of the IRFM Standard, namely:

Section 1: Fisheries Management
Section 2: Compliance and Monitoring
Section 3: Ecosystem Considerations

  

# 3. Fishery Applicant Details

**Table 1.** Fishery applicant details.

| **Applicant Contact Information** | |
|---|---|
| **Organisation/Company Name:** | Samtök fyrirtækja í sjávarútvegi (SFS) (Fisheries Iceland) |
| **Date:** | 8th February 2010 |
| **Correspondence Address:** | Samtök fyrirtækja í sjávarútvegi (SFS) |
| **Street:** | Borgartún 35 |
| **City:** | Reykjavík |
| **Country:** | Iceland |
| **Postal Code:** | |
| **Phone:** | (354) 591 0300 |
| **Web:** | www.sfs.is |
| **E-mail Address** | info@sjavarutvegurinn.is |
| **Organisation/Company Name:** | The National Association of Small Boat Owners, Iceland (NASBO) |
| **Date:** | 8th February 2010 |
| **Correspondence Address:** | Landssamband smábátaeigenda |
| **Street:** | Hverfisgötu 105 |
| **City:** | 101 Reykjavik |
| **Country:** | Iceland |
| **Postal Code:** | IS-101 |
| **Phone:** | (354) 552 7922 |
| **Web:** | www.smabatar.is |
| **E-mail Address:** | ls@smabatar.is |

  

# 4. Background to the Fishery

## 4.1. Species Biology

The genus Sebastes is very common and widely distributed in the North Atlantic. It is found off the coast of Britain, along the Norwegian cost, in the Barents Sea and Spitzergen, off the Faroe Island, off Iceland, off East and West Greenland, and along the east coast of North America from Baffin Island south to Cape Cod. Of the three exploited species in the North Atlantic, golden redfish (*Sebastes norvegicus,* formerly *S. marinus*) has the longest history of exploitation[6].

**Figure 1.** Golden redfish[7].

Golden redfish are a slow growing, ovoviviparous species (i.e. producing young by means of eggs hatched within the parent body). The gonads of males and females do not mature at the same time. The spermatozoa are kept in the ovary of the female after copulation until such time that the eggs ripen paving the way for fertilisation[8]. Insemination of the females occurs in August-September (Barents Sea) and from October to January (off Iceland and Greenland). Fertilization of the ripe oocytes occurs during February and March and release of larvae from April to June or even to August. Golden redfish gives birth to 50,000-350,000 pelagic larvae of 8 mm length.

[6] http://scimar.icm.csic.es/scimar/pdf/67/sm67s1301.pdf
[7] https://seaiceland.is/what/fish/redfishes
[8] https://www.fishbase.in/summary/Sebastes-norvegicus

  

The juveniles live in the fjords, bays and inshore waters[9], while the adults are found off the coast at 100 to 400 m, less commonly down to 500 m. At great depths, fishes have a larger size than in shallow waters. Golden redfish feed mostly on euphausiids in summer; herring in autumn and winter; capelin, herring, krill and comb jellies in spring. They tend to be gregarious throughout life.

Males mature at age 8-10 at size 31-34 cm whereas females mature at age 12-15 at size 35-37 cm. Individuals can attain about 100 cm in length and 15 kg in weight, at a considerable age. However, few specimens today live long enough to exceed 50 cm (usually 35-55 cm).

## 4.2. Fishery Location and Method

Golden redfish in the East Greenland/Iceland/Faroe Islands area are considered as one management unit by ICES (see ICES Statistical Areas below).

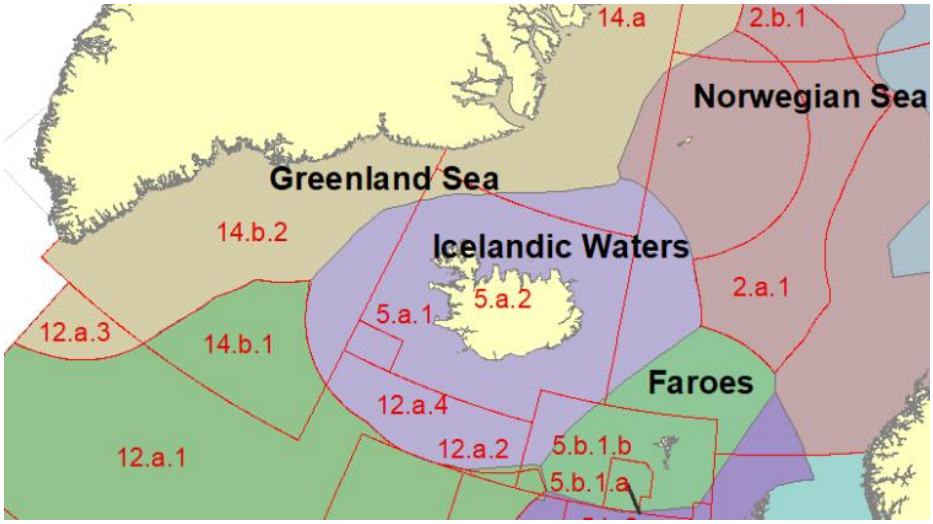


**Figure 2.** ICES Statistical areas 5, 12, and 14.

For the past two decades, 90–98% of the total catches have been taken in Icelandic waters (ICES Area 5a). A substantial increase in landings from East Greenland has occurred since 2010, and is now the highest since early 1990s. Very little redfish is caught in Faroese waters[10].

Between 90—95% of the golden redfish catch in ICES Division 5.a (Iceland) is taken by demersal (bottom) trawlers (Figure 3) targeting redfish (both fresh fish and factory trawlers; vessel length 48—65 m).

[9] http://www.fao.org/fishery/species/3324/en
[10] https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

  

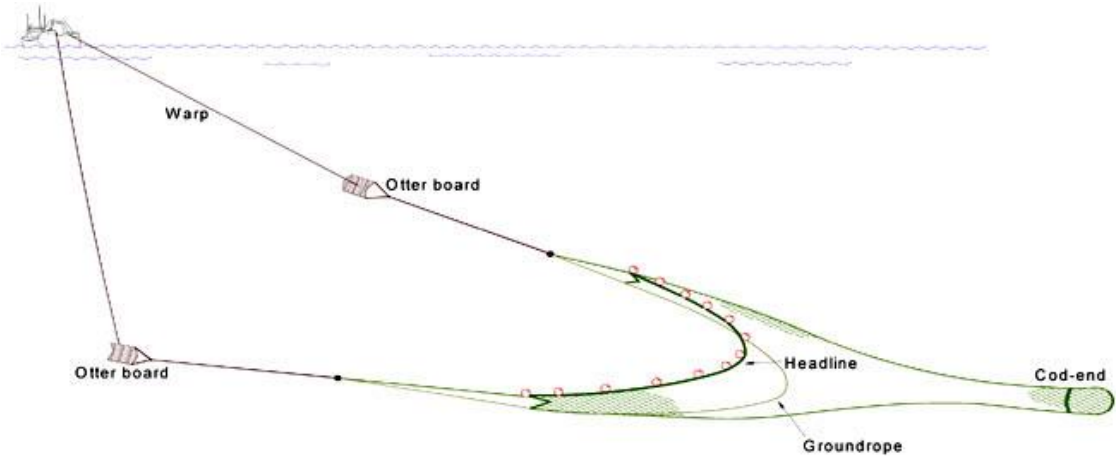


**Figure 3.** Demersal (bottom) trawl gear graphic (source: http://www.fao.org/3/y7135e/y7135e06.htm).

Bottom trawls in Iceland operate with pelagic or semi-pelagic "flying" doors that do not drag on the seafloor. There are several designs and types used in Iceland but common ones are shown in Figure 4. Common use of "T90 bottom trawls" (i.e. a regular net that has been turned 90° and along with lines on the codend ensuring that the mesh stays open during trawling resulting in 30% lesser net and drag) and pelagic doors not dragged on the bottom[11] has resulted in considerable fuel savings, better redfish selectivity[12] and decreased habit impacts.


**Figure 4.** Different trawl doors used for demersal fishing in Iceland (source[13] [14] [15]).

[11] https://www.government.is/topics/business-and-industry/fisheries-in-iceland/fisheries-management/
[12] https://www.icefish.is/news101/better-redfish-selectivity-with-four-panel-codend
[13] http://www.polardoors.com/project-type/bottom-trawl-doors/
[14] http://thyboron-trawldoor.dk/products/semipelagic-trawldoors/
[15] https://www.vonin.com/en/fishing/trawl-doors/semi-pelagic-trawl-doors/storm-semi-pelagic-trawl-door/

  

Bottom trawlers in Iceland are also reported to use rock hoppers to decrease the impacts and drag between the gear and the seabed (pers. comm. HB Grandi, Nov. 2018 site visits) (Figure 5).

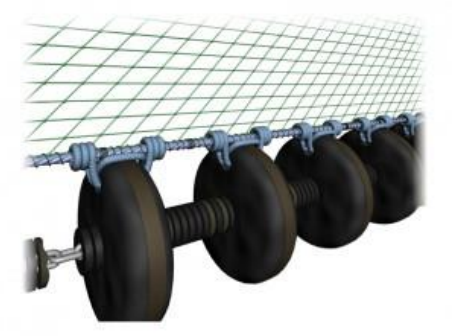

**Figure 5.** Rock hoppers used for bottom trawl fishing in Iceland.

The remaining catches are partly caught as by-catch in gillnet, long-line, and (Norway) lobster fishery. In 2017, as in previous years, most of the catches were taken along the shelf southwest, west and northwest of Iceland (see figure below). A higher proportion of the catches is now taken along the shelf northwest of Iceland and less on the south and southwest.

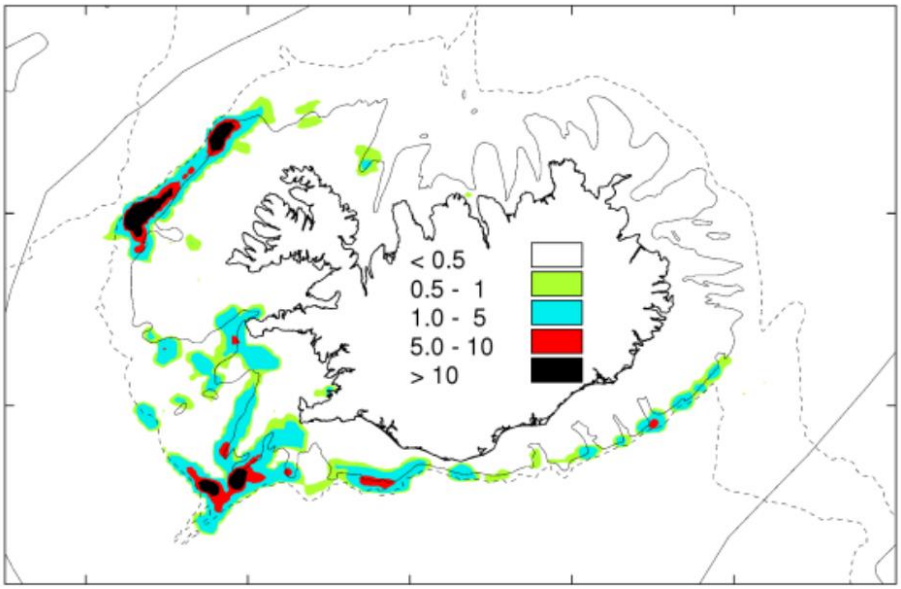


**Figure 6.** Golden redfish. Fishing grounds in Icelandic waters in 2017 (t/nmi$^2$).

  

## 4.3. Fishery Management History and Organization

Fishery resources and their exploitation have shaped the economy and social history of Iceland for centuries. In recent history they have provided valuable export commodities, such as salt cod and shark liver oil in the 19th century and have become the foundation for an economic renaissance and development in Icelandic society. The introduction of motorized vessels, motor-boats and steam-trawlers during the first decade of the 20th century caused rapid expansion and changes in the Icelandic fisheries. The fishing effort was greatly enhanced as were catches. Within a period of two decades Iceland acquired a modern fishing fleet which was technically second to none in northern Europe and could go fishing all the year round. The fishing capacity of the new fleet of motor- and steam-vessels was much greater than that of the earlier fleet of rowing boats and decked sailing vessels. For the first time, Icelanders were able to utilize practically *all* fish stocks of the fishing grounds off their coasts (Ministry of Industries and Innovation, Iceland).[16]

In 1901 Iceland declared a fishing limit of three nautical miles which remained in effect until this was extended to four miles in 1952. As scientific knowledge of the fisheries resources increased it became clear that some of the most important fish stocks, most notably the cod stock, were under severe pressure by a multinational fleet and that strict fisheries management was needed and hence Iceland pursued the objective of achieving a 200-mile Exclusive Economic Zone (EEZ).

Important milestones on that path were the extension of Iceland's economic zone to 12 miles in 1958 and further to 50 miles in 1972. The 200 miles EEZ was fully effective from May 1976. A very important landmark in the campaign for jurisdiction was the national law set in 1948 (No.44/1948) for the scientific conservation of the continental shelf fisheries. The law is very brief. It states that the Icelandic Ministry of Fisheries will issue regulations concerning areas protected against fishing within the Icelandic continental shelf. Also, that these areas will be subject to Icelandic control with the main aim of scientifically based protection of fish stocks. All the extensions of the fishing limits after 1948 were based on this law. The United Nations Convention on the Law of the Sea *inter alia* codified the extension of coastal State national jurisdiction. It entered into force in 1994, one year after being ratified by 60 nations. Much earlier, in 1985, Iceland was the first state to ratify this treaty.

In 1975 foreign fleets were catching about half of the total catches of redfish and saithe, a third of the total cod catch, and a quarter of the total haddock catch. It was considered that no effective fisheries management for groundfish would be possible under those circumstances. When the 200mile EEZ became effective the foreign share of the catches declined rapidly and fishing was strictly controlled by agreements with other nations.

**1976-1983 Restrictions in TAC and effort.** Soon after gaining control over Iceland's EEZ in 1976, serious concerns were raised that the most valuable fish stocks were being overfished, cod being the most important. They advised a cod total allowable catch (TAC) of 230,000 MT for that year but the catch was 350,000 MT. From that point, effort restrictions were introduced. Trawlers were at first allowed to fish for 323 days a year, later only 215 days. The system was clearly very uneconomic. By 1983, the spawning stock of cod was estimated at an all time low,

[16] https://www.government.is/topics/business-and-industry/fisheries-in-iceland/history-of-fisheries/

  

just over 200,000 tonnes and fishing mortality was very high. Catches were circa 100,000 tonnes in excess of recommendations.

**1984 Individual vessel quotas.** A system of individual vessel quotas with some transfer rights was introduced in 1984. By this law, each fishing vessel received a fraction of the TACs in the beginning. The allocation of quota was based on the vessel's catches in the three previous years. TACs and individual vessel quotas were imposed for cod, haddock, saithe, redfish, Greenland halibut, plaice and ocean catfish.

**1985-1990 Effort option.** In 1985 an effort-based option in the demersal fisheries was introduced. More than half of the cod catch, even up to two thirds was effort based at the time and the vessels fishing under that option could periodically re-enter the catch quota system with a new track record. Furthermore, vessels of 10 GRT had free access to the fisheries until 1988 and boats under 6 GRT until 1990. TAC's were still above scientific recommendations in this period and catches were in excess of the TACs.

**1990 The Fisheries Management Act.** In 1990 a comprehensive and uniform Fisheries Management Act was established. By this Act, the Individual Transfer Quota (ITQ) system was established for most of the commercial fisheries. They were all subject to vessel catch quotas and there was no effort option for trawlers and the larger boats. The quotas represent shares in the total allowable catch. They are permanent, perfectly divisible and transferable.

The fishing year for groundfish stocks was set from Sept 1 to Aug 31 in the following year rather than the calendar year. This was an effort to channel fishing away from the summer months, when quality suffers more quickly and regular factory workers are on vacation.

Since 1991, a number of amendments have been made to the fisheries management system. In August 2006 the legislation was re-issued as Law no. 116/2006, thus including all the changes made to the original 1990 legislation.

The present comprehensive fisheries management system is still based on Individual Transferable Quotas (ITQs). The objectives are described in the Fisheries Management Act including; to promote the conservation and efficient utilisation of the marine resources and thus to ensure stable employment and economic viability of fishing communities. Stated aims are to ensure the sustainability of the fisheries while emphasising the economic benefits of the fisheries sector.

In addition to the ITQ system, Icelandic fisheries management includes many other management measures such as area restrictions, fishing gear restrictions, and the use of permanent and temporary closed areas to conserve important vulnerable habitats and juvenile fish stocks. Extensive provisions are made for temporary closures of fishing areas to protect spawning fish from all fishing. These measures are all meant to support and secure the sustainability of the fisheries.

Effective control and enforcement is an inseparable part of responsible fisheries management. The Directorate of Fisheries undertakes monitoring of the Icelandic fisheries to ensure that all rules are being followed. Iceland

  

operates a comprehensive enforcement regime, in particular regarding port control and weighing of all catches. According to Icelandic law, discards are prohibited. All catches must be landed.

Scientific research is essential for successful management as extensive knowledge of the ocean around Iceland and its ecosystem must be the foundation regarding decisions on sustainable fisheries and other utilization of the natural resources of the sea.

**Organisation of Fishery Management in Iceland**

The Icelandic fisheries management system is well organised, with the Ministry of Industries and Innovation, the Directorate of Fisheries, the Marine and Freshwater Research Institute and Icelandic Coast Guard having central functions (Figure 7). There are other government departments linked to the management system for a range of purposes including the Ministry of Justice responsible for judicial proceedings and Statistics Iceland for collation of fishery statistics supplied by the Directorate. Port Authorities play an important role in monitoring and recording fish landings, overland transported fish and exports. They inspect, record and enter data on landing directly into the Directorate's central database through official Port Controllers. The food safety control of fishery products is under the jurisdiction of the Icelandic Food and Veterinary Authority (MAST), and all fish processing vessels and plants must be approved under the Icelandic Hygiene Regulations.

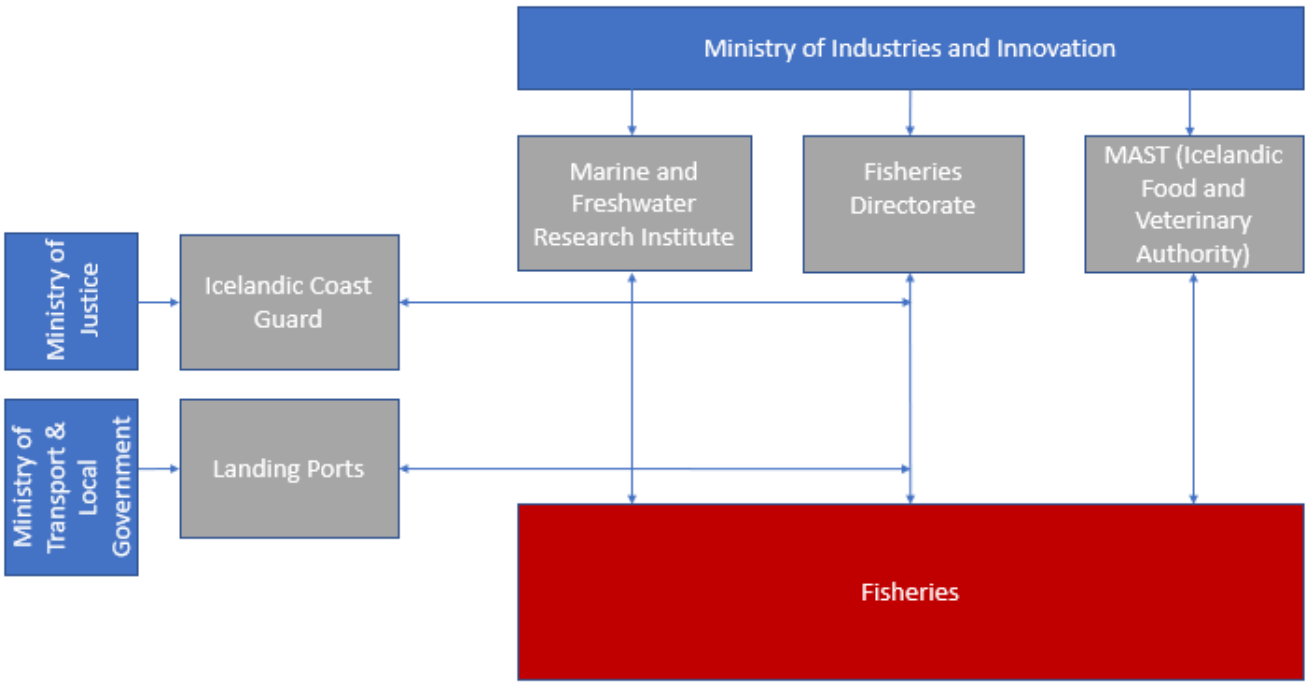


**Figure 7.** Basic Organizational Structure of Icelandic Fishery Management (Source: SAIG, modified from http://www.fiskistofa.is/fiskveidistjorn/).

  

**Ministry of Industries and Innovation**

The Ministry of Industries and Innovation (MII) covers all sectors of ordinary business and economic activity. It was formed on 1 September 2012 following the amalgamation of the Ministry of Industries and Innovation, the Ministry of Industry, Energy and Tourism and part of the Ministry of Economic Affairs. Within the Ministry, the Fisheries and Aquaculture Office is responsible for fisheries and aquaculture, creating an efficient management framework and development of policy. A large part of its work is in international affairs including the conclusion of international fisheries management agreements and participation in the work of international organizations.[17]

**The Directorate of Fisheries (Fiskistofa)**

The Directorate of Fisheries, called Fiskistofa in Icelandic, is an independent agency that belongs to the Ministry of Industries and Innovation. It has 61 staff (2017) located at 6 offices throughout the country with its headquarters in Akureyri. The Directorate of Fisheries is responsible for the implementation of laws and regulations on the management of fisheries in sea and fresh water on behalf of the Ministry. It also manages and controls fish farming, and collects and disseminates information on fisheries, aquaculture, salmon and trout fishing and whaling. The Directorate has three core divisions: Salmon and Trout Fishing, the Fisheries Inspectorate and the Service and Information division, and two support divisions: Information Technology and Human Resources and Finance[18].

The main functions of the Fisheries Inspectorate are as follows[19]:

- Supervise the fishing of Icelandic and foreign vessels in Iceland's jurisdiction and the fishing of Icelandic vessels outside Icelandic waters.
- All catches of Icelandic fishing vessels must be weighed and recorded at the port of landing by a certified official weigher. The Fisheries Inspectorate is responsible for issuing weighing licenses for the weighing or re-weighing of marine catches and issuing production licenses to vessels that process on board.
- Monitor fishing gear and equipment, fishing permits and logbook entries.
- Fisheries inspectors monitor the species and size composition of catches and propose the closure of fishing grounds to protect small fish and prevent harmful fishing.
- Supervise fishing, processing and utilization activities on board processing vessels, and that the products of processing vessels are correctly recorded against catch quotas.
- Monitor export of unprocessed catches in containers and on fishing vessels and surveillance of domestic fish transport.
- Investigate violations and includes a legal department that makes decisions on the application of administrative penalties and / or sending criminal cases to the police.
- Collaborate with the Icelandic Coast Guard, the Marine Research Institute and the Director of Customs, as well as with foreign fisheries authorities and multinational organizations in this field.

All catches of Icelandic fishing vessels must be weighted and recorded at the port of landing by a certified official weigher. This can be done by either Directorate staff at ports or by certified individuals where fish is landed directly

[17] https://www.stjornarradid.is/default.aspx?PageID=c2a9c95f-ec71-11e6-9417-005056bc530c
[18] http://www.fiskistofa.is/umfiskistofu/
[19] http://www.fiskistofa.is/umfiskistofu/starfsemi/veidieftirlitssvid/

  

to the processing sector. The official record of the catch is recorded on a computer system that is directly linked to a centrally located database at the Directorate of Fisheries. Thus, 60 ports in Iceland send electronic data daily to the Directorate. A total of approximately 50,000 landings are registered in the system every year[20]. The data is processed in the Directorate´s database and catches are subtracted from the vessel´s quotas. The system is designed so that the Directorate can act quickly before vessels overfish their quotas. Excess catches can result in a revocation of fishing licenses and fines. Statistics Iceland then receives copies of the data for the production of statistics regarding the economy.

**The Marine and Freshwater Research Institute**

The Marine and Freshwater Research Institute (MFRI) is a government institute under the auspices of the Ministry of Industries and Innovation. The institute employs around 190 staff, operates 2 research vessels and 10 branches around the country, including an aquaculture experimental station. MFRI conducts various marine and freshwater research and provides the Ministry with scientific advice based on its research on marine and freshwater resources and the environment. MFRI is leading in marine and freshwater research in Icelandic territories and the arctic, providing advice on sustainable use and protection of the environment with an ecosystem approach by monitoring marine and freshwater ecosystems. The main research priorities are research on marine and freshwater ecosystems, sustainable exploitation of main stocks, ecosystem approach to fisheries management, research on fishing technology and seafloor/habitat mapping.[21] The MFRI's organisational chart is set out below (Figure 8).

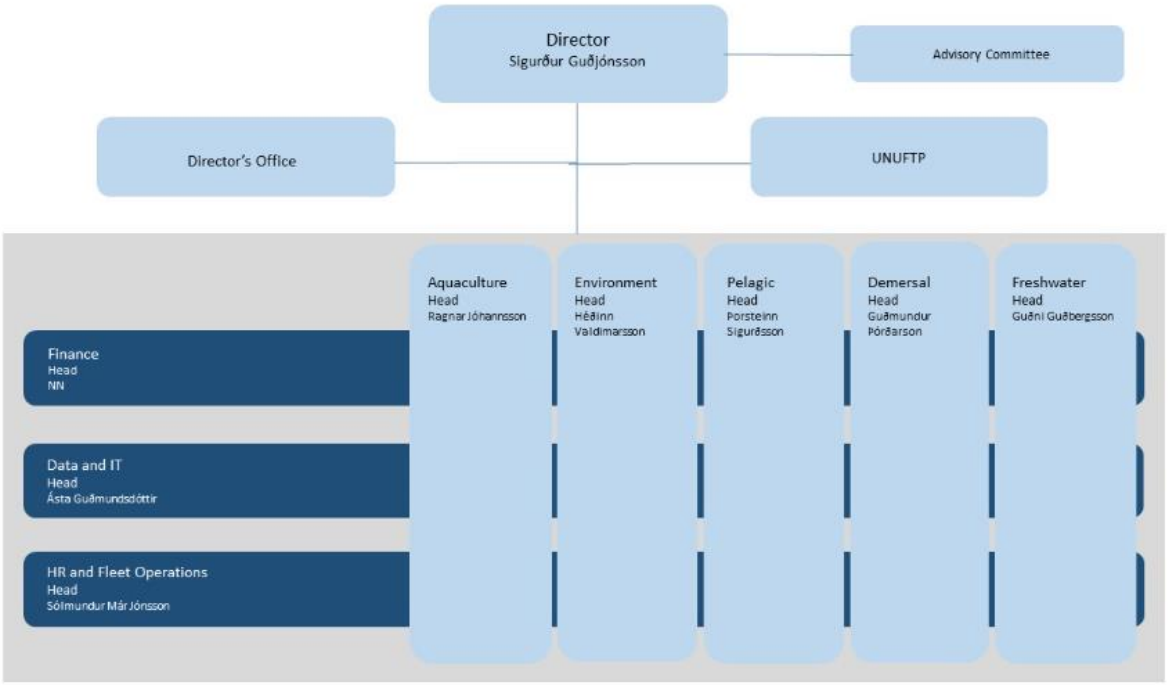


**Figure 8.** MFRI organizational chart (Source: https://www.hafogvatn.is/en/about/mfri).

[20] http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/afli-og-aflaverdmaeti/
[21] https://www.hafogvatn.is/en/about/mfri

  

The MFRI undertakes research on the exploited stocks of fish, crustaceans, molluscs and marine mammals, prepares stock assessments and formal advice on the total allowable catch (TAC) and sustainable fishing strategies for the government. Two ocean-going research vessels are currently operated by the MRI. The MRI is an active participant in the work of the International Council for the Exploration of the Sea (ICES) and its advisory Committee on Fisheries Management. The stock assessment findings of the MFRI are subject to review by ICES before the TAC recommendations are made. The MFRI is also represented in several other organizations, such as the Northeast Atlantic Fisheries Commission (NEAFC), the Northwest Atlantic Fisheries Organization (NAFO), the North Atlantic Marine Mammal Commission (NAMMCO) and the International Whaling Commission (IWC).

**The Icelandic Coast Guard**

A large part of the at sea surveillance falls directly under the responsibility of the Icelandic Coast Guard. The Coast Guard performs sea and air patrols of Iceland's 200-mile exclusive economic zone and 12-mile territorial waters and monitoring of fishing within the zone in consultation with the MFRI and Ministry of Industries and Innovation. In addition to patrolling the Icelandic EEZ, the Coast Guard performs surveillance and inspection duties in international areas, e.g. the NEAFC Regulatory Area which is the area outside the EEZ towards the South-West, South and East of Iceland. The Coast Guard is also responsible for rescue operations in the Icelandic Search and Rescue Region, more than twice the area of the EEZ. The Coast Guard operates the Icelandic Maritime Traffic Service within its operations centre. This centre is a single point of contact for all maritime related notifications, involving, for example, the Maritime Rescue Co-ordination Centre, the Vessel Monitoring Centre and the Fisheries Monitoring Centre. All hydrographic surveys in Icelandic waters are undertaken by them, including the preparation of nautical charts. The Coast Guard operates rescue helicopters, offshore patrol vessels, coastal vessels, and maritime surveillance aircraft. [22]

**Fishing permits**

The primary legislative instrument relating to fisheries management in Iceland is the Fisheries Management Act No.116/2006 which forms the basis for the individual transferrable quota (ITQ) system in Iceland. It supersedes the Fisheries Management Act 1990 and established allocation harvest rights and permit requirements for all participating commercial fishing vessels. These permit requirements represent the initial legal requirement without which a vessel may not obtain the quota necessary to fish for Icelandic quota stocks.

**Allocation of fishing rights**

The Directorate of Fisheries issues annual catch quotas (kgs) to individual vessels as a share in the total allowable catch (TAC) which the Minister of Fisheries sets every year for each species. The annual catch quota is based on the individual vessels quota share (%). All major commercial stocks are now subject to quotas. The TAC of most of the species is issued for each fishing year, the period being from the 1st of September to the 31st of August the following year. Fishing rights can be either general catch quotas, catch quotas for hook and line boats (max 15 GT) or fishing days. The system has been amended to adapt to new changing circumstances and support the allocation

[22] http://www.lhg.is/english

  

of fishing opportunities on an equitable basis. Of course, there are some disputes and concerns of quota consolidation among a fewer larger organizations. However, there are fundamental rules such as no one vessel can have more than 12% share of the cod quota. A logbook and landings weight monitoring system is in place to ensure vessels remain within catch allowance.

**Note on Transfer of Quota**

It is permitted, under given circumstances, to transfer both quota shares and annual catch quotas between vessels. The quota shares can also be fully or partially transferred between vessels. Applications for transfer are submitted to The Directorate which verifies and registers the transfer. There are specific limitations on the size of quota share that can be controlled by one individual, company or legal entity (12%) and related partners. These limitations apply to both quota shares in individual species as well as total quota share. Sharing quota is based on 'cod equivalents'. These are based on weight and use cod, as the most important commercial species, as the common denominator to determine relative value of different fish species on the market. The value of different species in cod equivalents changes and is set by a regulation every year. For vessels with a quota of several species the total quota may be calculated in kg as cod equivalents.

**Flexibility in the ITQ system**

Flexibility is built into the ITQ system, enabling vessel owners and fishermen to make more efficient use of their quota allocation and fishing opportunities available to them:

- Vessels may fish in excess of their quota for individual species and reduce their quota allocation in other species (except cod) subject to certain restrictions (5% of the total value of demersal quota, 1.5% of individual species).
- They may fish in excess of their catch quota to a certain limit (5% for demersal species) and deduct that % from their quota allocation in the following year.
- They may transfer up to 15% of the catch quota allocation from one year to the next.

Vessels may also decide not to include part of the vessels catch in its catch quota. This is limited to no more than 0.5% of the vessel's pelagic catch and 5% of other marine catches per fishing year. The bulk of profit from the sales of this catch (known as 'VS catch') go to a fund for fisheries research and monitoring, with 20% going to cover the operational costs of the vessel. As discarding of commercial species (and also non-viable specimens of protected species) is prohibited, this provision encourages fishers to land all commercial species but actively avoid catching vulnerable fish e.g. undersized fish or protected species.

**Golden Redfish Bilateral Agreement**

A bilateral agreement between Iceland and Greenland on the management of the golden redfish fishery was signed in September 2015 and is based on the 2014 golden redfish management plan[23]. The agreement is for the period 2016–2018, and states that each year 90% of the TAC is allocated to Iceland and 10% to Greenland. Furthermore, 350 tonnes are allocated each year to other areas. The Faroe Islands are not a part of this agreement.

[23] https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

  

## 4.4. Stock Assessment Activities

Golden redfish (*Sebastes norvegicus*) is widespread near the shelf breaks in the North-East Atlantic. ICES recognizes two stock units. Golden redfish on the continental shelves of East Greenland, Iceland and Faroe Islands (ICES Subareas 5 and Division 14.b, see figure below) is considered one stock, the other is in ICES Subareas I and II (Norwegian Sea and Barents Sea). The stock definition of East Greenland, Iceland and Faroe Islands Golden redfish is based on the location of copulation and extrusion areas. The few population genetic studies that have been conducted do not provide definitive results[24].

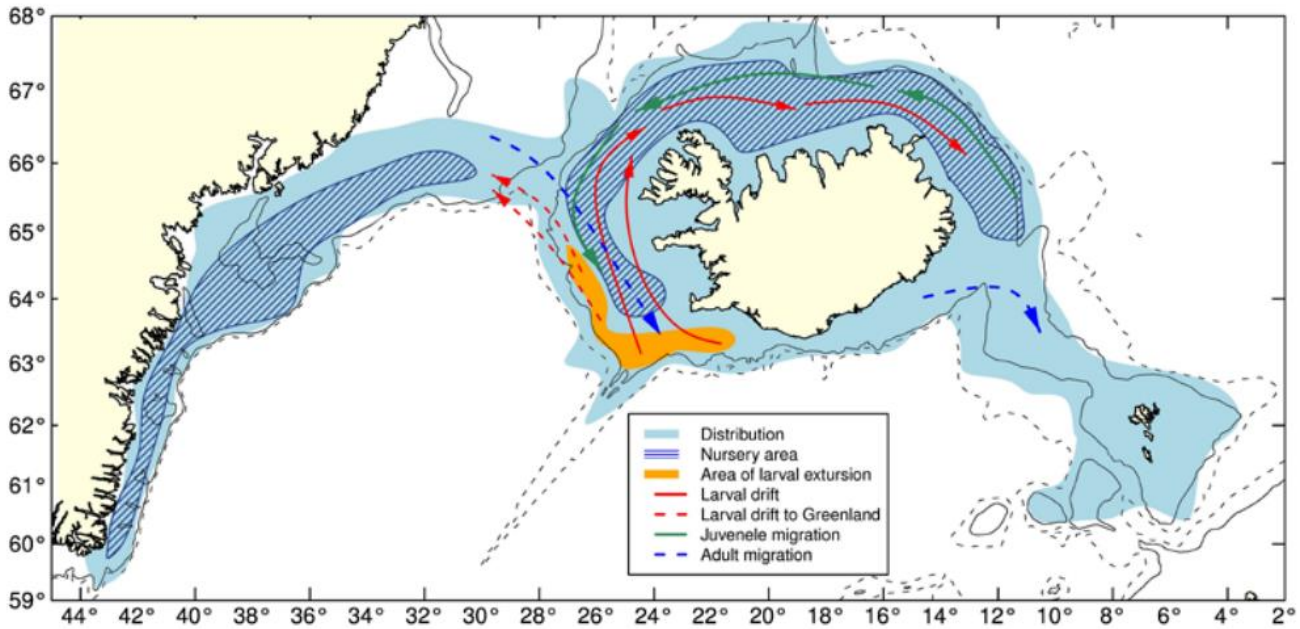


**Figure 9.** Geographical range of golden redfish in East Greenland, Icelandic and Faroese waters, area of larval extrusion, larval drift and possible migrations routes. The solid and dashed lines indicate the 500 m and 1000 m depth contour respectively (source WKRED 2012[25]).

### Stock Assessment

The stock is assessed by the NWWG using the Gadget software. The method was introduced in a benchmark in 2012[26] and accepted for assessment after some modifications in 2014[27] in connection with evaluation of the management plan. The method fits a length and age structured population model to catch and survey data at

[24] ICES stock annex: http://ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2015/smr-5614_SA.pdf

[25] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2012/WKRED%202012/wkred_2012.pdf

26 WKRED 2012, Section 5: Golden Redfish in Subareas V, VI and XIV: http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2012/WKRED%202012/wkred_2012.pdf

27 WKREDMP 2014. Section 4.3 in: http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/WKREDMP/wkredmp_2014.pdf

  

length and age-length keys from surveys and commercial catches. Forerunners of the Gadget software (versions of Bormicon) were used for exploratory assessments of golden redfish in several earlier years.

Landings statistics are available from Iceland, Greenland and the Faroes. Previously, redfish was not separated by species. In Iceland, which takes the major part of the catches, species specific quotas were introduced in 2010/2011 fishing year. Greenland and the Faroes still do not separate by species. When landings are not reported by species, the splitting by species is quite complex, based on whatever information is available. Mostly, information from log-books (on position and time), available samples and survey information is utilized. Historical data by species prior to 2010/2011 are necessarily uncertain, but are probably realistic in gross terms.

Discards are prohibited and regarded as small. They are not included in the assessment. Information on the bycatch and length distribution of the redfish caught in the shrimp fishery indicated bycatch rates of 0.5% in 2006–2007, most of these being redfish < 15 cm. Sorting grids have been mandatory in the shrimp fisheries in ICES Division XIVb since 2002, and in Division Va since 1 September 1995[28].

Length samples are available from Icelandic catches since 1999, and occasionally in earlier years. In Greenland, length samples are only available form occasional years in the past. From the Faroese fleet, there are regular samples since 2001. Age data are only available from the Icelandic fleet since 1999.
Two surveys are used in the assessment, the Icelandic bottom trawl survey in the spring, and a German bottom trawl survey at East Greenland. At present, the data from the two surveys are merged into one common index.

Data used in the Gadget model are[29]:

- Length disaggregated combined survey indices 19–54 cm in 2 cm length increments from the Icelandic groundfish survey in March 1985–2018 and the German survey in East Greenland 1984–2017.
- Length distributions from the Icelandic, Faroe Islands and East Greenland commercial catches since 1970.
- Landings by 6-month period from Iceland, Faroe Islands and East Greenland.
- Age-length keys and mean length at age from the Icelandic groundfish survey in October 1996–2017.
- Age-length keys and mean length at age from the Icelandic commercial catch 1995–2017.

The assessment (in 2018) covers the period from 1970 to 2022 using data until the first half of 2018 for estimation. Two time steps are used each year. The ages used are 5 to 30 years, where the oldest age is treated as a plus group (fish 30 years and older). Natural mortality is fixed at 0.05/year, but 0.1 for the 30+ group.

The model projects the stock forward in time, starting with initial numbers and annual recruitment, and reducing stock numbers by mortality. Parameters that are estimated by fitting the model to the data include:

- Number of fishes when the simulation starts (8 parameters).
- Recruitment at age 5 each year (46 parameters).

28 Section 19.16 in 2015 NWWG report:
http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2015/NWWG/21%20NWWG%20Report%20-%20Sec%2019%20Golden%20redfish%20(Sebastes%20norvegicus)%20in%20Subareas%20V,%20VI%20and%20XIV.pdf

29 NWWG 2018:
http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%2019_Golden%20redfish%20in%20subareas%205,%206%20and%2014.pdf

  

- Length at recruitment (3 parameters).
- Parameters in the growth equation; (2 parameters).
- Parameter β of a beta-binomial distribution controlling the spread of the length distribution.
- Selection pattern of the three commercial fleets (Iceland, Greenland, Faroes) assuming logistic selection (S-shape) (3x2 parameters).
- Selection pattern of the survey fleet assuming an Andersen selection curve (bell-shape) (3 parameters).

The retrospective pattern shows some tendency to overestimate the stock and underestimate the fishing mortality, but is not severe. However, the 2018 assessment (Figure below) shows a downwards revision (about 12%) of the SSB in recent years and upward revision in the distant past, as well as a more pessimistic view of future recruitment. The reason for this does not seem to be the inclusion of one more year's data, but rather a weakness in the parameter estimation procedure, leading to local optima.

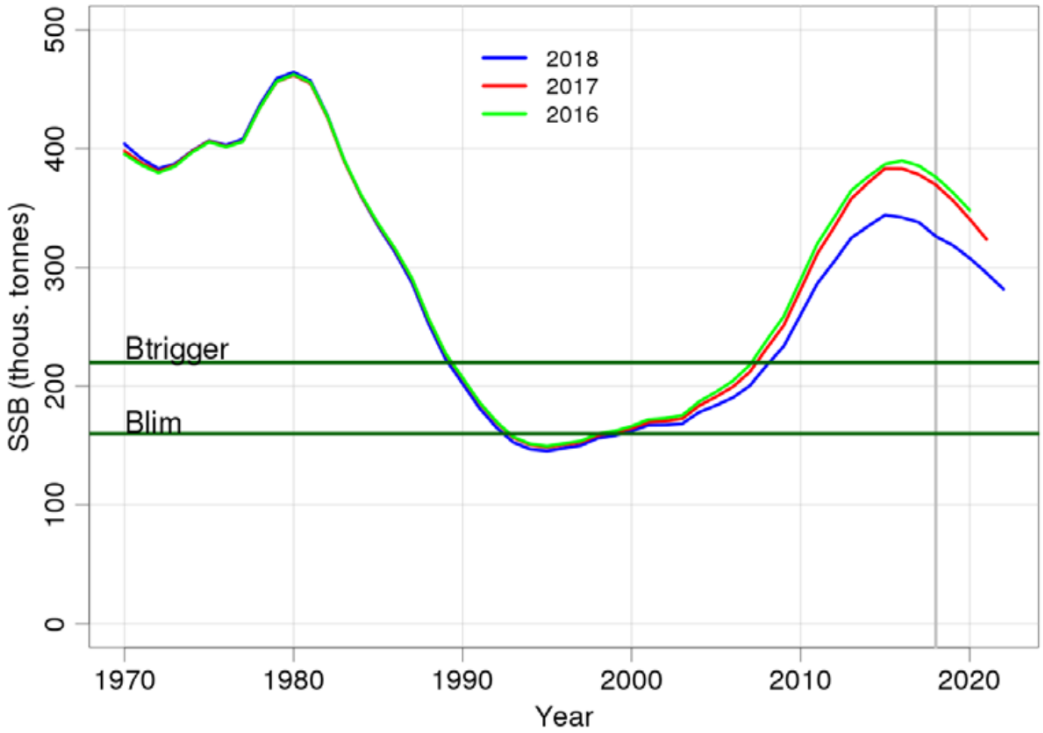


**Figure 10.** Comparison of the current assessment and the same assessment done in 2016 and 2017, including the retrospective pattern (Source 2018 NWWG Report).

Residuals indicate problems with fitting the model to the length distributions in the combined survey, leading to clusters in the residual pattern, in particular for lengths 33-38 cm. Apparently, there is a conflict in the survey data between amounts over and under this interval.

The assessment was approved in 2014 and has been used as the basis for advice since then. It has some clear weaknesses, however. Accordingly, a new benchmark has been proposed for 2020. The proposal lists the known major problems with the present assessment.

- Poor fit to survey indices for fish between 30–40 cm;

  

- Potential dome-shape in selectivity;
- Uncertainty estimates are not available;
- The current growth and maturity model used in the assessment.

## 4.5. Historic Biomass and Removals in the Fishery

Exploitation of golden redfish of the East Greenland/Iceland/Faroe Islands stock started in the mid-1920s in Icelandic waters, and after the Second World War in the two other areas[30] . Before WW2, redfish was mainly caught by foreign vessels operating in Icelandic waters. After WW2 and until 1977, the majority of the catches were taken by foreign vessels, mainly from West-Germany. Since 1977, with the expansion of the EEZ to 200 nautical miles, mainly Icelandic vessels have fished for golden redfish in Icelandic waters. Overall landings from these ICES areas can be viewed in the figure below.

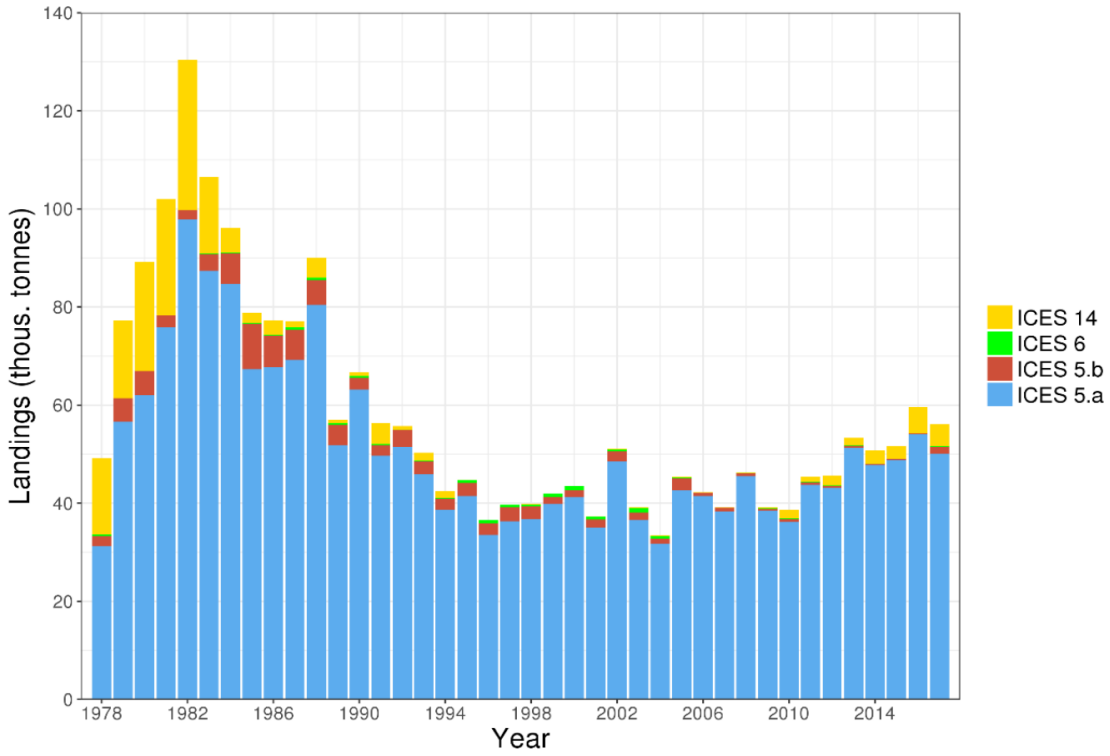


**Figure 11.** Nominal landings of golden redfish in tonnes by ICES Divisions 1978–2017. Landings statistics for 2017 are provisional (Source 2018 NWWG Report).

Landings of golden redfish in Division 5a (Iceland) declined from about 98 000 t in 1982 to 39 000 t in 1994. Since then, landings have varied between 32 000 t and 54 000 t, highest in 2016[31]. The landings in 2017 were 50 119 t, about 4000 t less than in 2016.

30 ICES stock annex: http://ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2015/smr-5614_SA.pdf

31 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%2019_Golden%20redfish%20in%20subareas%205,%206%20and%2014.pdf

  

In Division 5.b (Faroese), landings dropped gradually from 1985 to 1999 from 9000 t to 1500 t and varied between 1500 and 2500 t from 1999—2005. In 2006—2016 annual landings were less than 700 t which has not been observed before in the time series. The landings in 2017 increased substantially compared to recent 11 year and were 1397 t. That is 1232 t more landings than in 2016 and the highest landings since 2005. The majority of the golden redfish caught in Division Vb is taken by pair and single trawlers (vessels larger than 1000 HP).

Annual landings from Subarea 14 (East Greenland) have been more variable than in the other areas. After the landings reached a record high of 31 000 t in 1982, the golden redfish fishery drastically reduced within the next three years (the landings from ICES Subarea 14 were about 2 000 t in 1985). During the period 1985—1994, the annual landings from Subarea 14 varied between 600 and 4,200 t, but from 1995 to 2009 there was little or no direct fishery for golden redfish and landings were 200 t or less mainly taken as by-catch in the shrimp fishery. In 2010, landings of golden redfish increased considerably and were 1650 t, similar to the early 1990s. This increase was mainly due to increased *S. mentella* fishery in the area. Annual landings 2010—2015 have been between 1000 t and 2700 t, but increased to 5442 t in 2016 which is the highest landings since 1983. The landings in 2017 were 4501 t, about 950 less than in 2016.

Annual landings from Subarea 6 (West of Scotland, traditionally included in the ICES assessment) increased from 1978 to 1987 followed by a gradual decrease to 1992. From 1995 to 2004, annual landings have ranged between 400 and 800 t, but decreased to 137 t in 2005[32]. Little or no landings of golden redfish were reported from Subarea 6 in 2006–2017 and were 90 t in 2017.

In the recent period, the stock abundance was lifted in the 1970s, and in 2002-2010 by periods with strong year classes, and by occasional outstanding year classes in 1973, 1990 and 1995. Throughout the 1980s and 1990s, the stock declined. The fishery collapsed in East Greenland waters in the late 80s, and declined in the other areas, but with a delay compared to the biomass. The decline in catches was associated with an increase in fishing mortality.

Apparently, the Golden redfish stock did not tolerate the fishing mortalities around 0.2 in the 1980s and 1990s, and the catches declined accordingly (Figure below). Towards the end of that period, the biomass stabilized thanks to two strong year classes and a gradual reduction of fishing mortality. The biomass then improved again due to a combination of better recruitment and reduced fishing mortality.

32 ICES advice 2018: http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf

  

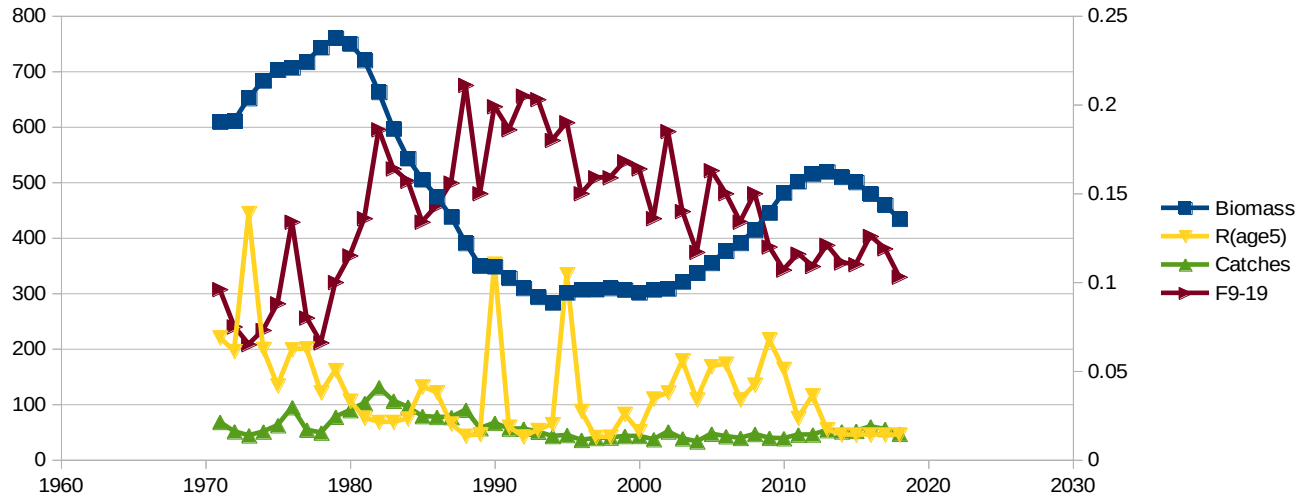


**Figure 12.** Development of biomass, recruitment, catches and fishing mortality since 1970. Source: Table 19.4.1 in 2018 NWWG report[33].

**TAC overages**

Since the introduction and implementation of the Golden Redfish Fishery Management Plan (FMP) and Harvest Control Rule therein in 2015, Icelandic catches have exceeded the overall TAC by an average of 6.6% (2.7 to 11.5%, figure below) due to legal catch transfer flexibility measures (i.e. between species and years) and to facilitate adherence to the discard ban.

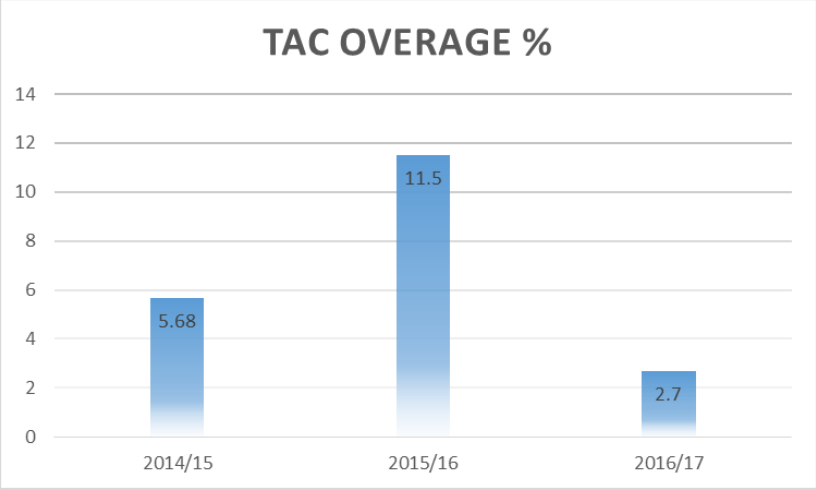


**Figure 13.** Total Icelandic landings of golden redfish % over TACs (2014/15-2016/17). [170]

33 NWWG 2018: http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%2019_Golden%20redfish%20in%20subareas%205,%206%20and%2014.pdf

  

**Factors influencing TAC overshoot**

There are a number of legal reasons that impact the yearly TACs.

- Transfer of quotas (Law 116/2006, §11),
    - Transfer of quotas between years, is legal within bounds. Vessels may transfer up to 15%[34] of catch quotas for each demersal species from one year to the next.
    - Transfer of quotas between most species is legal within bounds. It may happen that vessels spend part of the golden redfish quota on other species or uses quotas for other species to cover catches of golden redfish.
- Undersized fish catches shall still be landed and sold (up to 5% of catches per fishing year), but the vessel gets only 20% of the price. The reminder goes to the Fisheries Commission Project Fund or 'VS Fund'[35].
- Some of the overall TAC overages are due to catches of golden redfish outside Iceland. In the Faroes (not covered by the TAC sharing agreement between Iceland and Greenland, but Iceland unilaterally subtracts 350 tonnes from the TAC to compensate for such catches.), the main regulatory tool is effort-quotas but there is no explicit quota for golden redfish, hence any catch there contributes to the overall TAC overage. The Faroese catch spiked in 2017 to 1397 tonnes out of a total of 56101 tonnes (i.e. 2.5% of total), while it was averaging 700 tonnes (about 1.4% in the previous 10 years).

During the full assessment, the Fisheries Direcorate, communicated to the Audit Team that the main reason for recently overshooting the redfish TAC is that there are considerable golden redfish bycatches in the targeted fisheries for cod/haddock in areas closer to the coast (as opposed to deep sea fisheries). Typically these are the small to medium sized vessels in the fleet with limited quota in golden redfish. As a result, they utilize the allowances for transfers between species to accommodate the accidental redfish catches in their quota portfolio.

This is a relatively large part of the fishing fleet so small catches handled in this way eventually add up. Fiskistofa also highlighted that an attempt to incorporate these catches into the TAC (e.g. by increasing the catch quota) would mainly increase the catch quotas of the vessels that have high quota shares and are targeting golden redfish but would not help the vessels that are using the transferability option.

On the other hand, stronger restrictions on transfer between species for the golden redfish may only increase the temptation for discarding – which at the moment is considered negligible[36]. Therefore, the flexibility measures within the Icelandic fishery management system impact the overall catches.

34
Act No. 116/2006 as amended by Act No. 22/2010
35
http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Sveigjanleiki_i_aflamarkskerfinu
36
https://www.hafogvatn.is/static/extras/images/05-ICES_NWWG_loka731445.pdf

  

**Implication of current fishing mortality**

Fishing mortality was reduced some years prior to introducing the current harvest rule from the previous level to close to the target value of 0.097, and has remained there. The latest (2018) golden redfish assessment[37] shows a downwards revision of the stock biomass (about 12%) and an upward revision of all fishing mortalities since 2005 (see Figure below). The reason for this revision was technical - the previous assessments had not fully converged to an optimum solution. Robustness tests performed indicated that the 2018 assessment has fully converged and the problem was fixed. Prior to this error being spotted, the fishing mortality estimate was floating since 2010 at or slightly above the target fishing mortality reference point (0.098 and 0.099 in most years). According to the most recent assessment in 2018, F has been above FMSY but below Fpa in the past 10 years.

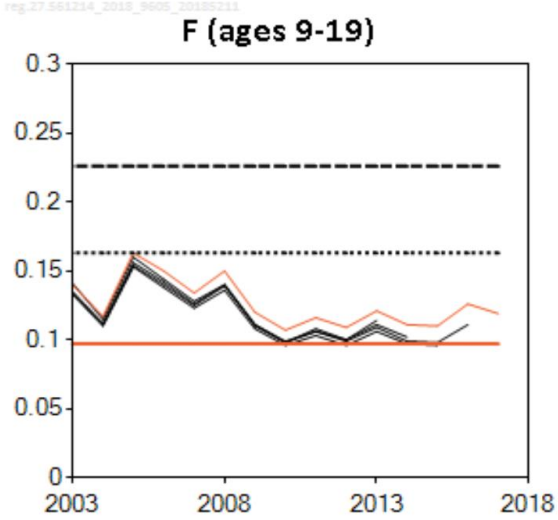


**Figure 14.** Golden redfish fishing mortality in red as calculated in 2018, and recent retrospective error (in black). The solid red line at the bottom represents the target fishing mortality (FMSY) in the management plan, the line above it is the Fpa reference point. Source: 2018 ICES Advice for Icelandic golden redfish[38].

The F value of 0.097 (straight red line in the figure above) is the target fishing mortality in the management plan. This value was the one evaluated by the NWWG because it was the one proposed by managers and it performed satisfactorily. TACs are derived by applying that F value to the assessed stock abundance. In some previous assessment with a slightly different method, F=0.097 was the estimate of FMSY. With the present method, where *inter alia* the growth is modeled differently, FMSY = Fmax = 0.114. However, when the management plan was presented for evaluation by the Iceland government, the target F = 0.097 was proposed since that was the estimate of FMSY at the time. The target F is now on the conservative side of the actual FMSY. ICES still refers to the target value as FMSY. The simulations done when the harvest control rule was evaluated indicated a low risk even to the trigger biomass, when quite large uncertainties were taken into account, for example an assessment error of 20-25% with high autocorrelation, among others. This shows that the rule should be robust to far greater uncertainties than the present difference between target F and the point estimate of F.

37 https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

38 http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf

  

Nonetheless, the NWWG has recognised several elements that make the assessment uncertain, which have been listed for consideration in the upcoming golden redfish benchmark process in 2020.

Furthermore, having recognised a potential issue here (ie. consistent TAC overshoot / implementation bias), the Assessment Team has recorded two (related) Recommendations for the client group to more explicitely address this issue, through modelling efforts, in the upcoming 2020 benchmark.

  

## 4.6. Economic Value of the Fishery

Expansion and development of the fisheries was the driving force behind Iceland's economic transformation during the 20th century[39]. Fisheries remains one of the pillars of the Icelandic economy, responsible for a fair share of both the GDP and the nation's export revenue. Iceland is one of the world's leaders in fisheries, but has in recent years also become a leading country in the advancement of marine technology, fishing equipment, navigational techniques and fish detection instruments, as well as maintaining a sophisticated seafood sector, exporting world-class produce[40].

The economic value of the golden redfish fishery has increased steadily between 1982 and 2017, more specifically with a peak in the early 1990s and another one around 2011. The value of the golden redfish fishery catches in 2017 was valued at ISK 8.8 billion (over USD 73 Million) by statistics Iceland[41].

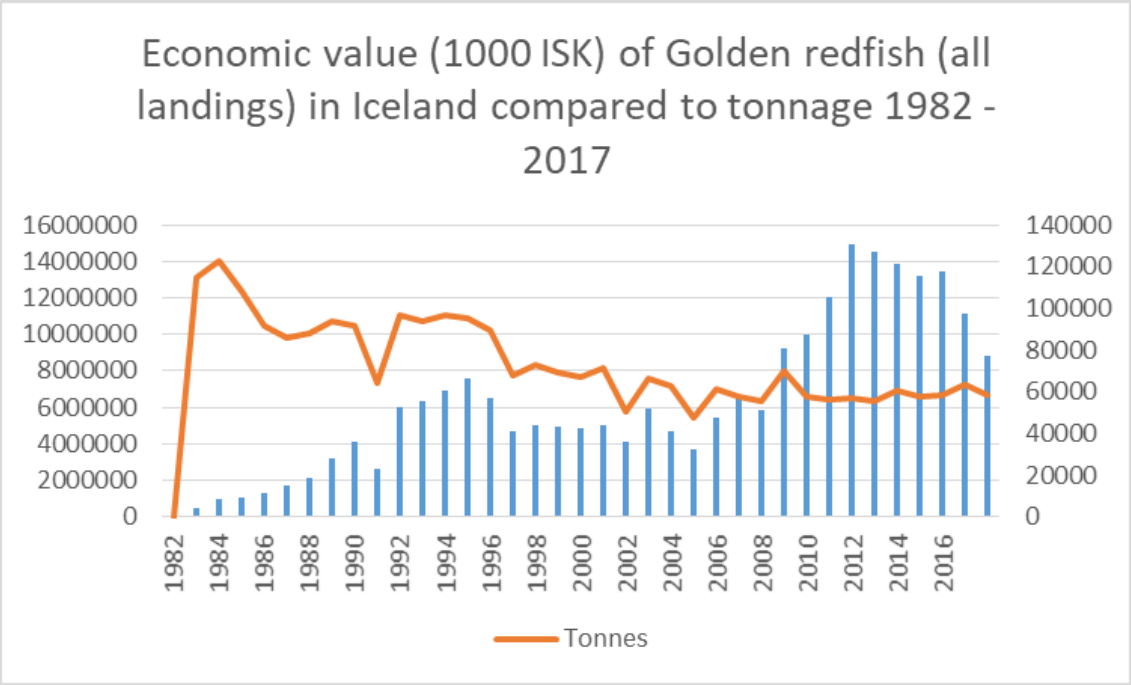


**Figure 15.** Golden redfish fishery commercial value (blue) in ISK (1000) for all Icelandic catches (orange) from 1982 to 2017.

39 https://www.researchgate.net/publication/42764430_The_Role_of_the_Fishing_Industry_in_the_Icelandic_Economy_A_Historical_Examination

40 https://www.iceland.is/trade-invest/fisheries

41 https://www.statice.is/statistics/business-sectors/fisheries/

  

# 5. Proposed Unit(s) of Assessment and Certification

The applicant Units of Assessment (UoA)(s) (i.e., what is to be assessed) are described by the following:

**Table 2.** Unit(s) of Assessment (UoA(s)).

| **Units of Assessment (UoAs)** | | | |
|---|---|---|---|
| **Common across all UoAs** | | **UoA** | |
| **Species:** | **Common name:** | **All** | Golden redfish (Gullkarfi) |
| | **Latin name:** | **All** | *Sebastes norvegicus* |
| **Geographical Area(s)** | | **All** | Iceland 200 mile EEZ within FAO Fishing Area 27 |
| **Stock(s)** | | **All** | Golden redfish in ICES Divisions 5 and 14 |
| **Principal Management Authority:** | | **All** | Ministry of Industries and Innovation (Iceland) |
| **Unique to each UoA** | | **UoA** | |
| **Fishing gears:** | | **1** | Demersal trawl (principal gear) |
| | | **2** | Nephrops trawl |
| | | **3** | Longline |
| | | **4** | Gears from other Icelandic fisheries legally landing golden redfish (i.e. Gillnet, Danish seine net, hook and line by small vessels, shrimp trawl, pelagic trawl, purse seine)* |

***comprised of gears contributing less than 1% to total landings of target species.**

The applicant Unit of Certification (UoC) (i.e., what is to be covered by the certificate if all Units of Assessment listed above meet the required standard) is described by the following:

**Table 3.** Unit of Certification.

| **Unit of Certification (UoC)** | | | | |
|---|---|---|---|---|
| **Species:** | **Common name:** | Golden redfish (Gullkarfi) | **Stock:** | Golden redfish in ICES Division 5 and 14 |
| | ***Latin name:*** | *Sebastes norvegicus* | | |
| **Geographical Area(s):** | | Iceland 200 mile EEZ within FAO Fishing Area 27 | | |
| **Principal Management Authority:** | | Ministry of Industries and Innovation (Iceland) | | |
| **Fishing gear(s):** | | Demersal trawl (principal gear)<br>Nephrops trawl<br>Long-line<br>Gears from other Icelandic fisheries legally landing golden redfish (i.e. Gillnet, Danish seine net, hook and line by small vessels, shrimp trawl, pelagic trawl, purse seine)* | | |

***comprised of gears contributing less than 1% to total landings of target species.**

  

# 6. Consultation Meetings

## 6.1. On-Site Assessment and Consultation Meetings

**Table 4.** Summary of Meetings, Golden redfish commercial fishery. Fishery site visits, 27th - 29th November 2018.

| Date | Organization, location and representative | Main Topics of Discussion |
|---|---|---|
| Tuesday 27th of November 2018 | 09.00 The Client (opening meeting)<br>Kristján Þórarinsson, Fisheries Iceland<br>Örn Pálsson/Axel Helgason NASBO<br><br>SAIG Assessment Team:<br>Vito Romito<br>Conor Donnelly<br>Dankert Skagen<br>Gisli Svan Einarsson | • Introduction and audit plan/objectives<br>• Confirm Units of Certification for cod, haddock, saithe and golden redfish including gear used (any changes from previous year?)<br>• Changes in fisheries management<br>• Status of stock under assessment<br>• Current issues<br>• Coastal fisheries and rest of the fleet<br>• Ministry bycatch working group |
| Tuesday 27th of November 2018 | 10.00 Marine and Freshwater Research Institute (MFRI)<br><br>Guðjón Már Sigurðsson;<br><br>Steinunn Hilma Ólafsdóttir;<br><br>Bjarki Þór Elvarsson<br><br>SAIG Assessment Team:<br>Vito Romito<br>Conor Donnelly<br>Dankert Skagen<br>Gisli Svan Einarsson | • Changes in data sources, data preparation and assessment method for any of the stocks - now or since last benchmark.<br>• Plans for revisiting/updating Fishery Management Plans or benchmark assessments.<br>• New information on the genetic structure of cod, haddock, saithe and redfish in Icelandic waters.<br>• Landings and catch weights for un-gutted vs. gutted.<br>• Discards rates for cod, haddock, saithe and redfish<br>• Changes in distribution and migration<br>• New studies on fishing gear selectivity<br>• Area closures<br>• *Redfish* Assessment retro problem<br>• Length based indices from the spring survey<br>• Splitting by species<br>• Faroes in international agreements<br>• 90-10 split between Iceland and Greenland<br>• *Cod* current management plan, stock increases and cod in the catches is getting very large.<br>• Pressure to change the rule to allow different cod exploitation<br>• *Haddock* general issues, recruitment pattern<br>• *Saithe* retro-pattern,<br>• Catches below quotas<br>• implications for transfer between species<br>• Management-industry stakeholder consultation arrangements<br>• Short term closures (e.g. 2 week closures) implemented in Icelandic waters to protect juveniles of cod, haddock, saithe and redfish, |

  

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| | | • Skippers logbooks accounting by MFRI<br>• New studies/reports on bycatch related to the fisheries catching cod, haddock, saithe and redfish<br>• Spotted wolffish in Icelandic waters is caught as bycatch in the bottom trawl and longline fisheries<br>• Interactions between the fisheries under assessment and the following: basking sharks and leafscale gulper sharks<br>• Total catch in numbers of Grey skate (*Dipturus flossada*) for the latest available MFRI survey<br>• Catches of Atlantic halibut<br>• Status of Greenland shark and spiny dogfish<br>• Interactions with Blue whales and Northern right whales<br>• New studies or report on Endangered, Threatened and Protected species interactions<br>• Long-liners bycatch reduction devices<br>• Marine mammal and seabird bycatch in the lumpsucker fishery<br>• Bycatch rate in inspector trips was around four times higher than reported by the fleet in 2017<br>• Bycatch reported in other fisheries (e.g. longliners, gillnetters, bottom trawlers)<br>• Harbour porpoise updates, status and management,<br>• Management objectives set for grey seals<br>• Bycatch recording smartphone app in development by the Directorate of Fisheries<br>• Mortality/survival rate of released marine birds and marine mammals<br>• 2018 towed bottom-fishing gears effort<br>• Bycatch of sponges<br>• Collection of information on non target, non commercial species (e.g. starfish, jellyfish, crabs, tunicates, bivalves, etc..) during the yearly MFRI surveys<br>• Hydrothermal vent chimney areas in Eyjafjord and Southeast Coral closures<br>• Mapping the distribution of benthic assemblages and habitats which are considered to be sensitive to trawling disturbances<br>• Multi-species stock assessment/ecosystem based management. Applicability |
| Tuesday 27th of November 2018 | 13.00 Fisheries Directorate<br>Þorsteinn Hilmarsson,<br>Head of Services and information<br>Sævar Guðmundsson<br>Department Manager<br><br>SAIG Assessment Team:<br>Vito Romito<br>Conor Donnelly<br>Dankert Skagen | • Differences on organization, responsibilities, legislation<br>• Changes in technical measures and effort controls<br>• Catch versus TAC for 2017/2018 season. TAC allocation for 2018/2019 season. Deviation from TAC<br>• Current arrangements in terms of quota flexibility<br>• Analysis carried out with the aim of detecting deviations that may occur between actual total catch and TAC<br>• Average inspector coverage % on trawlers, longliners and gillnetters<br>• Shore based monitoring by Directorate's staff<br>• New gear restrictions/technical measures applicable |

  

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| | Gisli Svan Einarsson | • Short term closures (e.g. 2 week closures) implemented in Icelandic waters to protect juveniles of cod, haddock, saithe and redfish<br>• Closure of coastal areas to bottom trawls<br>• Role of inspectors on board of Icelandic fishing vessels<br>• Changes to the legal and administrative system to improve recording of non-commercial by-catch<br>• Compliance of fishermen recording of such interactions changed in recent years<br>• Use of gear modification to prevent encounters with seabirds<br>• Enforcement of, and levels of compliance with, logbook reporting of interactions/bycatch between seabirds and marine mammal<br>• Smartphone app in development by the Directorate of Fisheries, to improve reporting and identification of bycatch<br>• Rules and regulations around marking of static gear and avoid potential gear loss/ghost fishing<br>• Additional considerations or plans for additional coral *Lophelia pertusa* closures in Icelandic waters. |
| Tuesday 27th of November 2018 | 15.00 Fish Auction<br>Örn Smárason<br>Branch Manager | • How catches are reported electronically and sold through the Auction system<br>• System in place to track purchase and sale of fish<br>• Selling the juvenile portion of catches<br>• Treatment of species under species ban in relation to discard ban.<br>• Marketable species, changed in recent years |
| Wednesday 28th of November 2018 | 10.00 Coastguard<br>Ásgrímur L. Ásgrímsson<br>Chief of Operations<br>Björgólfur H. Ingason<br>Chief controller<br>Icelandic Coast Guard<br><br>SAIG Assessment Team:<br>Vito Romito<br>Conor Donnelly<br>Dankert Skagen<br>Gisli Svan Einarsson | • Enforcement Laws and Regulations. Have there been important amendments or changes to the Icelandic enforcement laws?<br>• Type of vessels boarded (Gears: Trawl, longline, gillnet etc. and Vessel type: wetfish, freezer trawler, small boat etc.). Foreign vessels boarded.<br>• Boardings rate and type/ number of violations recorded<br>• Most commonly occurring violations<br>• Airborne fisheries patrol hours conducted over the last fishing season<br>• Level of resources and monitoring effort<br>• Prosecutions and reprimands made against skippers<br>• Violations of fishermen fishing over their TAC<br>• Changes in violation/compliance rate<br>• What is checked when the vessels are boarded (gear, catch composition)<br>• Changes to the range of monetary and operational penalties for serious infractions to fisheries regulations<br>• Any instances of IUU fishing by Icelandic or foreign vessels<br>• Enforcement of, and levels of compliance with, logbook reporting of interactions/bycatch between seabirds and |

  

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| | | marine mammal. Any prosecutions for failing to report? Any changes from previous years? |
| Wednesday 28th of November 2018 | 13.00 HB Grandi hf<br>Torfi Þorsteinsson<br>General Manager - Groundfish<br>Ægir Páll Friðbertsson COO<br>Guðmundur Kristjánsson CEO<br>Friðrik Friðriksson<br><br>SAIG Assessment Team:<br>Vito Romito<br>Conor Donnelly<br>Dankert Skagen<br>Gisli Svan Einarsson | • Updates on HB Grandi's efforts towards fisheries and environmental sustainability<br>• Percentage of catches do HB Grandi's trawlers take on average as a proportion of total catches for the species under assessment<br>• The FMRI 2017 Advice on harbour seals mentions that 86 harbour seals were estimated to have been caught in bottom trawls in 2015. Relevance to HB Grandi's fleet<br>• Technical or management measures are there in place to minimise bycatch and interactions between trawl vessels and marine mammals and seabirds<br>• Measures are there in place to improve fishing selectivity of target species and to exclude/minimise non target catches<br>• Measures are in use by trawl vessels to minimize the impacts of bottom trawl gear on the seabed and sensitive habitats |
| Wednesday 28th of November 2018 | 14.30 Kristján Þórarinsson<br>Fisheries Iceland<br>Finnur Garðarsson<br>Iceland Responsible Fisheries Foundation (IRFF)<br><br>SAIG Assessment Team:<br>Vito Romito<br>Conor Donnelly<br>Dankert Skagen<br>Gisli Svan Einarsson | • Brief review of the 2017/2018 cod, haddock, saithe and golden redfish fishing seasons. Key issues or updates etc.<br>• Any recent changes in the management system, key laws or regulations<br>• Any key changes to management of small boat coastal fisheries or allocations<br>• Plans for revisiting/updating Fishery Management Plans<br>• Updates on the Iceland Responsible Fisheries Programme.<br>• Fisheries interactions with marine mammals and seabirds recording and management efforts. Recent improvements, issues and updates<br>• Initiatives to improve the fishing industry in Iceland and promote the utilisation of a greater proportion of catches<br>• Interactions between small vessels and larges vessels. Recent improvements, issues and updates |
| Thursday 29th of November 2018 | 10.00 BirdLife International<br>Erpur Snær Hanssen<br><br>SAIG Assessment Team:<br>Vito Romito<br>Conor Donnelly<br>Dankert Skagen<br>Gisli Svan Einarsson | • Birdlife International work/projects in Iceland<br>• Icelandic fisheries (especially longliners and gillnetters) interactions with seabirds<br>• Long-liners in Iceland reportedly use protective devices to shield baited hooks as gears are shot in order to prevent encounters with seabirds. Use of such practices (e.g. tori lines, night settings, acoustic devices) or equivalent practices within the industry<br>• Other measures in place to improve fishing selectivity of target species and to exclude/minimise non target catches and interactions<br>• Interaction between the fisheries under assessment and ETP seabird species<br>• New projects, studies or other relevant updates |

  

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| Thursday 29th of November 2018 | 11.00 Vísir hf.<br>Erla Pétursdóttir<br><br>SAIG Assessment Team:<br>Vito Romito<br>Conor Donnelly<br>Dankert Skagen<br>Gisli Svan Einarsson | • Updates on Visir HF efforts toward fisheries and environmental sustainability<br>• Percentage of catches Visir HF longliners take on average as a proportion of total catches for the species under assessment<br>• Long-liners are reported to use protective devices to shield baited hooks as gears are shot in order to prevent encounters with seabirds. Are there specific regulations for the use of use mitigation measures on longline fisheries (e.g. tori lines, night settings, acoustic devices) or equivalent practices?<br>• What other management measures (e.g. communication, move away from hotspot type rules) are there in place to minimise interactions between longliners and marine mammals and seabirds<br>• What measures are there in place to improve fishing selectivity of target species and to exclude/minimise non target catches<br>• To what extent are such bycatch reduction devices / practices used in the fisheries under assessment by industry |
| Thursday 29th of November 2018 | 13.00 The Client (closing meeting)<br>Kristján Þórarinsson, Fisheries Iceland<br>Örn Pálsson/Axel Helgason NASBO<br><br>SAIG Assessment Team:<br>Vito Romito<br>Conor Donnelly<br>Dankert Skagen<br>Gisli Svan Einarsson | • Summary of people met<br>• Key findings from various stakeholders<br>• Issues about marine mammals and seabird bycatch recording in logbooks<br>• Assessment timelines for redfish, cod, haddock and saithe |

# 7. Assessment Outcome Summary

## 7.1. Fishery Management

**Clause 1.1. Fisheries Management System and Plan for Stock Assessment, Research, Advice and Harvest Controls**

Iceland has a structured management system that covers all commercial species. There is a principal Act *(*Lög um stjórn fiskveiða, nr. 116; 10. August 2006) and a number of supporting Acts and Regulations for the management of the fishery. The Ministry of Industries and Innovation is the principal management body responsible for Icelandic fisheries. The Directorate of Fisheries is responsible for the implementation of Fishery Regulations on behalf of the Ministry. The Icelandic Coast Guard performs sea and air patrols of Iceland's 200-mile exclusive economic zone and 12-mile territorial waters, and monitoring of fishing within the zone in consultation with the Marine and Freshwater Research Institute and Directorate of Fisheries. The Marine and Freshwater Research Institute conducts a wide range of marine research and provides the Ministry with scientific advice.

The general management strategy for Icelandic commercial fish stocks is to maintain the exploitation rate at the level which is consistent with the Precautionary Approach and that generates maximum sustainable yield (MSY) in the long term. The key element in the management is output control through a total allowable catch (TAC) that is distributed on the participating vessels by an ITQ system. There is a suite of monitoring and control measures in place to keep catches in conformity with allowed amounts, including control at sea by the Coast Guard, obligation to land in designated ports where the catch is weighed by authorized weighers, temporal and permanent area closures, technical regulations and an obligation to land undersized fish for a reduced price.

Legal gears do not include dynamiting, poisoning and other comparable destructive fishing practices.

Interested parties participate in decisions processes through regular meetings between industry and management. Digital tools for publication allow almost real-time publishing of results and decisions, including results of stock assessments, MFRI advice and catches and quota status even for individual vessels. Conflicts between vessels may be prevented by the Icelandic Maritime Traffic Service which is a single point of contact for all maritime related notifications. The Ministry can close areas for certain gears if necessary.

The management of golden redfish is part of the general fisheries management in Iceland, and rules and regulations that apply in general apply to golden redfish as well. Some elements are specific to golden redfish, in particular the harvest rule. Taken together, this set of rules and regulations can be regarded as a fisheries management plan. The elements are in place, documented and publicly available. The quota regulations are supplemented by area closures, mesh size regulations, sorting grids in selected fisheries, discard ban and surveillance at sea and at landing sites.

**Clause 1.2 Research and assessment**

The Marine and Freshwater Research Institute (MFRI) is the main research institute in marine science in Iceland.

Data collection for assessment purposes, both from the fishery and surveys, is performed by the MFRI, in cooperation with the Fisheries directorate. MFRI issues advice on individual stocks on the web.

The golden redfish stock is assessed using the Gadget tool, which is a population model fitted to catch and survey data. Landings data from all nations and catch data at length from Iceland is used. The assessment method was first proposed in 2012, and accepted by ICES in 2014 after some modifications. A revision is planned in 2020.

Discards is prohibited, and discards for golden redfish is believed to be negligible, partly due to area closures and use of sorting grids in the shrimp fishery. Unobserved and incidental mortality is covered by the assumed natural mortality. The value for that is just assumed at a level that is regarded as sensible for long-lived fish. The strict control with landings and detailed monitoring of fishing operations by the Coast Guard should make black landings very unlikely.

There is close communication between scientists and the fishing industry, both in formal meetings and through informal contact. There are specific consultation groups between fishermen and the MRFI that meet annually in December allowing fishermen (captains) to describe the fishing experience of the year and make comparisons with those previously. Log-books information is not used directly in the stock assessment, but is important background material for both managers and scientists.

**Clause 1.3. Stock under Consideration, Harvesting Policy and the Precautionary Approach**

The precautionary approach is implemented through a harvest rule that implies low risk of stock depletion. ICES has defined a limit SSB (Blim) at 160000 tonnes, which is considered to be sufficient for normal recruitment. Reaching that limit is unlikely with the present harvest rule. The harvest rule was tested by simulation, taking the relevant sources of uncertainty into account. The harvest rule was found to be in accordance with the precautionary approach, according to the rules practiced by ICES. These rules imply a low probability of bringing the stock below Blim.

ICES has defined biomass and fishing mortality reference points for golden redfish that have been adopted by MFRI. An additional protective measure is to apply a reduced F if SSB is below a trigger level of 220 kt. Further measures if SSB gets too low would depend on the reason why the SSB became reduced. The Icelandic management has the authority to take the necessary action.

The general long term harvesting policy is stated by the government of Iceland as: The management strategy for Icelandic fish stocks, in general, is to maintain the exploitation rate at the level which is consistent with the Precautionary Approach and that generates maximum sustainable yield (MSY) in the long term. This statement also appears as the objective of the management plan specific for golden redfish. The harvest rule was designed to provide a near maximum long term yield and a stock abundance safely away from the limit. The target fishing mortality is set on the low side of the plateau associated with maximum yield, which provides a buffer biomass against natural variations in productivity.

The management target for the fishing mortality is at 0.097 which shall be reduced linearly towards the origin if SSB in the assessment year is estimated below Btrigger = Bpa = 220 kt. A long term target for the stock size is considered redundant and not defined.

A limit fishing mortality has been set at 0.226 which is more than two times the target fishing mortality in the harvest rule. There are no explicit measures planned for the event that fishing mortality shall exceed the F limit. The limit is so high that reaching it when setting TACs according to the target is extremely unlikely. A precautionary limit biomass has been defined as SSB = 160000 tonnes, above which there is no indication of impaired recruitment. The procedure applied when setting reference points follows ICES standards and the results were accepted by ICES.

There are no specific measures at present directed towards protecting extrusion areas. There are nursery areas for golden redfish in Iceland and Greenland waters. Sorting grids are compulsory in shrimp trawls in both countries. In Iceland there are permanent area closures to protect juvenile golden redfish, and short term closures are invoked if undersized golden redfish appears in the catches.

**Clause 1.4. External Scientific Review**

ICES is regarded as the relevant scientific body that organizes stock assessments and performs evaluations of management plans. The assessment as well as the management plan for golden redfish were evaluated and approved by ICES in 2014. A re-evaluation of the assessment method and management plan is planned in 2020.

**Clause 1.5. Advice and Decisions on TAC**

The stock assessment and advice for the TAC in the coming year is provided annually by ICES. The MFRI provides advice to the Ministry, which is the competent fisheries management authority. The advice published by the MFRI has reference points tabulated. These are identical to the reference points defined by ICES, and include the reference values in the harvest rule in the management plan.

The stock of golden redfish is shared between Iceland, Greenland and the Faroes. All these nations participate in the ICES advisory process. The harvest rule defines the overall TAC according to the assessed state of the stock. There is an agreement between Iceland and Greenland on sharing the TAC as derived from the harvest rule. There is no such agreement with the Faroes.

There is a wide range of measures to ensure that the total catch is in accordance with the decided TAC. These include a landings obligation, catch reporting by independent, authorized personnel, and close monitoring of activities at sea. However, legal transfers of quotas between species and years may lead to catches deviating from the set quotas. Since the introduction of the management plan in 2014, catches have exceeded the total TAC by 2.7-11.5%, partly due to flexibility measures to avoid discarding.

## 7.2. Compliance and Monitoring

**Clause 2.1 Implementation, Compliance, Monitoring, Surveillance and Control**

An effective legal and administrative framework exists which is implemented by the Fisheries Directorate, part of the Ministry of Industries and Innovation. The Directorate works closely with the Coast Guard and Port Authorities. Key legislation underpinning the framework comprises the Fisheries Management Act (No. 116/2006), the Act on Fishing in Iceland's Exclusive Economic Zone (no. 79/1997) and the Act concerning the Treatment of Commercial Marine Fish Stocks (no. 57/1996). Together these provide the legal basis for the Icelandic Individual Transferable Quota (ITQ) system, establish allocation harvest rights and permit requirements for all participating commercial fishing vessels, prohibit discarding of commercial fish, grant powers to implement closures for juvenile fish, put in place strict controls regarding the recording of catch and the landing and weighing of fish and establish penalties for violation of the provisions of these Acts and associated Regulations, amongst other things. The system incorporates a number of important measures to enable flexibility which encourages compliance with the law whilst ensuring sustainable use of the resource. Effective mechanisms for monitoring, surveillance, control and enforcement exist involving at-sea and land-based monitoring of fishing activity, catches and landings by the Coast Guard and Fisheries Directorate Inspectors, supported by Port Authorities. Offences are recorded and enforcement action is taken, this largely comprises administrative penalties ranging from guidance letters and reprimands to suspension of fishing permits and weighing licenses. More serious cases are sent to the police for prosecution under the criminal system which can result in imprisonment.

Acts and regulations concerning conservation and management measures are publicly available and effectively disseminated through a number of government websites including via an annual law gazette. The Fisheries Directorate website provides current information on management of the fishery including, for example, in relation to allocation of quota, opening and closure of fisheries and license revocations. Temporary and long-term fishery closures are published on-line and scientific advice on the fisheries is available on the MFRI and ICES websites.

**Clause 2.2 Concordance between actual catch and allowable catch**

Landings must be recorded in logbooks at sea and these are verified and standardised through physical weighing at accredited weigh stations in landings ports throughout Iceland. Registered weights for each landing are sent to the Fisheries Directorate, recorded on their catch registration database (GAFL), and the appropriate amount is subtracted from the vessels quota. ITQ transfers are also monitored to ensure that vessels either have or source sufficient quota to cover the entirety of their catch within 3 days of landing. Compliance is checked through at-sea and on-land monitoring by the Coast Guard and Fisheries Directorate inspectors with enforcement action taken where non-compliance occurs (detailed in clause 2.1.1). However, landings are consistently higher than the TAC set by the Ministry.

Corrective management measures and/or appropriate adjustments in management decisions are implemented when the need is indicated by the relevant information. Icelandic catches have been higher than the TAC in all recent years, ranging from 2.7 – 11.5% since the 2014/15 season. However, this is allowed for by flexibility measures in the ITQ system and the golden redfish stock is currently considered healthy and above the trigger reference point.

Participating companies must ensure that they have been issued with all required permits; operate in compliance with the relevant rules and regulations; and limit the catches of their vessels in accordance with their catch quota. These are legal requirements which are monitored by the Fisheries Directorate, Coastguard and Port Authorities and enforcement action taken.

**Clause 2.3 Monitoring and Control**

**Clause 2.3.1. Vessel Registration and catch quotas**

As the share of the TAC allocated to vessels is based on the number of shares for that particular species that the vessel owns, the overall value of quota allocated cannot exceed the TAC set by the Icelandic authorities. Note that within fishing seasons additional inter-annual, inter-species and/or inter-vessel transfers may cause the amount a particular vessel is allowed to catch to increase or decrease.

Commercial vessels participating in the fishery require a permit issued by the Fisheries Directorate. Permits are only granted to fishing vessels holding certificates of seaworthiness and registered in the Registry of Vessels.

The Fisheries Directorate maintain a catch registration system (GAFL database) which is updated with information on registered catches from ports of landing and information on catches exported unprocessed. The catch statistics are published, subject to change, once they have been compared to submitted logbooks and reports from buyers, and are available on the Fisheries Directorate website.

Information on the size and composition of the fleet of fishing vessels is available and documented and includes the official Registry of Vessels maintained by the Icelandic Transport Authority (ICETRA). The allowed catch of golden redfish for each vessel or vessel group is specified on the Fisheries Directorate website.

**Clause 2.3.2 Fishing vessel monitoring and control systems**

The Icelandic Coast Guard, working closely with the Fisheries Directorate, administers an integrated monitoring, control and surveillance system which covers the activities of Icelandic and foreign fishing vessels. It involves several different but complementary electronic vessel monitoring systems including satellite-based systems, comprising VMS and use of satellite imagery, the monitoring of coastal activity through a dedicated land-based very high frequency (VHF) system and the use of the Automatic Identification System (AIS). The integrated system uses all available data such as identification of the vessel, its movements, IUU (illegal, unreported and unregulated) lists, notifications, reports, fishing licenses, permits, port State control reports, etc. to detect and prevent unauthorised fishing in the Icelandic Exclusive Economic Zone (EEZ) and the North Atlantic Ocean.

Unannounced at-sea inspections, which cover fishing gear, composition of the catch, correct recording of catch in logbooks amongst other things, are undertaken during boardings by the Coast Guard and on fishing trips accompanied by the inspectors of the Fisheries Directorate. The Directorate's inspectors also undertake unannounced in-port inspections. Surveillance is strategic and risk-based, using information supplied by the Fisheries Directorate to identify highest risk activities where monitoring effort is then concentrated, for example, at present on the gillnet fisheries.

VMS is used by the Coastguard to enforce temporary and long-term fisheries closures. Vessels fishing in proximity to closed areas are monitored at the Coast Guard operation centre and vessels are directly contacted if they encroach on prohibited areas. This is the first point at which the Coast Guard operator may issue a warning to the vessel and decide to escalate if necessary.

Catch amounts by species and fishing area are estimated and continually recorded in fishing logbooks on-board fishing vessels and these data are provided to the competent authorities either by fishing event or fishing trip depending on the size of the vessel.

Although required by legislation, there is some evidence of non-reporting/under-reporting of seabirds and marine mammals bycatch such that the Assessment Team cannot be fully confident that catch amounts by species and fishing area (of marine mammals and seabirds) are estimated and continually recorded in fishing logbooks. Therefore, the Assessment Team have deemed a Minor Non-conformance to be appropriate in this instance. Following the issuance of this non-conformance, and in accordance with rules of the IRF Programme, the Client has submitted a Corrective Action Plan (CAP) to address the non-conformance raised within a defined period. Corrective Actions in place are to be reviewed annually at surveillance audits.

Discarding of golden redfish is prohibited. Discarding is monitored, by comparing the catches of vessels fishing in the vicinity of each other and, where unusual activity is detected, implementing closer surveillance of the vessel/s involved. Discarding of undersized golden redfish is considered highly unlikely because there are virtually no under-sized fish in Icelandic waters since 2009 due to an absence of recruitment.

Vessels are required by law to comply with relevant national fishery management and technical conservation measures.

The Icelandic management model has been designed to promote compliance through reporting and includes provisions which create flexibility, enabling fishers to avoid non-compliance with rules and regulations and effectively encourages compliance. The rapid reporting system further encourages compliance through near real-time information on the catch of each vessel, quota allocation and transfers. This transparency in effect introduces an element of ‘self-policing’ into the management system.

The law requires that all catches by Icelandic vessels from Icelandic waters must be landed and weighed in an Icelandic port. Weighing is undertaken on official port scales, or on other approved scales at private companies or Fish Markets, that have been certified by the Fisheries Directorate and operated by individuals authorised by the Directorate. The Fisheries Directorate maintains a list on their website, organised by port, of all official weighing license holders that they audit and the type of weighing license held.

Within two hours of landing, all commercial species caught, both target and by-catch, must be officially separated and declared by logbook and landed weight. Port authority officials and Fisheries Directorate inspectors monitor this and that the correct weighing and registration of the catch occurs. New powers have been enacted through legislation to address the risk posed by incorrect weighing of ice.

The weights are submitted to the Fisheries Directorate's catch registration system where they are compared against the logbook entries and deducted from the vessel's quota. Any discrepancies/deviations are recorded and investigated. Deviations, where they occur, can sometimes be rectified using the flexibility within the system (e.g. by using inter-annual, inter-vessel or inter-species transfers to cover catches of a species for which the vessel did not already have quota). Excess catches which are not corrected using these flexibility measures can result in a revocation of fishing licenses and fines.

The golden redfish fishery is predominantly caught by bottom trawl but is also caught as by-catch in gillnet fisheries. There are regulations that require passive fishing gear left unattended at sea to be marked so that the owner can be identified.

**Clause 2.3.3. Catches are subtracted from relevant quotas**

Landed catches are subtracted from the relevant quotas (allowable catch) of the vessel or vessel group. Vessels must weigh catch within two hours of landing. The official weighed catch for each vessel is then submitted by the Port Authority to the Fisheries Directorate's catch registration system and deducted from the vessel's quota. Comparison of the official weighed catch is made with the vessels logbook as part of this process. Transfers of quota to meet any shortfall are also monitored to ensure any additional quota required is secured. Processed at sea catch is also monitored, including its conversion to live weights which are then deducted from the vessel's quota.

Some flexibility occurs in the quota management system so that the species composition of catches may be matched with the quota portfolio available to individual fishing vessels and to discourage discarding. This is facilitated by a number of provisions including the ability to use a limited amount of the following season's quota or to transfer a limited amount of unused quota to the following season, or transfer quota between species using 'cod-equivalents'. Where a vessel has exhausted these options it must transfer quota from other vessels and if unable to do this it must stop fishing.

All transfers of quota must be authorised by the Fisheries Directorate and do not come into effect until the Directorate have confirmed it. Information on the catch quota, including quota transfers, of each vessel or vessel group, is recorded in the Fisheries Directorate's official central database. This information is updated in near real-time and is made public and accessible to all on the Fisheries Directorate's web-site, thus ensuring transparency.

**Clause 2.3.4. Rules are enforced**

There is a clearly established legal framework which sets out rules and regulations relating to fishing activity within Icelandic waters and the penalties for violation of these rules. It gives powers to the Ministry, the Fisheries Directorate, the Coast Guard and the MFRI to monitor fishing activities and enforce these rules. Penalties exist for serious infractions. This largely comprises administrative penalties ranging from guidance letters and reprimands to suspension of fishing permits and weighing licenses. More serious cases are sent to the police for prosecution under the criminal system which can result in imprisonment

**Clause 2.3.5. Analysis is carried out**

Analysis is carried out with the aim of detecting any deviations that may occur of the actual total catch from the Total Allowable Catch (TAC). Measures are available and are adopted when indicated.

All processors purchasing fish, be it directly or at auction, are obliged to submit monthly reports to the Directorate. In addition, the fish auction reports all sales of fish directly to the Directorate. Analysis of catches includes the comparison of reported catches with the amount of sold or exported products to verify independently that landings aligned accurately with those reported. If comparison reveals discrepancies in reported and actual landings received from quayside weighing by registered weighers corrective action is taken as appropriate.

Where required, there is full traceability from catch, through processing, export and delivery on the market is possible

## 7.3. Ecosystem considerations

**Clause 3.1. Guiding Principle**

The main priorities of the MFRI are research on marine and freshwater ecosystems in Iceland and sustainable exploitation of main stocks, ecosystem approach to fisheries management, research on fishing technology and seafloor and habitat mapping.

Since the Icelandic groundfish fishery is multispecies in nature with vessels simultaneously targeting numerous species, habitat and bycatch effects are generally attributed to the fishery as a whole rather than to any species in particular.

Most commercially fished species in Iceland, target or non-target, are now part of the ITQ system and as such they are retained and accounted for within the catch accounting system operated by Fiskistofa. Discarding is prohibited. There are vulnerable and /or Endangered, Threatened and Protected (ETP) species occurring in Icelandic waters according to OSPAR. The fishery does not appear to have significant effects on any bycatch or ETP species.

E-logbooks recording of all marine mammals and seabirds catches (by species and numbers) is a legal requirement (Reg. 126/2014). A smartphone app is in development by the Directorate of Fisheries to make both reporting and identification of bycatch easier for operators in the fishery.

Interactions between fishing gears and the seabed are highly dependent on gear type with towed bottom gears such as demersal trawls and dredges having a greater impact than static gear such as longlines, set nets or pots. The 2017 ICES Report on the Icelandic Ecoregion Ecosystem highlights that based on analysis of electronic logbook data a total area of about 79 000 $km^2$ was fished with towed bottom-fishing gears in 2013 in Iceland, composing 10% of the ecoregion.

It is the policy of the Icelandic government to protect vulnerable marine ecosystems (VMEs; coldwater corals and hydrothermal vents), from significant adverse impact from bottom contacting gear. Large areas within the Icelandic EEZ are closed, either temporarily or permanently, to fishing for a variety of reasons; these include the

protection of juveniles, spawning fish and VMEs. Cumulatively, a large portion of Icelandic shelf area within which fishing activities occur is closed to bottom trawling.

**Clause 3.2.1. Information gathering and advice**

Information is available on the legal specification of fishing gear in the Icelandic groundfish fishery. The primary aim of fishing gear regulations is size selectivity with a secondary aim being species selectivity. Gears are regulated in several ways to regulate both size and species selectivity. The MFRI provide advice for 40 fish stocks in Iceland as well as advice for harvest of marine mammal species (e.g. fin whale and common minke whale). Their most recent advice, which include routine monitoring and assessment efforts is available online. Also, there appears to be enough information to assess effects on ETP species in Icelandic waters.

**Clause 3.2.2. By-catch and discards**

According to section 2 of Act no. 57/1996, concerning the treatment of commercial marine stocks, discard of catches (although with minor exceptions) is prohibited. Discarding violations are subject to penalty ranging from ISK 400K to 8M.

Key bycatch risks relate to seabird bycatch in longline gear and marine mammal bycatch in gillnets. For the golden redfish fishery only longlines catch a small percentage of redfish. There are technical measures/mechanisms in place in Icelandic longliners to mitigate adverse impacts on seabirds. These include the use of acoustic cannons, balloons towed at the end of the vessel to scare-off of diving birds, and night settings to minimise interactions with seabirds.

Non-target catches, including discards, of stocks associated to the Golden redfish fishery, caught with bottom trawl, longline and Nephrops trawl gear, do not threaten these non-target stocks with serious risk of extinction or comparable irreversible risks. Most of these stocks are actively managed by the MFRI.

As appropriate, suitable steps are considered to avoid, minimize or mitigate encounters with endangered, threatened and protected species, as appropriate and relevant in the context of the golden redfish fishery. Most of these steps include ban on direct harvest for these species.

There are a number of initiatives and regulations in place to avoid the loss of fishing gear and subsequent ghost fishing of lost and abandoned gear. Where Fiskistofa finds and recovers lost or abandoned gear they recover the cost of recovery from the gears' owner. The directorate confirmed that gear loss (e.g. longlines, gillnets) and ghost fishing is not considered an issue and that reporting lost gear is compulsory.

Additionally, the Icelandic ITQ system operates in such a way that gear losses are minimised.

**Clause 3.2.3 – Habitat Considerations**

Golden redfish fry stays near the bottom off East Greenland and at the edge of the Icelandic continental shelf. The main fishing grounds, as well as the main adult grounds, are at the edge of the continental shelf at 200 to 400 m depth south and west of Iceland. Large areas within the Icelandic EEZ are closed for fishing, either temporarily or permanently. These closures are aimed at protecting juveniles and spawning fish and protecting vulnerable marine ecosystems.

The Icelandic government has closed 10 areas in South East Iceland where significant coral cover has been identified through scientific research. There are two known hydrothermal vent areas with series of chimneys and

fissures on the Icelandic continental shelf. Both are inside Eyafjörður to the north of the island and are fully protected by environmental law no. 249/2001 and 510/2007.

**Clause 3.2.4. Foodweb Considerations**

Golden redfish are epibenthic-pelagic and are preyed upon by larger fish including Atlantic cod, Atlantic halibut, harbour seals and whales. They feed mostly on euphausiids (i.e. krill) in summer; herring in autumn and winter; capelin, herring, euphausiids and ctenophores (e.g. comb jellies) in spring. There are spatial and temporal variations in the diet of redfish. It is not considered a key prey species in the ecosystem, its trophic level being 4.0 ±0.68 se; based on food items. Golden redfish appears to be reasonably well connected to other key fish species as both prey and predator but it does not appear to be a key prey species in the Icelandic marine ecosystem so it is not necessary that harvesting policy and management measures are specifically directed to avoid severe adverse impacts on dependent predators.

**Clause 3.2.5. Precautionary Considerations**

Icelandic government policy aims to protect vulnerable marine ecosystems from significant adverse impact from bottom contacting gear and legislation exists to provide for the prohibition of fishing activities with bottom-contacting gear in areas where vulnerable ecosystems occur. MFRI Advice includes a specific section on the ecosystem impacts of Icelandic fisheries. Measures to minimize or mitigate ecosystem issues identified include technical measures such as the use of night settings, trailing balloons, scare lines and weighted lines in longline fisheries, the trial of bycatch reduction devices in gillnet fisheries, the use of flying doors and rock hoppers on bottom trawlers, and real time, temporary and permanent areal closures.

# 8. Conformity statement

**The assessment team recommends that the management system of the applicant fishery, the Icelandic Golden redfish (*Sebastes norvegicus*) commercial fishery under state management by the Icelandic Ministry of Industries and Innovation, fished directly by demersal trawl (principal gear), long-line, gill net, Danish seine net, and hook and line by small vessel gear, and indirectly with Nephrops trawls, shrimp trawls, pelagic trawls and purse seines within Iceland's 200 nautical miles Exclusive Economic Zone (EEZ), be granted certification.**

# 9. Fishery Assessment Evidence

## 9.1. Section 1: Fishery Management

### 9.1.1. Clause 1.1. Fisheries Management System and Plan for Stock Assessment, Research, Advice and Harvest Controls

**The Fisheries Management System**

#### 9.1.1.1. Clause 1.1.1.

A structured fisheries management system shall be adopted and implemented.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Iceland has a structured management system that covers all commercial species. There is a principal Act (Lög um stjórn fiskveiða, nr. 116; 10. August 2006) and a number of supporting Acts and Regulations for the management of the fishery. The Ministry of Industries and Innovation is the principal management body responsible for Icelandic fisheries. The Directorate of Fisheries is responsible for the implementation of Fishery Regulations on behalf of the Ministry. The Icelandic Coast Guard performs sea and air patrols of Iceland's 200-mile exclusive economic zone and 12-mile territorial waters, and monitoring of fishing within the zone in consultation with the Marine and Freshwater Research Institute and Directorate of Fisheries. The Marine and Freshwater Research Institute conducts a wide range of marine research and provides the Ministry with scientific advice.**

**Evidence:**

Iceland has a structured management system covering all commercial species, including Golden redfish, and an established Marine Policy[42].

**Legislation.** There is a principal Act (Lög um stjórn fiskveiða, No 116/2006) and a number of supporting Acts and Regulations for the management of the fishery[43]. Article 1 in the principal Act states the overall objective for Icelandic fisheries management: *The exploitable marine stocks of the Icelandic fishing banks are the common property of the Icelandic nation. The objective of this Act is to promote their conservation and efficient utilisation, thereby ensuring stable employment and settlement throughout Iceland.*

Policies incorporate a number of International Agreements, including; UN Convention of the Law of the Sea,[44] Agenda 21 of the Rio Declaration[45], FAO Code of Conduct for Responsible Fisheries and the International Plan of Action to prevent, deter and eliminate Illegal, Unregulated and Unreported Fishing.

**Institutions.** There are a number of inter-related government agencies within the system under the direction of the Ministry of Industries and Innovation.

42 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/
43 An updated collection (in Icelandic) is issued yearly at http://vefbirting.oddi.is/raduneyti/fiskveidar2018/
44 Ratified 1985: https://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm
45 http://www.un.org/documents/ga/conf151/aconf15126-4.htm

The Ministry of Industries and Innovation[46] in Iceland is the principal management organization responsible for Icelandic fisheries and has the ultimate responsibility for fisheries management. They act according to law issued by the parliament (Althingi), and according to advice from the Marine and Freshwater Research Institute (MFRI).

The Ministry of Industries and Innovation opened on 1 September 2012 following the amalgamation of the Ministry of Fisheries and Agriculture, the Ministry of Industry, Energy and Tourism and part of the Ministry of Economic Affairs. Hence, it now covers all sectors of ordinary business and economic activity. Two ministers share the responsibilities, one for fisheries and agriculture and one for tourism, industry and innovation. The organisational chart is shown below. The Ministry of Industries and Innovation is responsible for formally setting annual total allowable catch limits following advice from the Marine Research Institute as well as in consultation with stakeholders.

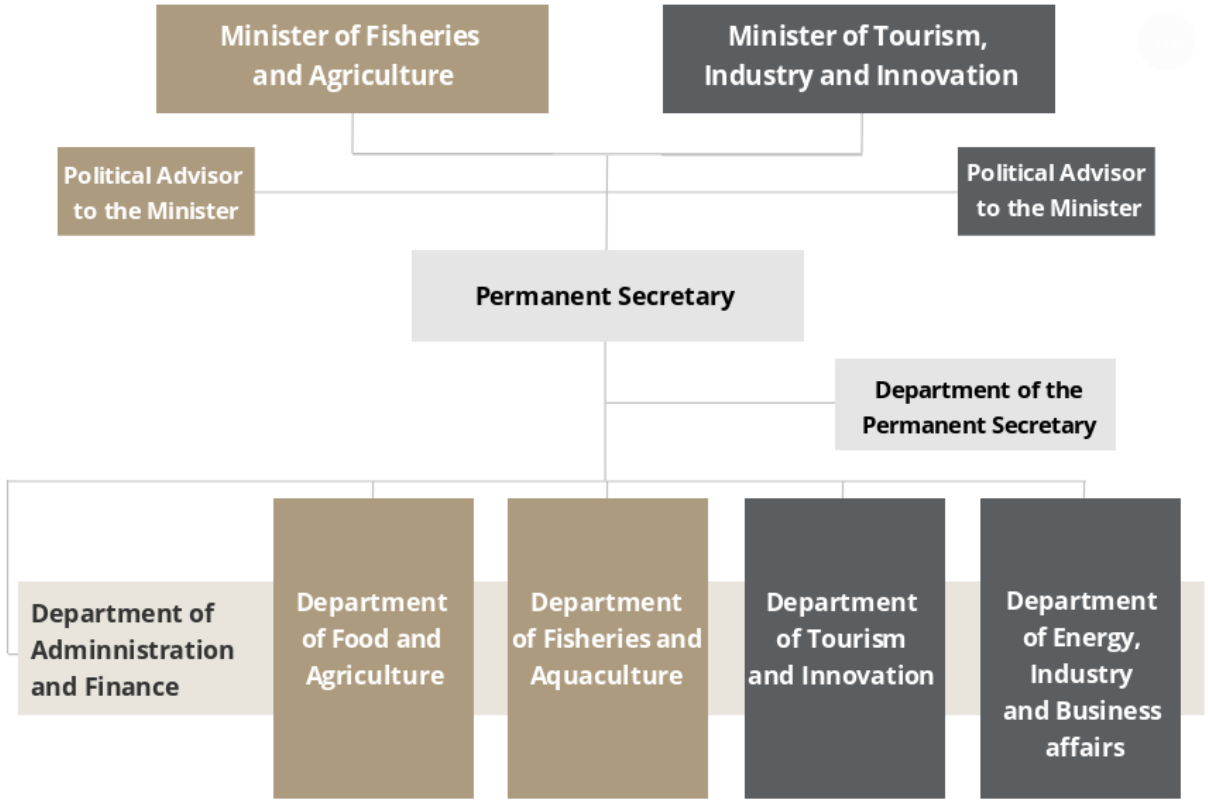



**Figure 16.** Organisational chart of the Icelandic Ministry of Industry and Innovation.

The executive body is the Fisheries Directorate (Fiskistofa)[47]. The Directorate allocates annual catch quotas to each vessel by distributing the total allowable catch according to the quota shares attached to each vessel. The individually transferable quota shares and catch quotas are the cornerstone of the Icelandic

46 http://eng.atvinnuvegaraduneyti.is/
47 http://www.fiskistofa.is/english

fisheries management system. In addition to the individually transferable quota system, Icelandic fisheries management includes management measures such as area restrictions, fishing gear restrictions, the use of closed areas and port control and weighing of all catches. The Directorate of Fisheries is responsible for the daily administration of these measures.

The Icelandic Coast Guard (ICG)[48] is responsible for control at sea, both of the catches and the quality of the vessels. It is a civilian law enforcement agency that is responsible for search and rescue, maritime safety and security surveillance, and law enforcement in the seas surrounding Iceland. The Icelandic Coast Guard performs sea and air patrols of Iceland's 200-mile exclusive economic zone and 12-mile territorial waters, and monitoring of fishing within the zone in consultation with the Marine and Freshwater Research Institute and Ministry of Industries and Innovation.

The ICG's duties include protection against illegal activities such as illegal migration and illegal drug tracking, fisheries control and enforcement, pollution surveillance and response, natural resource and ecology protection, and salvage and rescue diving. The ICG operates the NATO Iceland Air Defence System and CRC Keflavík and is responsible for Explosive Ordnance Disposal (EOD) in Iceland, hydrographic surveying and nautical charting. It also provides emergency medical transport, assistance to law enforcement on land, and civil protection. The Icelandic Coast Guard operates rescue helicopters, offshore patrol vessels, coastal vessels, and a maritime surveillance aircraft.

The Marine and Freshwater Research Institute (MFRI)[49] conducts a wide range of marine research and now provides the Ministry with scientific advice as the MRI did previously. MFRI was established on July 1, 2016 as a result of a merger of two inveterate Icelandic research institutes, the Institute of Freshwater Fisheries (founded in 1946), and the Marine Research Institute (founded in 1965).[50] The MFRI is responsible for fish stock assessment and scientific advice, and for obtaining the necessary information for that task, in particular sampling of catches, scientific surveys and providing scientific background for advice. MFRI also has the authority to manage short term area closures, which are used extensively to protect juveniles and spawning fish.

The MFRI has two research vessels Árni Friðriksson (LOA 69.9 m) and Bjarni Sæmundsson (LOA 56 m). The former, delivered in 2000, is a modern multi-purpose research vessel designed for fisheries and oceanographic research, principally in the North Atlantic Ocean, temperate and arctic water, and equipped to modern standards for a marine research vessel. MFRI has wide international cooperation in all major fields of marine science, as indicated by its publication record[51].

| **References:** | See footnotes. |
|---|---|
| **Non-Conformance Number (if relevant)** | **NA** |

48 http://www.lhg.is/english
49 https://www.hafogvatn.is/en
50 http://www.althingi.is/lagas/nuna/2015112.html
51 http://www.hafro.is/undir_eng.php?ID=20&REF=3

### 9.1.1.2. Clause 1.1.2.

The fisheries management system objective shall be to limit the total annual catch from the fish stocks so that catches are in conformity with amounts allowed by the competent authorities.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The management strategy for Icelandic commercial fish stocks in general, is to maintain the exploitation rate at the level which is consistent with the Precautionary Approach and that generates maximum sustainable yield (MSY) in the long term. The key element in the management is output control through a total allowable catch (TAC) that is distributed on the participating vessels by an ITQ system.**

**Evidence:**

Article 1 in the principal act (No 116/2006) states the overall objective for Icelandic fisheries management: is to promote their conservation and efficient utilisation, thereby ensuring stable employment and settlement throughout Iceland.

The management strategy for Icelandic fish stocks, in general, is to maintain the exploitation rate at the level which is consistent with the Precautionary Approach and that generates maximum sustainable yield (MSY) in the long term. Harvest Control Rules (HCR) are set by the managers of the fishery, in the case of Iceland by the government and are based on knowledge on the state of the stock and take account of the managers objectives, the nature of the resource and uncertainties. The main aim HCRs is thus to:

- Decrease the risk of short term interests influencing the level of exploitation.
- Ensures that the available information on the resource are used in the most rigorous manner.
- Long term sustainable yield.
- Ensure that stock is above save biological limits.
- Often include buffers on the amount of Catch/TAC change between fishing seasons.

The key element in the management of Iceland's commercial fish stocks, including golden redfish, is output control through a total allowable catch (TAC) that is distributed on the participating vessels by an ITQ system. There is a suite of monitoring and control measures in place, to keep catches in conformity with allowed amounts,[52] described in further detail in Clause 1.5.8 and Section 2. The overall TAC is set according to a harvest control rule. There is some flexibility to transfer quotas between species and between years. Discards is prohibited. Golden redfish can only be landed in designated ports, where they are weighed and reported by authorized personnel. There are several arrangements in place to reduce the incentive for discarding and black landings, including control at sea by the Coast Guard, temporal and area closures and an obligation to land undersized fish for a reduced price.

| **References:** | See footnotes. |
|---|---|
| **Non-Conformance Number (if relevant)** | **NA** |

52 https://www.government.is/news/article/2018/05/15/Fisheries/

### 9.1.1.3. Clause 1.1.3.

Appropriate measures for the conservation and sustainable use of the "stock under consideration" shall be adopted and effectively implemented by the competent authorities.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**The main measures for the conservation and sustainable use of the stock is quota regulations in an ITQ system, landings control, discard ban, area closures and technical regulations.**

**Evidence:**

**Quota regulation**

The main tool for conservation and sustainable use of the fish resources in Iceland, including the golden redfish stock, is output control in terms of quotas. In addition, there are technical measures, a general discard ban and area closures to support the sustainable use of the resource. There are special quotas for small scale fisheries to support local communities within the quota framework, and arrangements to reduce the incentive for discarding.

All commercial fishing operations are subject to a permit from the Directorate of Fisheries. On average, about 1300 vessels and boats are licensed for commercial fishing. In addition to general fishing permits, special licenses are issued for specified catches, e.g. for fishing on lumpfish and for fishing with seine. General fishing permits are of two types, a general fishing permit with a catch quota and a general fishing permit with a hook-and-line catch quota. A vessel may only hold one type of fishing permit each fishing year. A commercial fishing permit shall be cancelled if a fishing vessel has not been fishing commercially for 12 months.

Overall quotas are set by the Ministry. Since 2014, the overall TAC for golden redfish is derived according to a harvest control rule. The harvest rule is applied to estimates of stock abundance from a stock assessment. The assessment is made by the NWWG in ICES, where all involved nations participate. ICES formulates an advice based on the harvest rule and the result of the assessment. This advice is taken over by MFRI, modified and extended if necessary and presented as the scientific advice to the Ministry. The Ministry bases its decisions on annual total allowable catch on the recommendations of the MFRI as well as consultation with stakeholders. In practice the Ministry follows almost all recommendation by the MFRI and very compelling and concrete arguments have been needed in the few instances in latter years when the Ministry has allowed bigger total allowable catches than recommended by the Institute[53].

The overall quota is distributed on individual vessels in an ITQ (Individual Vessel Quota) system that is organized and managed by the Directorate of fisheries. The legal basis for the ITQ system is the principal fisheries management act (116/2006). The main elements are:

53 http://www.fiskistofa.is/english/fisheries-management/

- Each vessel is assigned a quota share (%) in each stock, initially based primarily on catch history over a reference period.
- The annual allowable catch for each vessel from each stock is obtained by multiplying the TAC of the year and the vessel's quota share (as a proportion).
- Quotas can be transferred between vessels; this applies both to quota shares and annual catch allotments. Quota transfer is mainly intended to promote rationalisation and thus increase profitability in the industry.
- Some fishery is permitted under quotas on the sideline of the ITQ system[54]: Community quotas (not based on vessels's quota share, all other provisions apply; limited amount) and summer inshore handline (jigging) fishery (limited amount). These exceptions are kept to support local communities.

Altogether, there is strong emphasis on making the system flexible and to reduce incentives for violations, while maintaining a firm control.

Catch quotas (quota shares and catch quota) follow the vessels. Transfer of quotas between vessels is permitted under certain conditions. There is limitations to the permitted quota share for individual owners.

There is some flexibility in the catch quota system. The main objective of that is to make it easier for ship owners and seafarers to comply with established rules and promote responsible use of fish stocks. Up to 15% of the catch quota of most species can be transferred from one fishing year to the next, and catches of up to 5% in excess of the allocated catch quota maybe deducted from the allocation to the next year. It is also possible to deduct a catch of one species from the catch quotas for another species. This does not apply to cod catches.

Under Icelandic ITQ system, no fish can be landed without a quota, and if a vessel gets fish for which it does not have a quota, it has to buy one. There is an efficient system for buying and selling quotas on-line, and for boat owners, trading quotas is a way to optimize their quota portfolio and operations. The quotas for all vessels are listed by the Directorate[55].

Fish can only be landed in authorized ports where it has to be weighed by authorized personnel[56]. Special rules apply to caches that are processed on-board. The weighed catch is directly recorded on-line. The landings statistics are managed by the Directorate, and are published on the Directorates web pages almost in real-time[57]. These landings are also used in the stock assessment.

If undersized fish is caught, it has to be sold, but the fisher gets a strongly reduced price and the surplus goes to a fund to promote science. This arrangement is to reduce the incentive for high-grading.

**Discard ban**

54 http://www.fiskistofa.is/veidar/aflaheimildir/byggdakvoti/byggdakvoti-1819/
55 http://www.fiskistofa.is/veidar/aflaheimildir/uthlutadaflamark/
56 https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/20213
57 http://www.fiskistofa.is/english/quotas-and-catches/

Discarding is prohibited in Icelandic fisheries. Discards due to high-grading has been monitored regularly for cod and haddock, but less so for other species. Important nursery grounds west of Iceland were closed for trawling. Substantial discard of small redfish took place in the deep-water shrimp fishery from 1986 to 1992 when sorting grids became mandatory. Since then the discard has been insignificant in that fishery, also due to much less abundance of small redfish in the region. Discard of redfish species in the shrimp fishery in ICES Division 14.b is currently considered insignificant[58].

**Landing and weighing**

All fish in Iceland must be landed in authorized ports and weighed by authorized weighers[59].

**Area closures**

Area closures are widely used in Icelandic fisheries management. They can be permanent or temporary. Permanent closures can be to protect spawners or juveniles, or to protect vulnerable habitats.

Some closures are designed to avoid exploitation of cod at the spawning grounds in the spawning season. They are permanent according to regulations, but apply only in the spawning season (Figure 17). While these closures are primarily for cod and plaice, they may offer some protection to other species as well. Other permanent closures are for certain gears, mostly all around the year (Figure 18).

In addition to closures that are permanent or regular, areas can be temporarily closed at short notice, in particular if concentrations of juveniles are detected[60]. If undersized fish are caught, they have to be landed. Special rules apply for payment to encourage landing, but discourage catching of undersized fish.

There is a system for closing areas temporarily that have elevated number of juveniles on short notice. They are managed by the MFRI, often at the advice from the Coast Guard or the fishing fleet, applied on few hours notice and normally valid for 2 weeks. They are published in several channels, including on the web[61]. There is no formal minimum landing size for golden redfish, but fishermen are only allowed to have up to 20% undersized (i.e. <33 cm) specimens of golden redfish (in numbers) in each haul. If the number of redfish <33 cm in a haul is more than 20%, a temporary closure is invoked. 33 cm is approximately the mean length at first maturity.

Fishing with trawls is prohibited in large areas near the coast which serve as spawning and nursery areas. Sorting grids are obligatory in shrimp fisheries to prevent catches of juvenile fish.

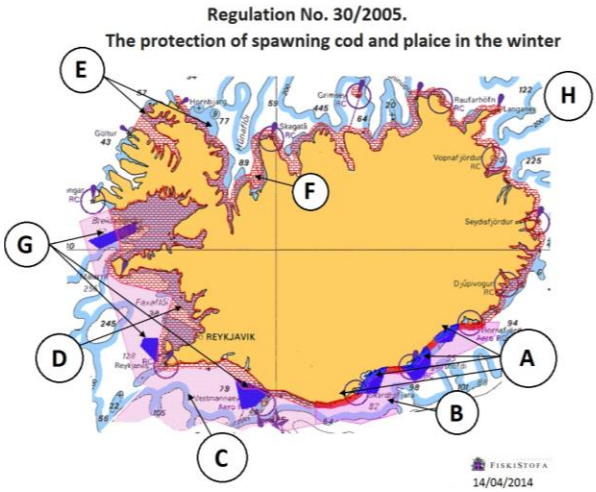
58 Section 19.3.2 in http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%2019_Golden%20redfish%20in%20subareas%205,%206%20and%2014.pdf

59 Law 57/1996: https://www.althingi.is/lagas/nuna/1996057.html

60 http://www.fiskistofa.is/fiskveidistjorn/veidibann has links to webpages for the various kinds of closures.

61 https://www.hafogvatn.is/is/skyndilokanir




A. Regulation No. 30/2005. Eastern Region Article 1. 1 and 2. April 8th through April 16th

B. Regulation No. 30/2005. Eastern Region Article 1.3. Amended by Regulation No. 225/2007. April 17th to 10:00 April 28th

C. Regulation No. 30/2005. Western Article 2.4. Amended by Regulation No. 225/2007. April 12th to 10:00 April 21st

D. Regulation No. 30/2005. Western Article 2. Paragraphs 1, 2 and 3. April 1st through April 11th

E. Regulation No. 30/2005 Northern and Eastern Regions, Article 3. A, B and C amended by Regulation No. 380/2008 from April 15th to 10:00 April 30th (A, B and C).

F. Regulation No. 30/2005. Northern and Eastern Regions, Article 3. D amended by Rgl. 380/2008 from 15th April to time 10:00 April 30th (D).

G. Regulation No. 30/2005. Article 4 Plaice Area. Closures April 1st to April 30th

H. Regulation No. 30/2005. Article 5 exemptions. Article worded so that notwithstanding the provisions of Articles 1 to 4 fishing sea cucumbers, lumpfish, inshore shrimp, scallops, sea urchins, whelk, ocean quahog and rearing of cod is permitted provided requisite licenses for the relevant area are obtained. (Amended by Regulation No. 289/2010)

**Figure 17.** Permanent closures to protect spawning grounds for cod and plaice[62]. Regulation in place in 2019.

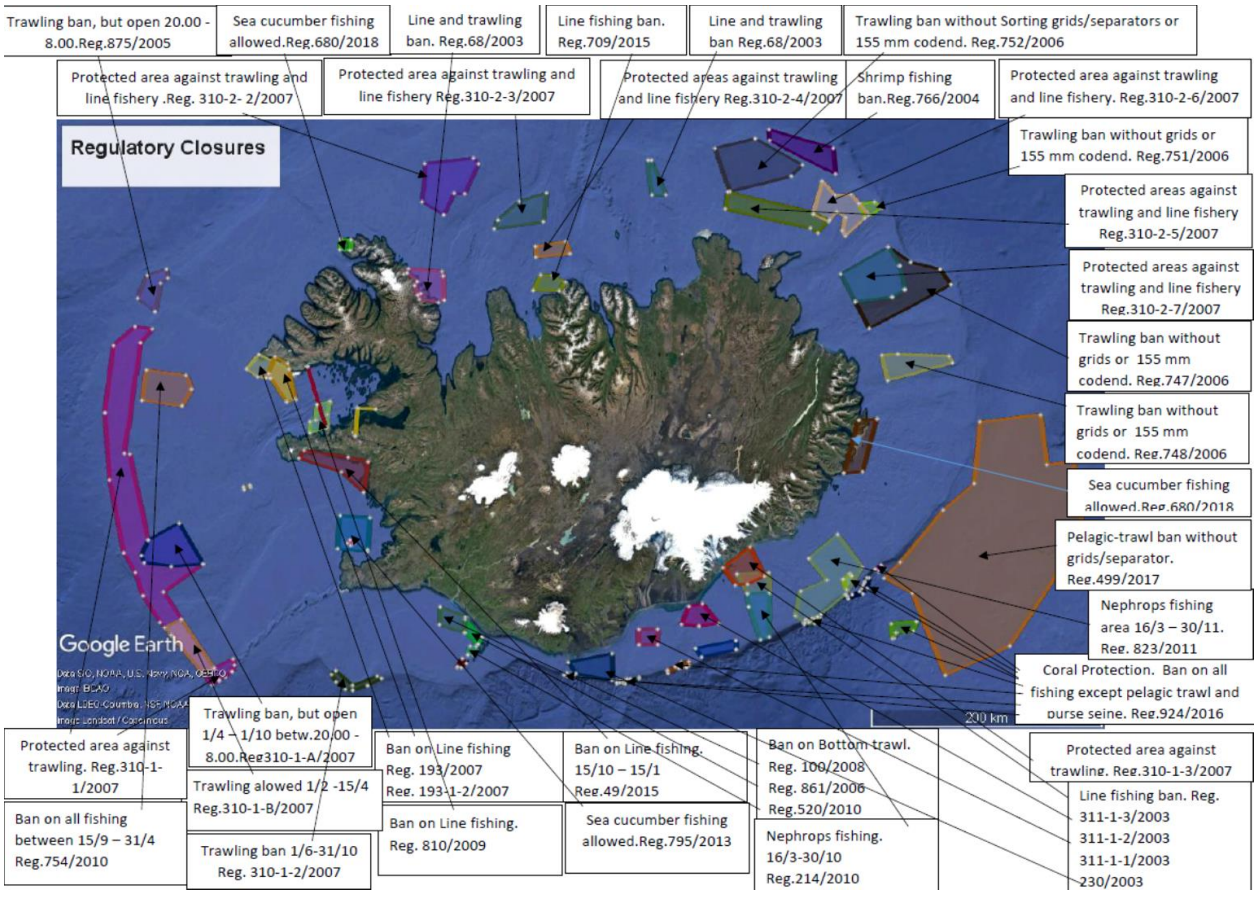



**Figure 18.** Key regulatory area closures in Icelandic waters as of January 2019. The long purple trawl closures in the South West of Iceland were originally designed to protect golden redfish juveniles, and were originally set up in the early 1990s[63].

62 http://www.fiskistofa.is/media/veidisvaedi/Hrygningarstopp_2.pdf

63 https://www.hafogvatn.is/static/research/files/fjolrit-133pdf

**Technical regulations:**

The general minimum mesh size in demersal trawls and pelagic trawls is 135 mm[64], with exceptions in for specific shrimp fisheries. Demersal trawl and pelagic trawl are (according to article 2 of act No. 543/2002) trawls which are used to fish for groundfish in Icelandic waters.
In many areas special rules regarding fishing gear apply, e.g. a requirement of using a sorting grid when fishing for shrimp to avoid juveniles and small fish and an obligation to use bycatch- or juvenile grid when fishing for pelagic species in certain areas to protect other species and juveniles.

**2018 Fisheries Regulations Update**

The Client group representative highlighted during the 2018 site visits that there is an ongoing effort to revise and integrate Icelandic fisheries regulations to facilitate understanding by fishermen and applicability by the management organisations. The official Icelandic committee report on the revision of Icelandic fisheries regulations is titled (and roughly translated as):
*Conclusions of a working group on the comprehensive revision of regulations on the use of fishing gear, fishing areas and protected areas in Icelandic waters – final report to the minister of fisheries and agriculture[65].*

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

64 https://www.reglugerd.is/reglugerdir/allar/nr/543-2002

65 https://www.stjornarradid.is/lisalib/getfile.aspx?itemid=0b53db18-ba77-11e8-942c-005056bc530c

### 9.1.1.4. Clause 1.1.4.

The Standard does not recognise fishing practices that are prohibited such as dynamiting, poisoning and other comparable destructive fishing practices.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Only permitted gears (e.g. trawls, longlines, seine nets, gillnets) can be used to target commercial species in Iceland. The use of dynamiting, poisoning and other comparable destructive fishing practices are not permitted under Icelandic law.**

**Evidence:**
Only permitted gears (trawls, longlines, seine nets and gillnets) can be used to target commercial species in Iceland. The use of dynamiting, poisoning and other comparable destructive fishing practices are prohibited under Icelandic law.

Legal Instruments are in force which specifies 'legal gears' for fishing. Article 9 of Act No. 79/1997 (page 33)[66] states that the Minister shall take the necessary measures to prevent fishing practices which can be regarded as harmful to the efficient utilisation of the commercial stocks and preservation of sensitive ocean areas. The large majority of golden redfish are captured using demersal trawl gear, but other fishing gears which capture the species include longline, Danish seine, gill netting, pelagic trawl, automatic lining and hand lining.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[66] http://vefbirting.oddi.is/raduneyti/fiskveidar2018/index.html

### 9.1.1.5. Clause 1.1.5.

Transparency in the fisheries management and related decision-making process shall be ensured.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Digital tools for publication allow almost real-time publishing of results and decisions, including results of stock assessments, MFRI advice and catches and quota status even for individual vessels. Interested parties participate in decisions processes through regular meetings between industry and management.**

**Evidence:**

Several mechanisms exist for ensuring transparency. Digital tools for publication are used extensively, where results and decisions are published once they are ready. The assessment of Golden redfish is done by the ICES NWWG[67]. ICES provides advice based on the results from NWWG[68]. The advice and the NWWG report are publicly available at the ICES website once they are ready. The final advice to Icelandic authorities is provided by MFRI. The MFRI advice follows the advice for ICES. MFRI provides an overview of the state and the advice for each of all major Icelandic stocks on its website once a year[69]. Likewise, the Directorate has a very transparent system for real time publication of catches and quota status even for individual vessels.

Interested parties participate in decisions processes through regular meetings between industry and management. A special consultation group of the MFRI meets every year and reviews different sources and information regarding the main demersal stocks and fisheries in the Icelandic EEZ, including redfish. The consultation group consists of experts from the MRI and fleet managers and skippers from many places around the country which conduct fisheries on small and large vessels with different gears. When the advice has been made available the Minister consults with representatives from the main stakeholders before decision is taken and regulation on commercial fisheries is issued.

Being a small nation, the Icelandic society is quite transparent. For example, several institutions often emphasize the value of direct communication and of knowing people, and transparency is facilitated by institutions like the Fisheries Directorate and the MFRI, both having offices in all parts of the country.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

67 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%2019_Golden%20redfish%20in%20subareas%205,%206%20and%2014.pdf

68 http://ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf

69 For Golden redfish: https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

### 9.1.1.6. Clause 1.1.6.

Fisheries shall be regulated in such a way as to avoid the risk of conflict among fishers using different vessels, gear and fishing methods. Where conflict arises appropriate venues and means shall be available for conflict resolution.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Conflicts between vessels may be prevented by the Icelandic Maritime Traffic Service which is a single point of contact for all maritime related notifications. The Ministry can close areas for certain gears if necessary.**

**Evidence:**

The Coast Guard operates the Icelandic Maritime Traffic Service[70] within its operations centre. This centre is a single point of contact for all maritime related notifications, involving, for example, the Maritime Rescue Co-ordination Centre, the Vessel Monitoring Centre and the Fisheries Monitoring Centre. This traffic centre has a key role in ensuring safety at sea, but can also take action if the behaviour of a fishing vessels is unusual. Conflicts between vessels and gears on the fishing ground does not appear to be common, and the Coast Guard has the tools to act if needed. The Ministry can and has closed areas for specific gear types.

Within the ITQ system, quota is reserved for local, coastal fisheries, a mechanism which contributes to avoid tension and conflict between fisheries and fishermen using different vessels, gear and fishing methods.

Iceland's small population and relatively small fishing community ensures short chains of communication that ensure conflicts can generally be resolved before they arise. There are regular meetings between fishery managers and industry representatives where all aspects of fisheries are discussed.

The Icelandic civil law legal system has strong foundations and long tradition. Its district courts and the supreme court deals with all disputes that arise within the system. Disputes are reviewed in public and all findings are published on the internet.

| | |
|---|---|
| **References:** | See footnote. |
| **Non-Conformance Number (if relevant)** | **NA** |

[70] https://www.icetra.is/media/english/Regulation-on-the-Maritime-Traffic-Service,-as-amended.pdf

## The Fisheries Management Plan

### 9.1.1.7. Clause 1.1.7.

Fishing for the "stock under consideration" shall be managed by the competent authorities in accordance with a documented and publicly available Fisheries Management Plan.[71]

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**The management of golden redfish is part of the general fisheries management in Iceland, and rules and regulations that apply in general apply to golden redfish as well. Some elements are specific to golden redfish, in particular the harvest rule. Accordingly, redfish is subject to a document and publically available fishery management plan.**

**Evidence:**

Iceland has in recent years implemented formal fisheries management plans, including precautionary long term harvest control rules, for some of its most important fish stocks, including cod, saithe, haddock, redfish and pelagic stock like capelin and herring. These management plans have been evaluated to be in conformity with the precautionary approach by the International Council for the Exploration of the Sea (ICES)[72] [73].

The management of Golden redfish is part of the general fisheries management in Iceland, and rules and regulations that apply in general apply to Golden redfish as well.

These elements, as outlined in previous clauses (Clause 1.1.1 - 1.1.3) and in Clauses 1.1.8 - 1.1.10, include:

- A legal basis for relevant management measures
- Organized distribution of authority and responsibility between institutions.
- Support for regular stock assessments, including monitoring of catches, bottom trawl surveys, sampling of biological data and assessments in an international framework.
- Organized advice following assessments according to an agreed harvest rule.
- Quotas in an ITQ system
- Technical regulations of fishing gear, area and season
- Control and enforcement of regulations.

Some management elements are specific to golden redfish, in particular the stock assessment and the harvest rule. Redfish is subject to a document and publically available fishery management plan[74].

| | |
|---|---|
| **References:** | See footnotes |
| **Non-Conformance Number (if relevant)** | **NA** |

[71] FAO Code of Conduct, art. 7 .3.3.

[72]

[73] https://www.government.is/news/article/2018/05/15/Haddock/

[74] https://www.government.is/news/article/2014/04/01/FisheriesManagement-Plan-Golden-Redfish/

### 9.1.1.8. Clause 1.1.8.

The Fisheries Management Plan developed and adopted by the competent authorities shall be formulated with due consideration to the following:

1.1.8.1 The management unit;

1.1.8.2 Specification of stock or component stocks of "stock under consideration";

1.1.8.3. Jurisdiction areas and the respective competent authorities for the entire range of component stock(s) of "stock under consideration";

1.1.8.4. The long-term harvesting policy, consistent with achieving optimum utilization, including the means for assurance of its consistency with the precautionary approach to fisheries management.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**The unit managed by Icelandic authorities is golden redfish in Icelandic waters. The relevant stock of golden redfish is distributed in Iceland, Greenland and Faroese waters, where it is managed by national authorities. There is a quota sharing agreement between Iceland and Greenland, but not with the Faroes. The long term harvesting policy is to set annual quotas in accordance with a harvest rule that has been demonstrated by simulations to imply low risk of exceeding limit reference points and to provide a yield close to the maximum sustainable yield.**

**Evidence:**

The unit managed by Icelandic authorities is Golden redfish in Icelandic waters. The distribution of the stock is wider and there is a quota sharing agreement with Greenland. The relevant stock of golden redfish and management unit (as per FMP[75]) is distributed in Iceland, Greenland and Faroese waters (Figure below).

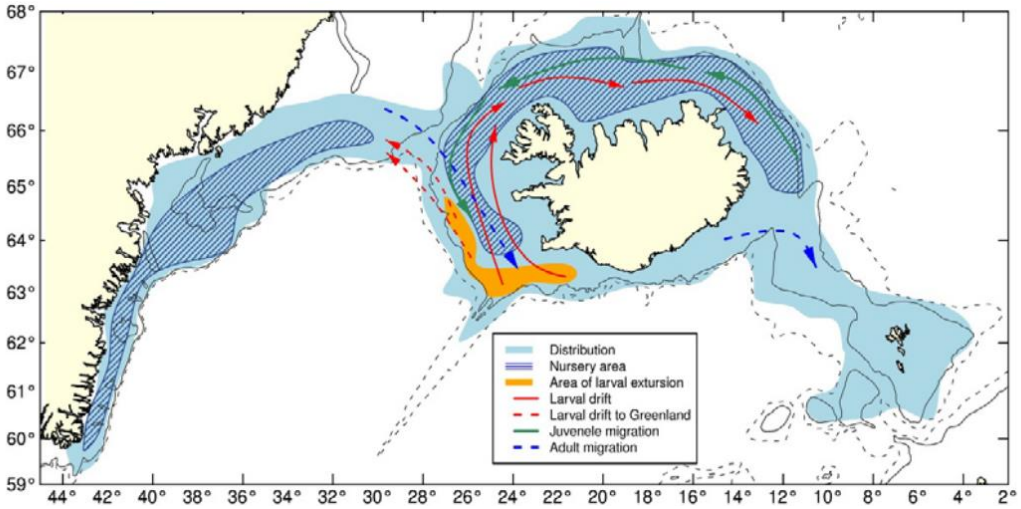



**Figure 19.** Distribution of Golden redfish in East Greenland, Iceland and Faroese waters. (Figure 5.3 of WKRED 2012[76]).

[75] https://www.government.is/news/article/2014/04/01/FisheriesManagement-Plan-Golden-Redfish/

[76] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2012/WKRED%202012/wkred_2012.pdf

In the stock assessment, also ICES Subarea 6 (West of Scotland) is included for practical reasons. The catches there are minor, and there is no evidence to indicate any significant mutual influence between that area and the main distribution area of the stock.

The stock in Iceland is managed by Icelandic authorities, as described in Clauses 1.1.1-5. In East Greenland it is managed by The Ministry of Fisheries, Hunting and Agriculture of the Greenland home rule and in the Faroes by the Faroese Directorate of Fisheries.

Iceland and Greenland have made an agreement on the golden redfish fishery based on the management plan applied in 2014. The agreement is from 2016 to the end of 2018, but apparently, it is followed for the fishing year 2018/2019 as well.[77]. The agreement states that each year 90% of the TAC is allocated to Iceland and 10% is allocated to Greenland. Furthermore, 350 t are allocated each year to other areas. There is no such agreement with the Faroes.

The long term harvesting policy is to set annual quotas in accordance with a harvest rule (see Clause 1.1.9) for details) that has been demonstrated by simulations to imply low risk of exceeding limit reference points and provide a yield close to the maximum sustainable yield.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

77 https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

### 9.1.1.9. Clause 1.1.9.

The Fisheries Management Plan shall specify:

1.1.9.1. The long term objective(s) of the fisheries management, including target(s) for stock biomass and target value(s) or range(s) for fishing mortality or its proxy;

1.1.9.2. Limits with respect to precautionary management, including the limit reference point for stock size or its proxy and the limit reference point for fishing mortality or its proxy (e.g. harvest as a proportion of stock size, etc.)[78], as well as remedial action to be taken if limits are approached or exceeded;

1.1.9.3. The applicable harvest control framework or harvest control rule, as appropriate.

1.1.9.4. The primary approach applied to managing the fisheries (e.g. input controls, output controls, etc.).

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**The long term objective in the Fishery Management Plan is to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term. This is achieved primarily by setting quotas according to a harvest rule. The rule states a fixed fishing mortality which is reduced if SSB is below a trigger value. There are limit values for SSB and fishing mortality defined, and simulations have demonstrated a low risk to exceed the limits.**

**Evidence:**

The long term objective is stated in the management plan for Golden redfish[79].

The management strategy for golden redfish is to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term.

Harvest control rule: According to the Harvest Control Rule (HCR)[80] the TAC for the following year (*y*+1) should be based on a fishing mortality of 0.097 ($F_{MGT}$).

If the spawning stock biomass (SSB) falls below 220 000 tonnes (MGT $B_{trigger}$), the HCR dictates that fishing mortality shall be reduced linearly to zero based on the ratio of the SSB estimated and MGT $B_{trigger}$, the fishing mortality for the following year (*y*+1) is then calculated as:

$F_{y+1} = F_{MGT}^{*} (SSB_y/\text{MGT } B_{trigger})$

The HCR has been evaluated by ICES and found to be consistent with the precautionary approach and conforms to the ICES MSY approach. In accordance with the general aims of the management strategy for golden redfish, the HCR was formally adopted by Icelandic and Greenlandic authorities in 2014 for the consecutive period of 5 years, starting in 2015. A revision of the plan, along with a benchmark of the stock assessment in ICES, is planned in 2020.

[78] $F_{lim}$ can be explicit, or implicit in cases where harvest rate is set annually to a precautionary $F_{lim}$ (or its proxy)]

79 https://www.government.is/news/article/?newsid=e747dac7-fb88-11e7-9423-005056bc4d74

80 https://www.government.is/news/article/?newsid=cf30e5ad-584f-11e8-9429-005056bc4d74

Reference points (see also Clause 1.3.1.4)**:** The rule has a standard fishing mortality of 0.097 and a trigger SSB at 220 000 tonnes below which the F to be applied is reduced linearly towards the origin.

A precautionary biomass limit (Blim) is set at 160 000 tonnes. This was the lowest SSB in the assessed time series when reference points were set in 2012. The general rule, as defined by ICES, is to regard a management as in accordance with the precautionary approach if it leads to a less than 5% probability of bringing SSB below Blim[81]. The trigger biomass is set at the ICES Bpa, which is the SSB below which there may be a risk that the actual SSB is below Blim, taking an assumed estimation uncertainty of 20% into account: Bpa= Blim × exp (0.2 × 1.645).

The target F = 0.097 was originally a value of Fmax (the F leading to maximum long term yield) as estimated in the 2012 assessment. Since then, the growth rate at young age has increased somewhat, leading to a slightly higher F-max estimate at present. Also, because a very low natural mortality is assumed (0.05) and the Fmax is based on a length-based assessment that takes into account that fast growing fish disappear at younger age, it tends to be on the conservative side compared to a standard age-based Fmax.[82] However, when the request to ICES was formulated, the old Fmax value was retained, and it seems to be a suitable value, close to Fmax but on the conservative side, and with low risk to Blim.

The primary approach to managing the fishery is output control in terms of quotas that are distributed on individual vessels in an ITQ system.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

81 Section 1.2.6 in Introducion to ICES advice. Obtainable at http://www.ices.dk/community/advisory-process/Pages/Latest-advice.aspx

82 Section 4.5 in ICES WKREDMP 2014: http://www.ices.dk/sites/pub/Publication%20Reports/Forms/defaultone.aspx?RootFolder=%2fsites%2fpub%2fPublication%20Reports%2fExpert%20Group%20Report%2facom%2f2014%2fWKREDMP&FolderCTID=0x0120005DAF18EB10DAA049BBB066544D790785

### 9.1.1.10. Clause 1.1.10.

The Fisheries Management Plan shall also consider the following:

1.1.10.1. The specific management method/approach or measures, according to fleet or jurisdiction or other relevant variables as appropriate;
1.1.10.2. Any further measures which support meeting the management objectives;
1.1.10.3. The institution(s) or arrangement(s) responsible for providing stock assessment and advice;
1.1.10.4. A description of the process for making decisions on Total Allowable Catch (TAC) - how and on what basis management decisions are made;
1.1.10.5. Provisions for considerations and consultation with the fishing industry and relevant authorities.
1.1.10.6. The means of implementing the management approach, including main provisions for monitoring, control, surveillance and enforcement
1.1.10.7. The objectives and management measures relevant to ecosystem effects of the fishery.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The primary management method is quotas set according to a harvest rule. The quota regulations are supplemented by area closures, mesh size regulations, sorting grids in selected fisheries, discard ban and surveillance at sea and at landing sites. The quotas are derived according to a harvest control rule from an assessment, performed with approved methodology by the ICES NWWG, and finally decided by the Ministry taking advice from MFRI and the industry.**

**Evidence:**
The primary management method is quotas set according to ha harvest rule, that has been shown to be in accordance with the precautionary approach and lead to near maximum long term yield. The quota regulations are supplemented by area closures, mesh size regulations, sorting grids in selected fisheries, discard ban and surveillance at sea and at landing sites (Clause 1.1.3), also supporting ecosystem management objectives. The quotas are derived according to a harvest control rule from an assessment, performed with approved methodology by the ICES NWWG (Clause 1.2.1), and finally decided by the Ministry taking advice from MFRI and the industry (Clause 1.1.5).

| | |
|---|---|
| **References:** | Refer to referenced clauses. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.1.2. Clause 1.2. Research and Assessment

#### 9.1.2.1. Clause 1.2.1.

A competent research institute or arrangement shall collect and/or compile the necessary data and carry out scientific research and assessment of the state of fish stocks and the condition of the ecosystem. Research results shall be made public in a timely and readily understood fashion.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The MFRI is the main research institute in marine science in Iceland. Data collection for assessment purposes, both from the fishery and surveys, is performed by the MFRI in cooperation with the Fisheries Directorate. MFRI issues advice on individual stocks on the web annually. The report from the underlying stock assessment and the ICES advice are readily accessible on the ICES website.**

**Evidence:**
The Marine and Freshwater Research Institute (MFRI)[83] is the main research institute in marine science in Iceland. The MFRI is owned by the Ministry of Industry and Innovation to which it is responsible for the provision of scientific advice. The MFRI covers all major fields in marine science[84] and its remit was recently extended to include inland waters. The MFRI has a staff of about 190 with sections for demersal resources, pelagic resources, aquaculture, freshwater resources and the marine environment, as well as supporting sections, including sampling and computing.

The main research priorities are:

- research on marine and freshwater ecosystems,
- sustainable exploitation of main stocks,
- ecosystem approach to fisheries management,
- research on fishing technology and
- seafloor and habitat mapping.

The MFRI has two research vessels Árni Friðriksson (LOA 69.9 m) and Bjarni Sæmundsson (LOA 56 m). The former, delivered in 2000, is a modern multi-purpose research vessel designed for fisheries and oceanographic research, principally in the North Atlantic Ocean, temperate and arctic water, and equipped to modern standards for a marine research vessel. Data collection for assessment purposes, both from the fishery and surveys, is performed by the MFRI, in cooperation with the Fisheries Directorate. This is further described in Clause 1.2.2.

MFRI has wide international cooperation in all major fields of marine science, as indicated by its publication record[85].

83 www.hafro.is, www.hafogvatn.is/en
84 http://www.althingi.is/lagas/148a/2015112.html
85 http://www.hafro.is/undir_eng.php?ID=20&REF=3

| | |
|---|---|
| MFRI participates in providing annual stock assessment and international advice by ICES, which for the golden redfish stock is done by the ICES NWWG. MFRI issues advice on individual stocks on the web annually[86]. On its website, there is also links to publication records and to news form the institute. The report from the underlying stock assessment and the ICES advice are readily accessible on the ICES website[87]. | |
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

86 https://www.hafogvatn.is/en/harvesting-advice
87 http://www.ices.dk/publications/library/Pages/default.aspx

### 9.1.2.2. Clause 1.2.2.

The relevant data collected/compiled shall be appropriate to the chosen method of stock assessment for stock under consideration and sufficient for its execution.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**The golden redfish stock is assessed using the Gadget tool, which is a population model fitted to catch and survey data. Landings data from all nations and catch data at length from Iceland is used. Most of the golden redfish catch or 90–98% is taken in Icelandic waters. In addition, bottom trawl survey abundance data from Iceland and Greenland combined and age-length keys from the Icelandic fishery and from one bottom trawl survey is used. The data are considered adequate for the assessment method. The assessment method was first proposed in 2012, and accepted by ICES in 2014 after some modifications. A revision is planned in 2020.**

**Evidence:**

The golden redfish stock is assessed using the Gadget tool, which is a forward projecting, age and length disaggregated population model fitted to catch and survey data. The assessment (in 2018) covers the period from 1970 to 2022 using data until the first half of 2018 for estimation. Two time steps are used each year. The ages used are 5 to 30 years, where the oldest age is treated as a plus group (fish 30 years and older). Natural mortality is fixed at 0.05/year, but 0.1 for the 30+ group. The available data, described below, are considered adequate for this method.

**Catch data**

Catch data used in the Gadget model are:

- Landings by 6-month period from Iceland, Faroe Islands and East Greenland.
- Length distributions from the Icelandic, Faroe Islands and East Greenland commercial catches since 1970.
- Age-length keys and mean length at age from the Icelandic commercial catch 1995–2017.

**Iceland**

Landings statistics are collected by the Fisheries Directorate. All fish in Iceland must be landed in authorized ports and weighed by authorized weighers[88]. These data are transferred to the Fisheries Directorate. They are published almost in real time on the Directorate website, together with the quota status for each species and vessel.

Over the years, total landings in Iceland gradually decreased by more than 70% from about 130 000 t in 1982 to about 43 000 t in 1994 (see Figure below). Since then, the total annual landings have varied between 33 500 and 60 000 t and have been gradually increasing since 2010. The total landings in 2017 were 56 101 t, which is about 3600 t less than in 2016.

88 Law 57/1996: https://www.althingi.is/lagas/nuna/1996057.html

Most of the golden redfish catch or 90–98% has been taken in ICES Division 5a. The landings in 2017 were 50 119 t, about 4000 t less than in 2016. Between 90–95% of the golden redfish catch in Division 5.a is taken by bottom trawlers targeting redfish (both fresh fish and factory trawlers; vessel length 48–65 m). The remaining catches are partly caught as bycatch in gillnet, longline, and lobster fishery.

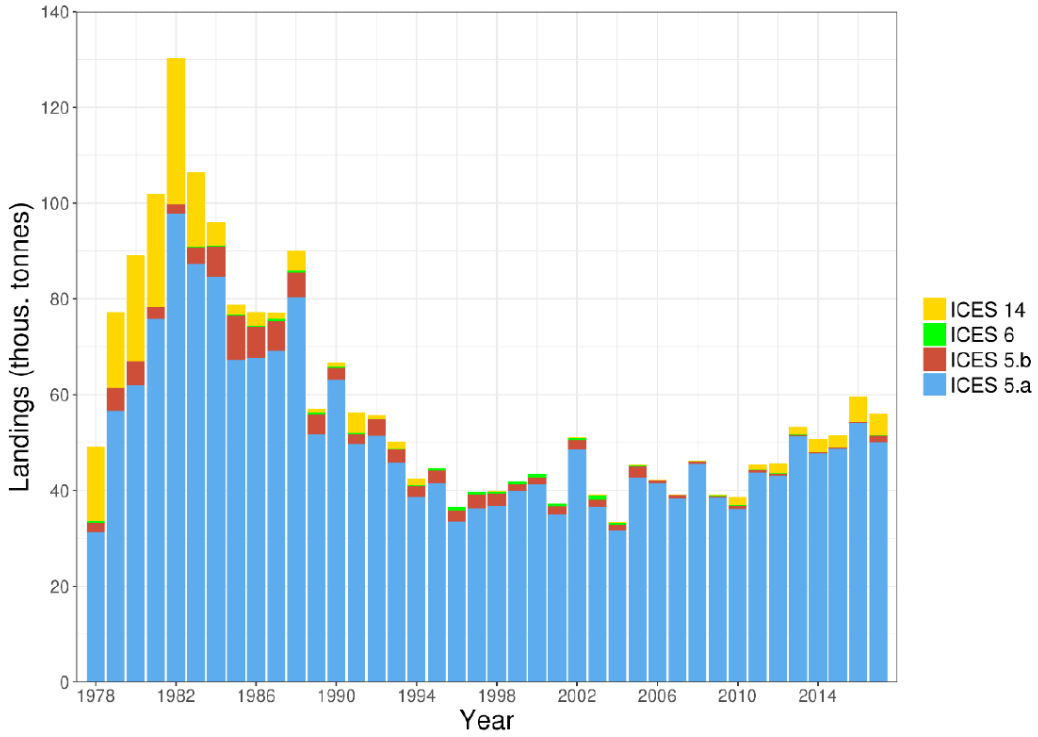



**Figure 20.** Golden redfish catches in ICEAS area 5, 6 and 14 from 1978 to 2017.

Most of the catches are taken along the shelf southwest, west and northwest of Iceland (Figure below). In recent years, a higher proportion of the catches is taken along the shelf northwest of Iceland and less south and southwest.

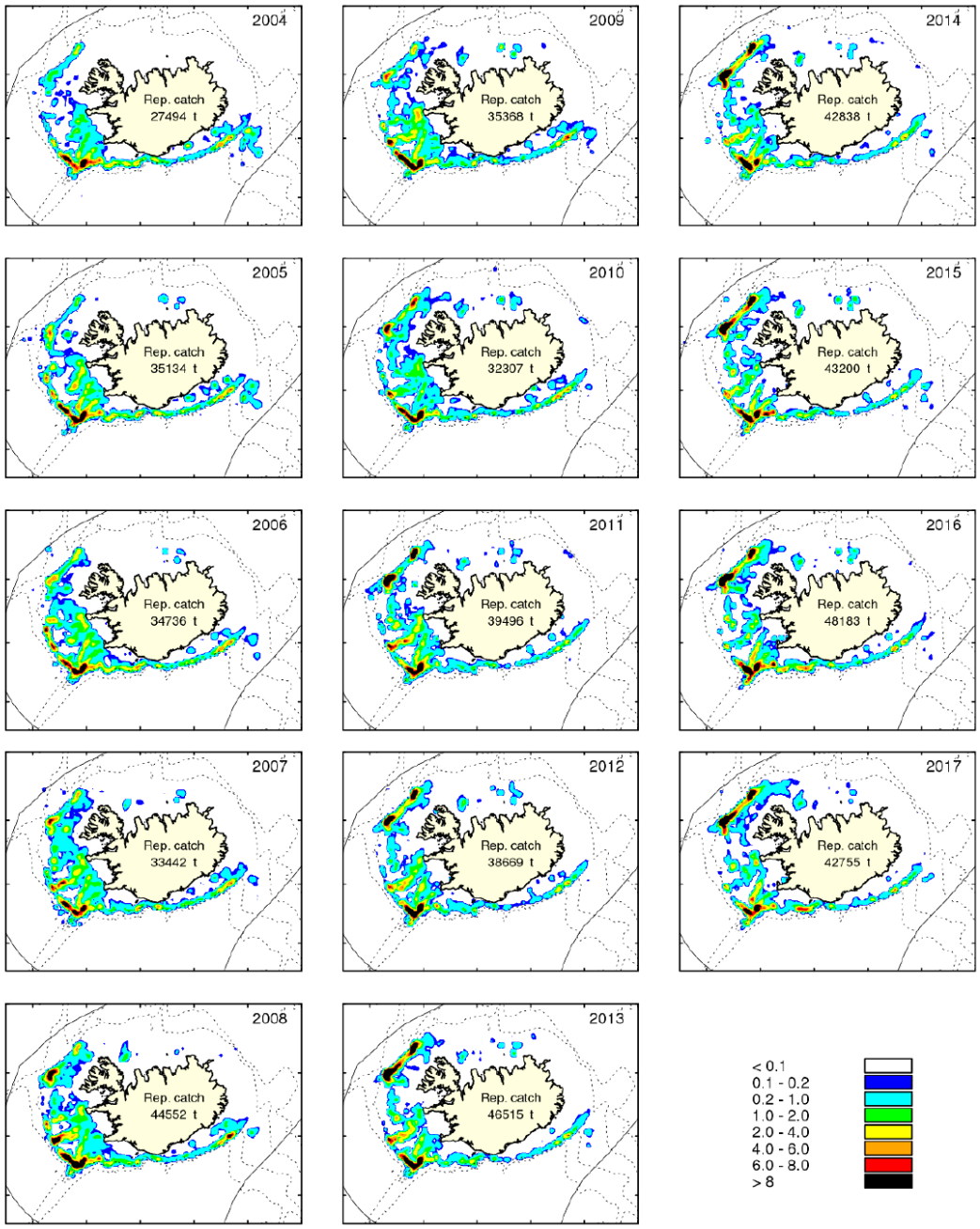



**Figure 21.** Geographical distribution of golden redfish bottom trawl catches, according to log books. (NWWG 2018 report).

In Division 5b (Faroes), landings dropped gradually from 1985 to 1999 from 9000 t to 1500 t and varied between 1500 and 2500 t from 1999–2005. In 2006–2016 annual landings were less than 700 t which has not been observed before in the time-series. The landings in 2017 increased substantially to 1397 t. Most of the golden redfish caught in Division 5b is taken by pair and single trawlers (vessels larger than 1000 HP).

Annual landings from Subarea 14 (East Greenland) have been more variable than in the other areas. After the landings reached a record high of 31 000 t in 1982, the golden redfish fishery drastically reduced within the next three years. During the period 1985–1994, the annual landings varied between 600 and 4200 t. From 1995 to 2009 there was little or no direct fishery for golden redfish and landings were 200 t or less mainly taken as bycatch in the shrimp fishery. In 2010, landings of golden redfish increased considerably and were 1650 t, similar as it was in early 1990s. This increase is mainly due to increased *S. mentella* fishery in the area. Annual landings 2010–2015 have been between 1000 t and 2700 t but increased to 5442 t in 2016 which is the highest landings since 1983. The landings in 2017 were 4501 t.

Annual landings from Subarea 6 have always been small, in particular since 2006. In 2017 they were 90 tonnes.

Since 2010 all redfish in Iceland is landed by species, and the quotas are by species. Prior to that, and still in all other areas, redfish is landed as such. Splitting the catches by species there is somewhat arbitrary, according to area and fishing gear, but based on a limited number of samples and historical experience. A detailed description is provided in the ICES Stock Annex[89].

In Greenland, there is a common quota for redfish, set under the assumption that 20% will be Golden redfish. The catches are split according to gear and location. For the Faroese catches, this split is based on data from Research Vessels surveys on horizontal and vertical distribution of the two species, from regular biological sampling of the redfish landings by fleet, and from logbooks (information on the location of each haul, effort, depth of trawling and how much redfish was caught).

Sampling: Only Iceland provides data on age, weight and maturity, other nations provide only total catch and length measurements.

Biological data are collected from landings by scientists and technicians of the MFRI directly on board (mainly length samples) by personnel of the Directorate of Fisheries. The biological data collected are length (to the nearest cm), sex, maturity stage and otoliths for age reading. The general process of the sampling strategy by the MFRI since 1999 is to take one sample of golden redfish for every 500 tonnes landed. Each sample consists of 200 individuals: otoliths are extracted from 30 fish which are also length measured, weighed, and sex and maturity determined; 70 fish are length measured, weighted, sex and maturity determined; the remaining 100 are length measured and sex and maturity determined. Since 2000 the annual number of samples has been between 45 and 50 and 1600–1800 otoliths are age determined.

Survey data.

- Length disaggregated combined survey indices 19–54 cm in 2 cm length increments from the Icelandic groundfish survey in March 1985–2018 and the German survey in East Greenland 1984–2017.

89 Section B.1.1 in:
http://ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2015/smr-5614_SA.pdf

- Age-length keys and mean length at age from the Icelandic groundfish survey in October 1996–2017.

Results from two surveys (Icelandic groundfish survey in March 1985–2018 and the German survey in East Greenland 1984–2017) are combined to provide an abundance index.

Two bottom trawl surveys are conducted in Icelandic waters: The Spring Survey in March 1985–2018 and the Autumn Survey in October 1996–2017 (except in 2011). In the present assessment setup, only the index from the spring survey is used as abundance measure - in combination with the East Greenland survey, is used. In addition, age-length keys from the autumn survey in 2 cm length groups are used. This usage of the surveys goes back to the benchmark assessment in 2014, as age based results were only available from the autumn survey at that time. This will be revisited in the upcoming benchmark assessment, planned for 2020[90].

The spring survey is primarily conducted with rented commercial trawlers, of a type built in 1972-73, all almost identical. Each year, up to five trawlers have participated in the survey, each in a different area (NW, N, E, S, SW). The trawlers are now considered old and it is likely that they will be decommissioned soon, so the search for replacements has started. The survey gear is based on the trawl that was the most commonly used by the commercial trawling fleet when the survey started in 1984–1985. It has a relatively small vertical opening of 2–3 m. The headline is 105 feet, fishing line is 63 feet, footrope 180 feet and the trawl weight 4200 kg (1900 kg submerged). Length of each tow was set at 4 nautical miles and towing speed at approximately 3.8 nautical miles per hour. The minimum towing distance so that the tow is considered valid for index calculation is 2 nautical miles. Towing is stopped if wind is more than 17–21 m/sec, (8 on Beaufort scale). The stations have largely been the same in the whole time series, although some areas have been added or omitted, in particular on the Iceland -Faroe ridge.

The autumn survey has been conducted since 1996. It has fewer (about 200) spread stations and that include deeper waters, to cover Greenland halibut and beaked redfish. The stations in both surveys is shown in the figure below.

90 Communicated at site visit at MFRI, 27th November 2018.

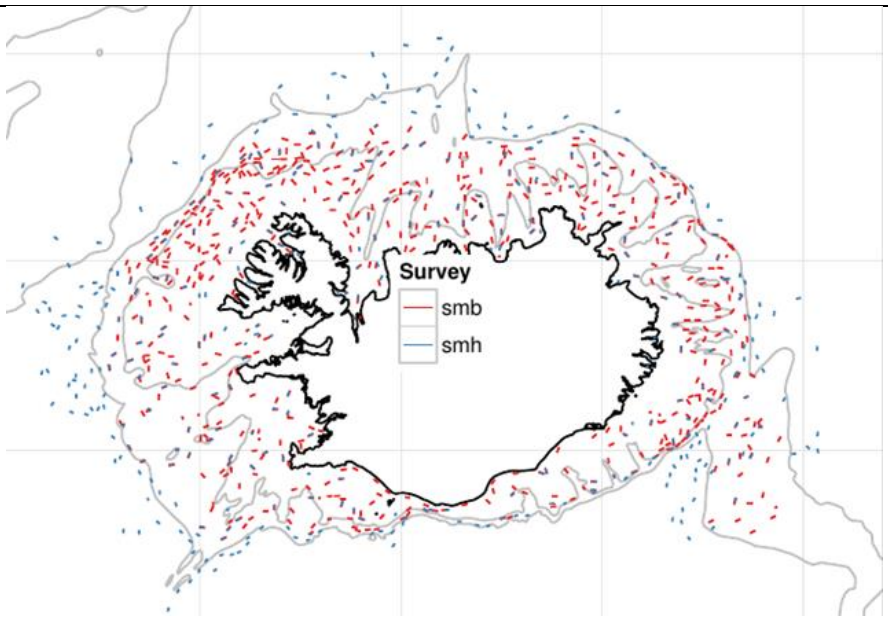



**Figure 22.** Bottom trawl surveys in Iceland. Red is spring survey, blue is autumn survey. These are the stations in 2013, but they vary very little from year to year.

An extensive survey protocol exists for these surveys.[91] This is an English translation of the manual from 2009, but there are at most minor changes from year to year.

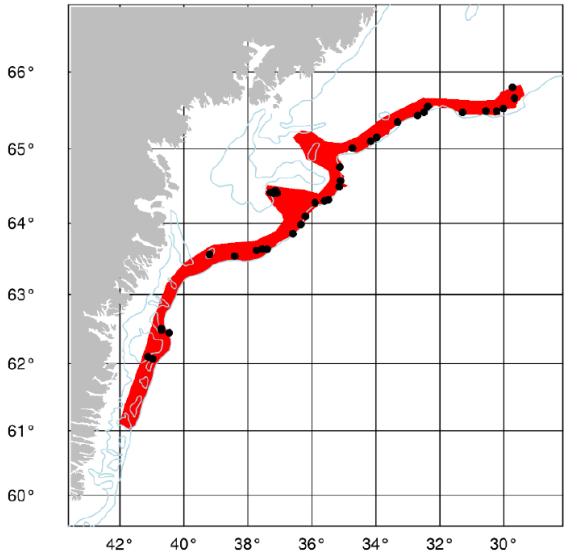



**Figure 23.** Survey area and trawl stations in East Greenland.

Relative abundance and biomass indices from the German groundfish survey on the coasts of Greenland are available for the period 1982 to 2017 for S. norvegicus (fish >17 cm). In 2013, the survey was re-stratified, with 5 strata in East Greenland (and 4 in West Greenland). Depth zones considered are 0–200 m

91 http://www.hafro.is/Bokasafn/Timarit/fjolrit-156.pdf

and 200–400 m. The time-series was recalculated accordingly. In 2017, sampling was only conducted in parts of East Greenland and one spot in NAFO 1F with a total of 46 stations. This is low compared to necessary coverage of 63–75 stations in the respective area as done in the previous years.

Relative abundance from the German groundfish survey from 1982 to 2017 for *S. norvegicus* (fish >17 cm) is illustrated in the figure below. After a severe depletion of the stock on the traditional fishing grounds around East Greenland in the early 1990's, the survey indices have been high although fluctuating since 2007.

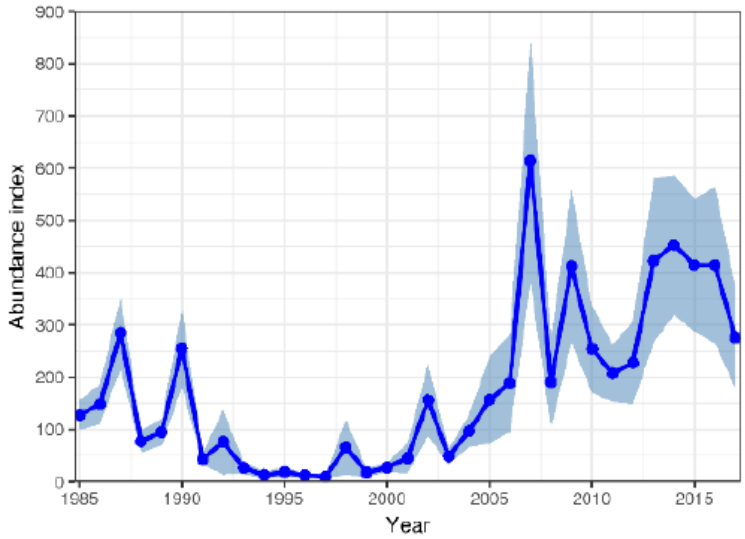



**Figure 24**. Abundance index in the East Greenland survey.

Since both surveys are local in the sense that each of them only covers part of the distribution area, the survey abundance index at length used in Gadget is a weighted sum of the indices in the Iceland spring survey and the East Greenland survey, where the latter gets half weight since fewer stations are included in the calculation of the indices. The final index and the contribution from each survey is shown in the Figure below.

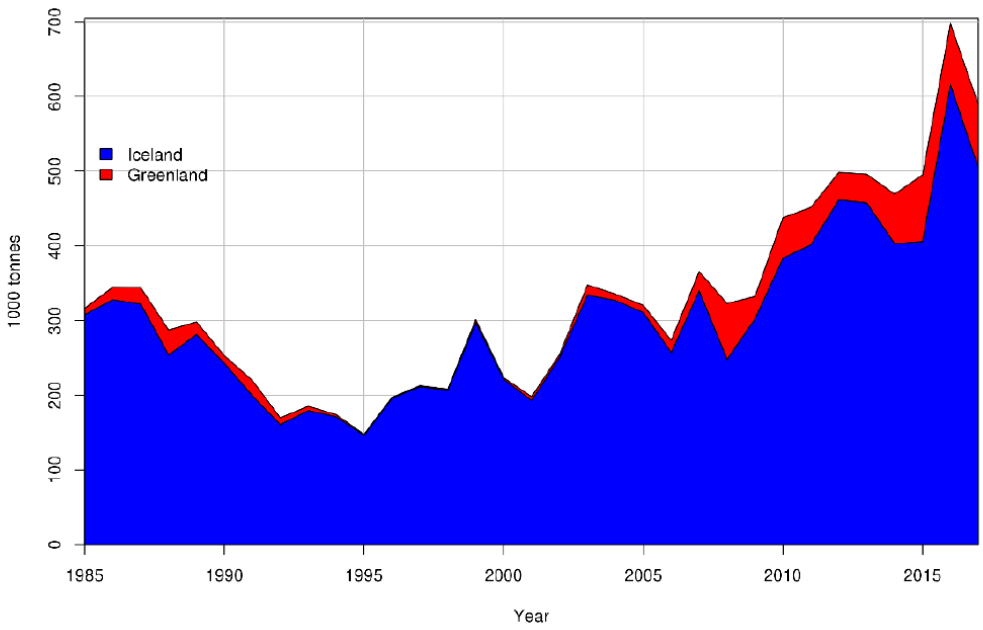



**Figure 25.** Combined survey biomass index (weighted mean) of Icelandic and East Greenland surveys.

The East Greenland survey has a large proportion of large redfish, in addition to covering juveniles. As the total abundance in this survey fluctuates, the weighted mean of the two surveys may not reflect fluctuations in the size composition of the whole stock correctly. In the assessment, fitting the model to the length composition in the survey has been problematic. Including the large fish from East Greenland does therefore affect model results. The estimated SSB is 20% higher when the German survey is included, even though the German survey does only account for 10% of the total biomass as it is weighted. The recruitment signal from the German survey is on the other hand not explaining the "missing recruitment" from Icelandic waters in recent two decades. These are issues to be considered at the next benchmark assessment in 2020.

Also survey data from the Faroes exist. However, since this is a small part of the distribution area, they are not included in the assessment.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.1.2.3. Clause 1.2.3.

Stock assessments shall be based on systematic research of the size and/or productivity of the fish stock(s).

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The state of the stock and its tolerance to exploitation is assessed using the assessment tool 'Gadget'. Individual growth is modelled within the Gadget model by using a von Bertalanffy parametric growth function. The parameters in the growth model are estimated by fitting to the observed length at age data. Each annual recruitment is estimated as a separate parameter, there is no stock recruitment relation assumed. Natural mortality as well as proportion mature at length have assumed values.**

**Evidence:**

The state of the stock and its tolerance to exploitation is assessed using the assessment tool 'Gadget', which is a forward projecting age and length disaggregated population model with parameters estimated by fitting the model to the catch and survey data described under Clause 1.2.2. This tool is used for several Icelandic stocks where age data are sparse compared to length data. It is an extension and modification of a Bormicon multispecies model that has been developed over several decades. For golden redfish, as for several other Icelandic stocks (e.g. tusk, ling, wolffish) the model is used as a single species model, i.e. without modelling predator prey interactions.

Individual growth is modelled within the Gadget model by calculating the mean growth for fish in each length group for each time-step, using a parametric growth function. In the golden redfish model a von-Bertalanffy function has been employed to calculate this mean growth. Assuming a beta-binomial distribution, proportions of fish at each length class is redistributed to new length classes in each time step. The parameters in the growth model (those of the von Bertalanffy function and of the assumed distribution) are estimated by fitting to the observed length at age data.

Mean length at recruitment is estimated as a parameter, separately for year classes before 1996, for year classes 1996–2000 and year classes 2001 and later. This is done to take into account increase in mean weight-at-age that has been observed since year class 1996.

Fishing mortality is modelled as a separate model, i.e. as a product of a fleet-specific component at length and a yearly level. The fisheries in Iceland, Greenland and the Faroes are handled as separate fleets. The selection is modelled as a two-parameter function for each fleet.

Maturation is not modelled. For reporting and predictions, a fixed maturity ogive by size is used, where 50% is mature at 33.54 cm.

$$P_L = \frac{1}{1 + e^{-0.3122(L-33.54)}}$$

Natural mortality is assumed. The value 0.05 is used for all ages below 30 years. Older fish is assembled in a 30+ group where M=0.1 is assumed.

Recruitment is at age 5, with a length distribution with parameters as for length at age elsewhere. Each annual recruitment is a separate parameter, there is no stock recruitment relation assumed. From the results, it

appears that recruitment has fluctuations and occasional strong year classes, but not dependent on SSB within the time period covered by the assessment (Figure below).

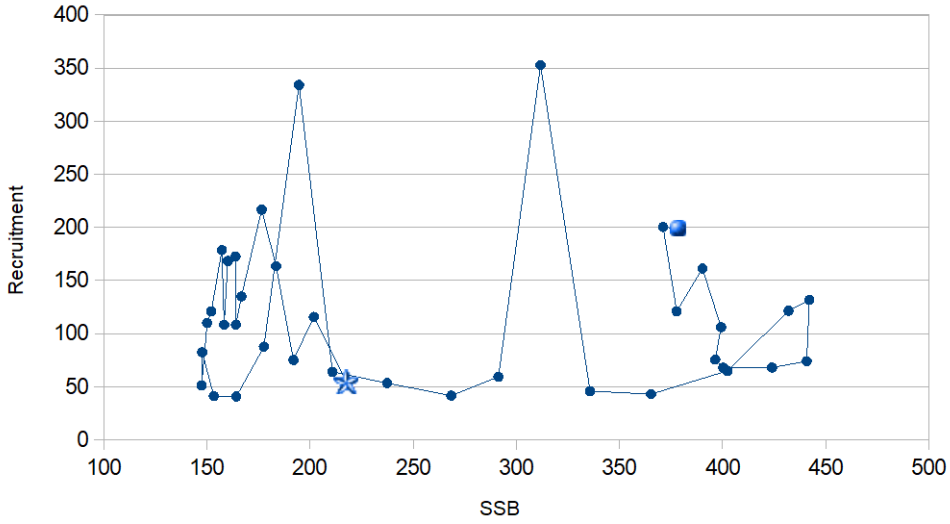



**Figure 26.** Stock-recruit relation. The blue ball symbol is the first year (year class 1971) and the blue star the most recent year class that is estimated (2008 year class).

The assessment method was first proposed in 2012, and accepted by ICES in 2014 after some modifications. In the following years, the performance has been stable with consistent results from year to year. In the 2018 assessment, there was a downward adjustment of the abundance estimate by 12% (Figure below) which most likely is a technical problem with fitting the model to the data. It appears that inconsistencies in length distributions can lead to local optima in the model fit. According to the MFRI advice: "Uncertainty in the assessment of golden redfish is due to uncertainty concerning both recruitment and migration of golden redfish between Iceland and Greenland"[92]. This is a field that needs clarification. However, the change in perception is still well within the confidence range for the stock estimates.

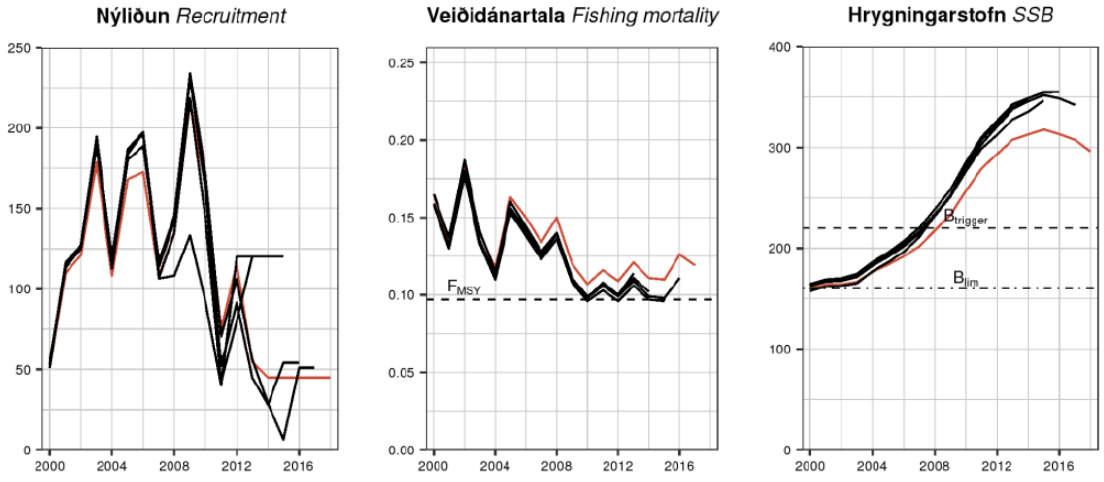



**Figure 27.** Retrospective results of the Golden redfish assessment.

92 https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

| | |
|---|---|
| A new benchmark assessment is planned for this stock in 2020. The plan is to explore several issues of current assessment, including poor fit to survey indices for fish between 30–40 cm; potential dome-shape in selectivity; the lack of uncertainty estimates; investigate the appropriateness of the current growth and maturity model used in the assessment. In addition, the meeting should explore under-utilized data sources from ICES 5b and 14b, mainly relevant survey and commercial samples of age and length. Revisions may also include reference points if changes in stock perceptions makes that relevant, and to change in form of harvest control rule, for example change the rule to proportion of biomass above certain size (i.e. 33 cm and bigger fish) from the F based rule that is used now.[93] | |
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

93 Section 19.17 in http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%2019_Golden%20redfish%20in%20subareas%205,%206%20and%2014.pdf

### 9.1.2.4. Clause 1.2.4.

For the stock under consideration, the determination of suitable conservation and management measures shall include or take account of total fishing mortality from all sources in assessing the state of the stock under consideration, including:

1.2.4.1. Estimates of discards;
1.2.4.2. Unobserved and incidental mortality,
1.2.4.3. Unreported catches and catches in other fisheries.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Discards is prohibited, and discards for golden redfish is believed to be negligible, partly due to area closures and use of sorting grids in the shrimp fishery. Unobserved and incidental mortality is covered by the assumed natural mortality. The value for that is just assumed at a level that is regarded as sensible for long-lived fish. The strict control with landings and detailed monitoring of fishing operations by the Coast Guard should make black landings very unlikely.**

**Evidence:**
Discards due to high-grading has been monitored regularly for cod and haddock, but less so for other species due to previous research findings. A study by Pálsson et. al (2007)[94] documented data collection between 2001-2007 mainly directed towards main fisheries for cod and haddock and towards saithe and golden redfish in demersal trawl fisheries. Sampling for other species was not sufficient to warrant a satisfactory estimation of discarding. Cod discards amounted to 2419 metric tons, 1.51% of landings, the second highest value over the period 2001-2007. Haddock discards were 2167 tons, 2.04%, the lowest proportion recorded during 2001-2007. No discarding was recorded for saithe and golden redfish.

Comparison of sea and port samples from the Icelandic discard sampling program does not indicate significant discarding due to high grading in recent years (Pálsson et. al., 2007), possibly due to area closures of important nursery grounds off West Iceland[95]. Substantial discard of small redfish took place in the deep-water shrimp fishery from 1986 to 1992 when sorting grids became mandatory. Since then the discard has been insignificant both due to the sorting grid and much less abundance of small redfish in the region. Discard of redfish species in the shrimp fishery in ICES Division 14.b is currently considered insignificant (see Chapter 18)[96].

Unobserved and incidental mortality is covered by the assumed natural mortality. The value for that is just assumed at a level that is regarded as sensible for long-lived fish (0.05/year for ages 5-30, 0.1 for older fish).

[94] https://www.hafogvatn.is/static/research/files/fjolrit-142pdf

[95] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2017/NWWG/21-NWWG%20Report%202017%20Sec%2019%20Golden%20redfish%20in%20subareas%205%206%20and%2014.pdf

96 Section 19.3.2 in http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%2019_Golden%20redfish%20in%20subareas%205,%206%20and%2014.pdf

| | |
|---|---|
| The strict control with landings and detailed monitoring of fishing operations by the Coast Guard should make black landings very unlikely. Catches of redfish in other fisheries have to be landed and reported, and accounted against a quota.<br><br>The Faroes and Norway have some fishing permits in Icelandic waters, subject to the rules and regulation that apply to the Icelandic fleet. Foreign vessels must also notify the Icelandic Coast Guard 6 hours prior and post entering and leaving Icelandic waters and during their time within Icelandic waters. Catches, including of golden redfish, that are taken in Icelandic waters may be landed in foreign ports. Icelandic vessels are only permitted to land fish taken in Icelandic waters in foreign ports if these ports are approved by Icelandic authorities, which inter alia requires that these catches are properly registered and are reported back to Iceland. | |
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.1.2.5. Clause 1.2.5.

In the course of research and stock assessment, relevant traditional, fisher and/or community information and/or knowledge shall be sought by the researchers through appropriate means/fora.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**There is close communication between scientists and the fishing industry, both in formal meetings and through informal contact. There are specific consultation groups between fishermen and the MRFI that meet annually in December allowing fishermen (captains) to describe the fishing experience of the year and make comparisons with those previously. Logbooks are compulsory. Their information is not used directly in the stock assessment, but is important background material for both managers and scientists.**

**Evidence:**

There is close communication between scientists and the fishing industry, both in formal meetings and through informal contact. Being a small nation, the Icelandic society is quite transparent. For example, in consultations, several institutions, both in industry and management, often emphasize the value of direct communication and of knowing people.

There are specific consultation groups between fishermen and the MRFI that meet annually in December allowing fishermen (captains) to describe the fishing experience of the year and make comparisons with those previously. MFRI also publishes short newsletters regularly providing updates on stock analysis and related research outcomes.

Logbooks are compulsory (Regulation Nr. 746/2016)[97]. Generally, they are electronic and assembled by the Directorate; the smallest vessels can still use logbooks on paper. The logbook contains information about position, gear, time, duration and catch for each fishing operation, as well as bycatches of birds and mammals, and where the fish is landed. This information is not used directly in the stock assessment, but is important background material for both managers and scientists.

All of the major organisations in the Icelandic fisheries nominate participants to Fiskiping (Parliament of Fisheries), being the supreme authority in all matters regarding Fiskifélag Íslands.

Fiskiþing are held each year. They are AGM of Fiskifélag Íslands one hand, and open seminar on fisheries issues on the other hand.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[97] https://www.stjornarradid.is/verkefni/allar-frettir/frett/2018/10/04/Stjorn-fiskveida-2018-2019-Log-og-reglugerdir/

### 9.1.2.6. Clause 1.2.6.

There shall be active collaboration with international scientific organisations, with the aim of ensuring that the focus is on internationally acknowledged research and assessment methods that provide the best available information on the condition of the stock under consideration at any time.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Iceland is member of ICES, which is a key forum for scientific and management activities and cooperation. Iceland has cooperation with several international organisations, in particular NEAFC and NAFO. Furthermore, the Icelandic government has cooperation agreements with Norway, Russia, Greenland, EU and The Faroe Islands.**

**Evidence:**
Iceland is member of ICES, which is a key forum for scientific and management activities and cooperation. The cooperation includes

- Routine stock assessments and management advice for many commercial stocks, including golden redfish.
- Quality control of assessment standards and management plans.
- For decades, Icelandic scientists have had a high standing within ICES on development of assessment methods and computing tools as well as standards for precautionary management.
- Participation in the broad scientific community in ICES.

The publication record of MFRI clearly shows broad international cooperation on published scientific work.[98]

Iceland has cooperation with several international organisations, in particular NEAFC and NAFO. Furthermore, the Icelandic government has cooperation agreements with Norway, Russia, Greenland, EU and The Faroe Islands. These are bilateral fisheries agreements as well as control agreements and agreements regarding catch information and information on fisheries and the monitoring of fishing activity through satellite driven vessel monitoring systems (VMS)[99]

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

98 https://www.hafogvatn.is/is/midlun/utgafa/ritaskra
99 http://www.fiskistofa.is/english/international-cooperation/

### 9.1.2.7. Clause 1.2.7.

In cases where the stock under consideration is a shared stock or a straddling stock or a highly migratory stock, there shall be scientific cooperation at the relevant bilateral, regional or international level for obtaining data and/or conducting stock assessments and/or providing advice, as appropriate.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The Golden redfish in ICES Subareas 5 and 14 is a shared stock between Iceland, Greenland and the Faroes. Stock assessment, including data preparation, is done in cooperation between the interested nations within the NWWG in ICES.**

**Evidence:**
The Golden redfish in ICES Subareas 5 and 14 is a shared stock between Iceland, Greenland and the Faroes[100]. Stock assessment, including data preparation, is done in cooperation between the interested nations. This work is done within the NWWG in ICES. This is also the case for the evaluation of management plans.

All the nations provide data to the assessment. However, being minor participants in the fisheries, Greenland and the Faroes only provide landings data, while biological samples only are provided by Iceland. There are surveys in all three countries. Results from the Greenland survey (performed by Germany) and the Iceland survey are merged for use in the assessment. The Faroese survey is not used at present, but only covers a minor part of the distribution area.

The general scientific activity on redfish in the area has been low, and mostly concentrated on beaked redfish stock identity issues. There are no cooperative research projects between Iceland, Greenland and the Faroes at present.

| | |
|---|---|
| **References:** | As referenced/see footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[100] https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

### 9.1.3. Clause 1.3. Stock under Consideration, Harvesting Policy and the Precautionary Approach

#### 9.1.3.1. Clause 1.3.1. The Precautionary Approach

##### 9.1.3.1.1. Clause 1.3.1.1.

The precautionary approach[101] shall be implemented to protect the stock under consideration.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The precautionary approach is implemented through a harvest rule that implies low risk of stock depletion.** | | | | |
| **Evidence:**<br>The precautionary approach is implemented through a harvest rule that implies low risk of stock depletion. In response to a request by the governments of Greenland, Iceland and the Faroe Islands, the Marine Research Institute proposed a management plan for golden redfish in February 2014. ICES evaluated the management plan to be consistent with the precautionary and MSY approach. The management plan was adopted by Iceland in March 2014[102]. We note that ICES also referred to the fact that "*a safety rule if SSB falls well below Blim*" should be added (ICES 2014 special request)[103].<br><br>Further aspects related to precautionary management of Icelandic golden redfish are further detailed in the clauses below. | | | | |
| **References:** | As referenced. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

[101] Referring to clause 29.6 of the FAO Eco-labelling Guidelines for Fish and Fishery Products from Marine Capture Fisheries

[102] https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

[103] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/Special%20Requests/Iceland_Faroe_Islands_Greenland_Evaluation_of_ltmp_for_golden_redfish.pdf

#### 9.1.3.1.2. Clause 1.3.1.2.

The stock under consideration shall not be overfished to a level causing recruitment overfishing[104].

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**ICES has defined a limit SSB (Blim) at 160000 tonnes, which is considered to be sufficient for normal recruitment. Reaching that limit is unlikely with the present harvest rule.**

**Evidence:**

The golden redfish stock is not overfished[105].

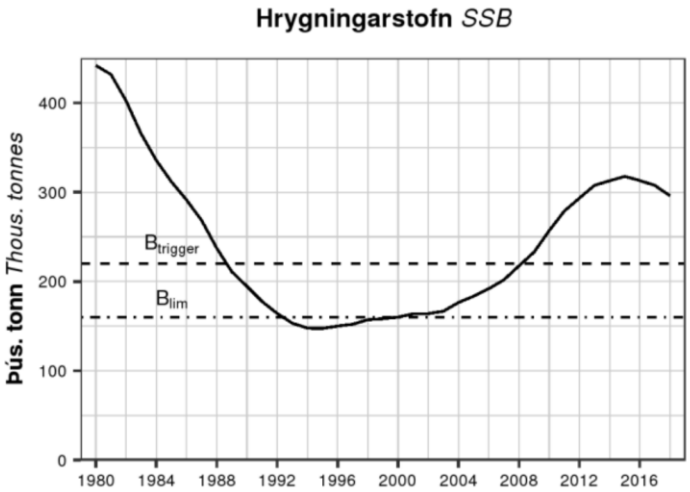



**Figure 28.** Golden redfish spawning stock biomass and reference points.

ICES has defined a limit SSB (Blim) at 160000 tonnes, which is considered to be sufficient for normal recruitment. It is the lowest observed SSB in the assessed time series, according to the assessment in 2014, when it was set. Above this SSB level, the recruitment is irregular with occasional strong year classes, but it does not seem to be dependent on SSB (see Clause 1.2.3). Reaching that limit is unlikely with the present harvest rule.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[104] The 'stock under consideration' is not overfished if it is above the associated limit reference point (or its proxy)." FAO Guidelines (2009), par. 30.1.
[105] https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

#### 9.1.3.1.3. Clause 1.3.1.3.

Relevant uncertainties shall be taken into account through a suitable method of risk assessment.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The harvest rule that is used for deciding quotas for golden redfish was tested by simulation, taking the relevant sources of uncertainty into account.** | | | | |
| **Evidence:**<br>The harvest rule that is used for deciding quotas for golden redfish was tested by simulation. The simulations were done as a bootstrap simulation, where all relevant uncertainties were represented by distributions, based on the experience with stock dynamics and assessment performance. This procedure is the standard way of evaluating harvest rules in ICES and elsewhere.[106] The harvest rule was found to be in accordance with the precautionary approach, according to the rules practiced by ICES. These rules imply a low probability of bringing the stock below Blim.[107] | | | | |
| **References:** | See footnotes. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

106 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WKGMSE/Report%20of%20the%20Workshop%20on%20Guidelines%20for%20Management%20Strategy%20Evaluations.pdf

107 Section 1.2.6 in http://www.ices.dk/community/advisory-process/Pages/Basis-for-ICES-Advice.aspx

### 9.1.3.1.4. Clause 1.3.1.4.

Appropriate reference points shall be determined and remedial actions to be taken if reference points are approached or exceeded shall be specified[108].

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**ICES has defined reference points for golden redfish that have been adopted by MFRI. The harvest rule prescribes a reduction in the fishing mortality if SSB goes below a trigger value of 220 000 tonnes. With the current stock dynamics and harvest rule, this situation is unlikely. Further measures if SSB gets too low would depend on the reason why the SSB became reduced. The Icelandic management has the authority to take the necessary action.**

**Evidence:**

ICES has defined reference points for golden redfish that have been adopted by the MFRI[109]. The values and their justification is listed below:

| | |
|---|---|
| Forsendur ráðgjafar<br>*Advice basis* | Aflaregla samþykkt af Grænlandi og Íslandi.<br>*Management plan agreed by Greenland and Iceland.* |
| Aflaregla<br>*Management plan* | Aflamark sett á veiðar við $F_{MSY}$ þegar stofn er yfir MSY $B_{trigger}$.<br>*TAC set at $F_{MSY}$ when the stock is over MSY $B_{trigger}$.* |
| Stofnmat<br>*Assessment type* | Aldurs- og lengdarháð stofnlíkan (Gadget).<br>*Length and age based analytical assessment (Gadget model).* |
| Inntaksgögn<br><br>*Input data* | Afli og lengdargögn úr afla frá Íslandi, Grænlandi og Færeyjum;<br>aldurs og lengdargögn úr stofnmælingum (SMB, SMH, stofnmælingar við Austur Grænland).<br>*Landings data and length distributions of catches from Iceland, Greenland, and the Faroes; survey data by length from IS-SMB and GER(GRL)-GFS-Q4, age data from Icelandic catches and IS-SMH.* |

| Nálgun<br>*Framework* | Gátmörk<br>*Reference point* | Gildi<br>*Value* | Grundvöllur<br>*Basis* |
|---|---|---|---|
| MSY<br>*MSY approach* | MSY $B_{trigger}$ | 220 000 t | $B_{lim}$ × exp(0.2 × 1.645). |
| | $F_{MSY}$ | 0.097 | Meðaltal aldurshópanna 9–19 ára. 80% af $F_{MAX}$ í úttekt árið 2012.<br>*Average of ages 9–19. 80% of $F_{MAX}$ in the 2012 Gadget run.* |
| Varúðarnálgun<br>*Precautionary approach* | $B_{lim}$ | 160 000 t | Lægsta sögulega gildi hrygningarstofns í úttekt árið 2012.<br>*Lowest SSB in the 2012 Gadget run.* |
| | $B_{pa}$ | 220 000 t | $B_{pa}=B_{trigger}= B_{lim}$ × exp(0.2 × 1.645). |
| | $F_{lim}$ | 0.226 | Veiðidánartala sem leiðir til þess að hrygningarstofn er yfir $B_{lim}$ með 50% líkum.<br>*Equilibrium F which will maintain the stock above $B_{lim}$ with a 50% probability.* |
| | $F_{pa}$ | 0.163 | $F_{lim}$ / exp(1.645 x 0.2). |

The Blim is the lowest value of SSB on record, as estimated in 2012 when the value was set. This is the SSB in 1995, at the time estimated at 160 kt. However, the Blim has been maintained as the difference is small and the management plan implies a low probability of even reaching 169 kt.

The Bpa represents the SSB where there is some probability that SSB actually is at Blim, due to assessment uncertainty. It is derived from Blim assuming an SD of the SSB estimate of 0.2.

[108] FAO Code of Conduct for Responsible Fisheries, Article 7.5.2.

[109] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf

The harvest rule is to derive a TAC corresponding to a fishing mortality of 0.097. This standard F is reduced if SSB is estimated below the Bpa, which in this context is handled as a trigger biomass in the rule. The efficiency of this measure has not been tested extensively, as the need for this reduction is very unlikely with the stock dynamics and uncertainties that were assumed in the simulation. Further measures would depend on the reason why the SSB became reduced. The Icelandic management has the authority to take the necessary action.

Precautionary fishing mortality reference points have been defined, but are not used at present. An Flim was derived from Blim as the fishing mortality that would lead to 50% probability of being below Blim, and the Fpa is set as a safety margin to account for uncertain assessments, with an assumed SD of 0.2. Both are far above the F in the harvest rule.

The F = 0.097 in the rule is regarded as an FMSY. It is an old (2012) estimate of FMSY. The FMSY estimate was revised upwards to 0.114 as a shift in growth rated in 1996 was included in the Gadget model. The agreed fishing mortality of 0.097 is therefore around 85% of FMAX with current settings, but still well above F0.1 (Figure below). Stochastic simulations indicate that it leads to very low probability of spawning stock going below Btrigger and Blim, even with relatively large autocorrelated assessment error.

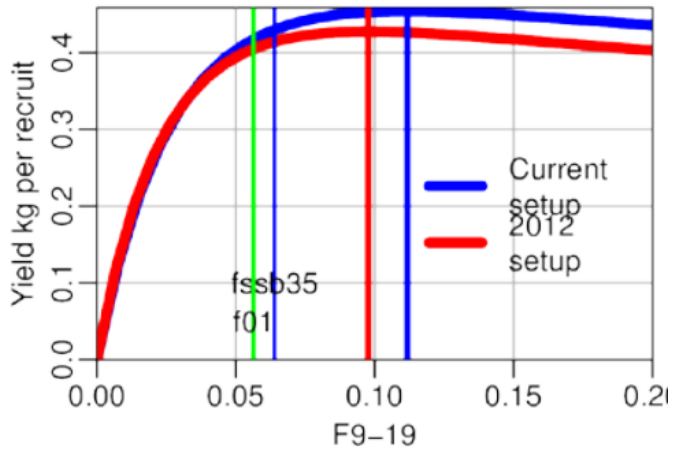



**Figure 29.** Present and past yield per recruit for golden redfish.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.1.3.1.5. Clause 1.3.1.5.

The long-term harvesting policy shall be stated in the Fisheries Management Plan.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The general long term harvesting policy is stated by government of Iceland as: "The management strategy for Icelandic fish stocks, in general, is to maintain the exploitation rate at the level which is consistent with the Precautionary Approach and that generates maximum sustainable yield (MSY) in the long term". This also appears as the objective of the management plan for golden redfish.**

**Evidence:**
The Government of Iceland has issued the following general statement on management plans[110]:

*The management strategy for Icelandic fish stocks, in general, is to maintain the exploitation rate at the level which is consistent with the Precautionary Approach and that generates maximum sustainable yield (MSY) in the long term.*
*Harvest Control Rules (HCR) are set by the managers of the fishery, in the case of Iceland by the government and are based on knowledge on the state of the stock and take account of the managers objectives, the nature of the resource and uncertainties. The main aim HCRs is thus to:*

- *Decrease the risk of short term interests influencing the level of exploitation.*
- *Ensures that the available information on the resource are used in the most rigorous manner.*
- *Long term sustainable yield*
- *Ensure that stock is above save biological limits*
- *Often include buffers on the amount of Catch/TAC change between fishing seasons.*

The specific rule for golden redfish has the policy statement:
*The management strategy for golden redfish is to maintain the exploitation rate at the rate which is consistent with the precautionary approach and that generates maximum sustainable yield (MSY) in the long term.*

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

110 https://www.government.is/news/article/?newsid=cf30e5ad-584f-11e8-9429-005056bc4d74

### 9.1.3.1.6. Clause 1.3.1.6.

The Fisheries Management Plan shall specify how the precautionary approach shall be implemented for the stock under consideration.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The fishing mortality according to the harvest rule of 0.097 implies a low probability of bringing the SSB below Blim, which is the biomass below which recruitment is impaired or stock dynamics are unknown. An additional measure is to apply a reduced F if SSB is below a trigger level of 220 kt.** | | | | |
| **Evidence:**<br>Following ICES practice[111], implementing the precautionary approach in a management plan would imply to ensure a low probability of bringing the spawning biomass to a point (expressed as Blim) where recruitment may be impaired or stock dynamics is unknown (as is the case for Blim for golden redfish). For the golden redfish, this is achieved by applying a fishing mortality according to the harvest rule of 0.097, which has been demonstrated by simulations taking relevant uncertainties into account, to imply a low probability (<0.05) of bringing the SSB below Blim. An additional measure is to apply an F below this value if SSB is below a trigger level of 220 kt. | | | | |
| **References:** | See footnotes. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

111 Section 1.2.6 in http://www.ices.dk/community/advisory-process/Pages/Basis-for-ICES-Advice.aspx

### 9.1.3.2. Clause 1.3.2. Management targets and limits

#### 9.1.3.2.1. Clause 1.3.2.1. Harvesting rate and fishing mortality

**Clause 1.3.2.1.1.**

The management target for fishing mortality (or its proxy) and the associated limit reference point, as well as the management action to be taken when the limit reference point is exceeded, shall be stated in the Fisheries Management Plan[112].

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The management target for the fishing mortality is at 0.097. According to the rule, the target F shall be reduced linearly towards the origin if SSB in the assessment year is estimated below Btrigger = Bpa = 220kt. A limit fishing mortality has been set at 0.226 which is more than two times the target fishing mortality in the harvest rule.** | | | | |
| **Evidence:**<br>The management target for the fishing mortality is at 0.097. According to the rule, the target F shall be reduced linearly towards the origin if SSB in the assessment year is estimated below Btrigger = Bpa = 220 kt. A limit fishing mortality has been set at 0.226 which is more than two times the target fishing mortality in the harvest rule. Please also see clause 1.3.1.2. | | | | |
| **References:** | See footnotes. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

[112] $F_{lim}$ can be explicit or implicit in cases where harvest rate is set annually to a precautionary $F_{target}$ (or its proxy)

**Clause 1.3.2.1.2.**

If fishing mortality (or its proxy) is above the limit reference point, management actions shall be taken to decrease the fishing mortality (or its proxy) below the limit reference point[113].

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**There is no explicit measures planned for the event that fishing mortality shall exceed the F limit. The limit is so high that reaching it when setting TACs according to the target is extremely unlikely.** | | | | |
| **Evidence:**<br>There is no measures planned for the event that fishing mortality shall exceed the F limit, except to apply the target fishing mortality again. The limit is so high that reaching it when setting TACs according to the target is extremely unlikely. In the period covered by the assessment (1971 - present), the fishing mortality estimate has never been that high[114]. If that should happen, the only sensible response would be to invoke a full revision of the management of golden redfish. The government has the authority to do so. | | | | |
| **References:** | See footnotes. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

[113] FAO Guidelines (2009), par. 30.2. See also: The 'stock under consideration' is not overfished if it is above the associated limit reference point (or its proxy)." FAO Guidelines (2009), par. 30.1.

[114] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf

### 9.1.3.2.2. Clause 1.3.2.2. Stock Biomass

**Clause 1.3.2.2.1.**

The long term management target for stock size (biomass), either explicit or implicit depending on management approach, consistent with the objective of promoting optimum utilization, shall be specified.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**A long term target for the stock size is considered redundant and not defined.** | | | | |
| **Evidence:**<br>A long term target for the stock size is not defined. It is considered redundant as the management target is to maintain a fishing mortality that is expected to lead to a biomass fluctuating safely above the precautionary biomass limit. The target fishing mortality has been demonstrated to provide a long term yield close to the MSY. | | | | |
| **References:** | N/A. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

**Clause 1.3.2.2.2.**

Limits or directions for stock size (or its proxy) with respect to precautionary management, consistent with avoiding recruitment overfishing, shall be specified.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**A precautionary limit biomass has been defined as SSB = 160000 tonnes, above which there is no indications of impaired recruitment.** | | | | |
| **Evidence:**<br>A precautionary limit biomass Blim has been defined as SSB = 160000 tonnes, and a trigger point in the harvest rule as SSB = 220000 tonnes. The limit value is near the lowest SSB observed, and there has been no indications of recruitment failure at that level. Simulations demonstrate a very low risk of reaching the SSB limit with the target fishing mortality. The biomass limit is discussed in more detail under clauses 1.3.1.4. | | | | |
| **References:** | As referenced in the clause. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

**Clause 1.3.2.2.3.**

The stock (biomass) limit reference point ($B_{lim}$) shall be developed in accordance with internationally accepted practice.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The procedure applied when setting reference points follows ICES standards and the results were accepted by ICES.** | | | | |
| **Evidence:**<br>The background for Blim is described in detail in Clause 1.3.1.4. This procedure follows ICES standards[115] and the result was accepted by ICES. | | | | |
| **References:** | See footnote. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

115 http://ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/12.04.03.01_Reference_points_for_category_1_and_2.pdf

**Clause 1.3.2.2.4.**

Should the estimated stock size approach $B_{lim}$ (or its proxy), then appropriate management action shall be taken with the objective of restoring stock size to levels above $B_{lim}$ (or its proxy) with high probability within a reasonable time frame.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The harvest rule prescribes a reduction in the target fishing mortality if SSB is below 220000 tonnes. Simulations demonstrate that approaching Blim would be very unlikely unless something happens that was not foreseen in the simulations. If so happens, further measures to be taken should be adapted to the underlying cause.** | | | | |
| **Evidence:**<br>Already if SSB falls below the trigger point at 220000 tonnes, the fishing mortality according to the rule is reduced linearly towards the origin. There is no specific action to be taken if SSB is estimated below Blim. According to the simulations done when evaluating the harvest rule, approaching Blim would be very unlikely unless something happens that was not foreseen in the simulations. If so happens, further measures to be taken should be adapted to the underlying cause. ICES, when evaluating the plan, recommended a revision clause for the situation that SSB goes below Blim[116]. This has not been explicitly incorporated, but the government has the legal instruments to take action as needed. ICES further proposed a revision after 5 years. A revision is now planned for 2020 as part of a benchmark assessment.<br><br>The Assessment Team has provided a recommendation for the Client Group to deal specifically with the ICES recommendation of adding a safety rule to the golden redfish FMP. See the Future Surveillance Action Section for further details. | | | | |
| **References:** | See footnotes. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

116 http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/Special%20Requests/Iceland_Faroe_Islands_Greenland_Evaluation_of_ltmp_for_golden_redfish.pdf

### 9.1.3.2.3. 1.3.2.3. Stock biology and life-cycle (structure and resilience)

**Clause 1.3.2.3.1.**

Information on the biology, life-cycle and structure of the stock shall be taken into account when designing management measures to promote optimal utilisation of the stock with respect to resilience to natural variability and fishing[117].

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The harvest rule was designed to provide a near maximum long term yield and a stock abundance safely away from the limit. The target fishing mortality is set on the low side of the plateau associated with maximum yield, which provides a buffer biomass against natural variations in productivity.** | | | | |
| **Evidence:**<br>The harvest rule was designed to provide a near maximum long term yield and a stock abundance safely away from the limit. The target fishing mortality is set on the low side of the plateau associated with maximum yield, (see Clause 1.3.1.4) which provides a buffer biomass against natural variations in productivity, and ensures near maximum yield with a minimum fishing pressure. | | | | |
| **References:** | As referenced. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

[117] From FAO Guidelines (2009), para 30.3. The structure and composition of the "stock under consideration" which contribute to its resilience are taken into account.

**Clause 1.3.2.3.2.**

Consideration shall be given to measures designed to avoid excessive exploitation of spawning components at spawning time, as appropriate, especially at times when biomass (SSB) may approach the level of the limit reference point ($B_{lim}$)[118].

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The stock is well above its limit biomass level. There are no specific measures at present directed towards protecting extrusion areas.** | | | | |
| **Evidence:**<br>The stock is well above its limit biomass level. Extrusion areas (rather than spawning areas for redfish since they are viviparous) are assumed to be located outside the South-West coast of Iceland (See Clause 1.1.8). From here, larvae may drift over to East Greenland were juveniles are found in the German trawl survey[119]. There is no specific measures directed towards protecting extrusion areas. | | | | |
| **References:** | See footnote. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

[118] FAO Guidelines (2009), par. 30.3.

[119] https://www.hafogvatn.is/static/extras/images/05-ICES_NWWG_loka731445.pdf

**Clause 1.3.2.3.3.**

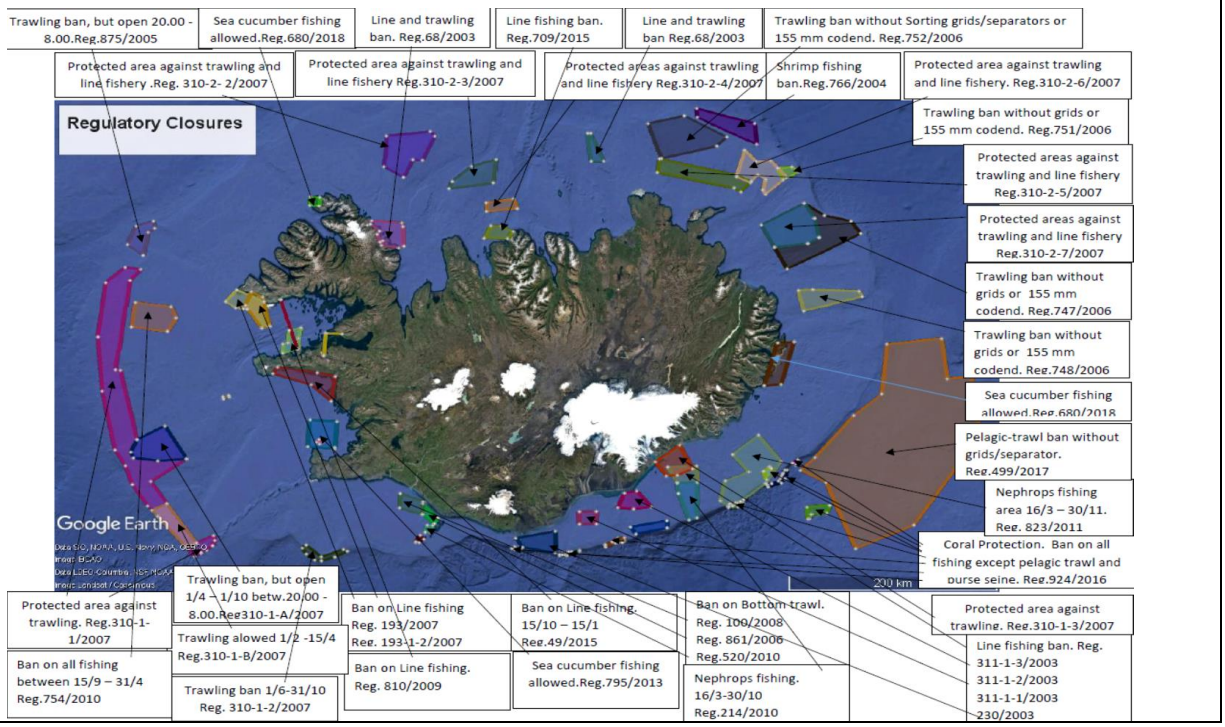
Consideration shall be given to relevant measures designed to limit fishing mortality of juvenile fish, with the objective to protect juveniles, to reduce the likelihood of growth overfishing and increasing the contribution of year classes to the spawning stock of the stock under consideration.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**There are nursery areas for golden redfish in Iceland and Greenland waters. Sorting grids are compulsory in shrimp trawls in both countries. In Iceland there are permanent area closures to protect juvenile golden redfish, and short term closures are invoked if undersized golden redfish appears in the catches.**

An overview of existing knowledge of the distribution of juvenile golden redfish (named *S. marinus* at that time) was provided by NWWG in 2007.[120] Available data on the distribution of juvenile golden redfish indicate nursery grounds both in Icelandic and Greenland waters but not in Faroese waters. There is considerable amounts of juvenile redfish off East Greenland, mixed with juvenile *S. mentella*. The nursery areas for golden redfish in Icelandic waters are found all around Iceland, but are mainly located west and north of the island at depths between 50 and 350 m. As they grow, the juveniles migrate along the north coast towards the most important fishing areas off the west coast. The long purple trawl closures in the South West of Iceland were originally designed to protect golden redfish juveniles, and were originally set up in the early 1990s[121] (Figure below).




120 Section 7.2. in http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2007/NWWG/07-Redfish%20in%20Subareas%20V,%20VI,%20XII%20and%20XIV.pdf

121 https://www.hafogvatn.is/static/research/files/fjolrit-133pdf

| | |
|---|---|
| **Figure 30.** Regulatory closures in Iceland. The long purple trawl closures in the South West of Iceland were originally designed to protect golden redfish juveniles, and were originally set up in the early 1990s[122] . Interactive maps available from the Directorate[123].<br><br>There is no formal minimum landing size for golden redfish, but fishermen are only allowed to have up to 20% undersized (i.e. <33 cm) specimens of golden redfish (in numbers) in each haul. If the number of redfish <33 cm in a haul is more than 20%, temporary closure is invoked. 33 cm is approximately the mean length at first maturity.<br><br>Fishing with trawls is prohibited in large areas near the coast which serve as spawning and nursery areas for many species. Sorting grids in fishing gear are obligatory in certain fisheries to prevent catches of juvenile fish. | |
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[122] https://www.hafogvatn.is/static/research/files/fjolrit-133pdf
[123] http://www.fiskistofa.is/fiskveidistjorn/veidibann/reglugerdarlokanir/

### 9.1.4. Clause 1.4. External Scientific Review

#### 9.1.4.1. Clause 1.4.1.

For the stock under consideration the harvesting policy (including its consistency with the precautionary approach), stock assessments and advice shall be reviewed, by request from the fisheries management authorities at appropriate, regular intervals as well as when substantive changes are made in harvesting policy by an appropriate international scientific body or committee.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**ICES is regarded as the relevant scientific body that organizes stock assessments and performs evaluations of management plans The assessment as well as the management plan for golden redfish were evaluated and approved in 2014. A re-evaluation of the assessment method and management plan is planned in 2020.** | | | | |
| **Evidence:**<br>ICES is regarded as the relevant scientific body. It organizes stock assessments, performs evaluations of management plans and advises on a wide range of issues within marine science, including fisheries management. The assessment as well as the management plan for golden redfish were evaluated and approved in 2014. The approved procedures have been followed since then. A re-evaluation of assessment methods and management plan is planned in 2020[124]. | | | | |
| **References:** | See footnote. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

[124] https://www.hafogvatn.is/static/extras/images/05-ICES_NWWG_loka731445.pdf

### 9.1.4.2. Clause 1.4.2.

Following external scientific review, the competent fisheries management authority shall review and/or revise the harvesting policy, taking into consideration the external review, as appropriate.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The Icelandic management authorities decides the harvesting policy, including the management plan. It takes advice form the MFRI as well as from the industry and fishermen. Managers and MFRI will seek the advice from ICES when revising harvesting policy. A revision of the ICES advice is planned for 2020.** | | | | |
| **Evidence:**<br>The Icelandic management authorities decides the harvesting policy, including the management plan. It takes advice form the MFRI as well as from the industry and fishermen. Managers and MFRI will seek the advice from ICES when revising harvesting policy. A revision of the ICES advice is planned for 2020[125]. | | | | |
| **References:** | See footnote. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

[125] https://www.hafogvatn.is/static/extras/images/05-ICES_NWWG_loka731445.pdf

### 9.1.5. Clause 1.5. Advice and Decisions on TAC

#### 9.1.5.1. Clause 1.5.1.

A competent scientific body, research institute, designated advisory body or arrangement shall provide the competent fisheries management authority with fisheries advice on the harvesting of the stock under consideration, in a timely manner.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The stock assessment and advice for the TAC in the coming year is provided annually by ICES. The MFRI provides advice to the Ministry, which is the competent fisheries management authority.** | | | | |
| **Evidence:**<br>The stock assessment and advice for the TAC in the coming year is provided annually by ICES. Based on that, the MFRI provides advice to the Ministry, which is the competent fisheries management authority. Normally, the MFRI advice will be identical to the ICES advice. The ICES advice is published on the ICES websites and the MFRI advice is published on the MFRI website annually around June. The last advice was published by ICES in June 2018[126]. | | | | |
| **References:** | See footnote. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

[126] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf

### 9.1.5.2. Clause 1.5.2.

Advice shall include the appropriate value(s) for precautionary reference points.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The advice published by the MFRI has reference points tabulated. These are identical to the reference points defined by ICES, and include the reference values in the harvest rule in the management plan.**

**Evidence:**

The advice published by the MFRI[127] in 2018 has reference points tabulated (shown below). These are identical to the reference points defined by ICES, and include the reference values in the harvest rule in the management plan.

| Nálgun<br>*Framework* | Gátmörk<br>*Reference point* | Gildi<br>*Value* | Grundvöllur<br>*Basis* |
|---|---|---|---|
| MSY<br>*MSY approach* | MSY $B_{trigger}$ | 220 000 t | $B_{lim}$ × exp(0.2 × 1.645). |
| | $F_{MSY}$ | 0.097 | Meðaltal aldurshópanna 9–19 ára. 80% af $F_{MAX}$ í úttekt árið 2012.<br>*Average of ages 9–19. 80% of $F_{MAX}$ in the 2012 Gadget run.* |
| Varúðarnálgun<br>*Precautionary approach* | $B_{lim}$ | 160 000 t | Lægsta sögulega gildi hrygningarstofns í úttekt árið 2012.<br>*Lowest SSB in the 2012 Gadget run.* |
| | $B_{pa}$ | 220 000 t | $B_{pa}=B_{trigger}= B_{lim}$ × exp(0.2 × 1.645). |
| | $F_{lim}$ | 0.226 | Veiðidánartala sem leiðir til þess að hrygningarstofn er yfir $B_{lim}$ með 50% líkum.<br>*Equilibrium F which will maintain the stock above $B_{lim}$ with a 50% probability.* |
| | $F_{pa}$ | 0.163 | $F_{lim}$ / exp(1.645 x 0.2). |

| **References:** | See footnote. |
|---|---|
| **Non-Conformance Number (if relevant)** | **NA** |

127 Advice published June 2018: https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

### 9.1.5.3. Clause 1.5.3.

Decisions on TAC shall be taken by the competent fisheries management authority taking into consideration the entire distribution range of the stock under consideration, as appropriate.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**The stock of golden redfish is shared between Iceland, Greenland and the Faroes. The harvest rule defines the overall TAC according to the assessed state of the stock. There is an agreement between Iceland and Greenland on sharing the TAC. There is no such agreement with the Faroes.**

**Evidence:**

The stock of golden redfish is shared between Iceland, Greenland and the Faroes. The very minor catches in ICES subarea 6 (West of Scotland) are also included in the assessment. The stock identity of the redfish stock in ICES Subarea 6 is unclear, but it is not normally regarded as part of the Iceland-East Greenland-Faroes stock and the catches there are negligible. The harvest rule defines the overall TAC according to the assessed state of the stock. There is an agreement between Iceland and Greenland to allocate 90% of the overall TAC to Iceland and 10% to Greenland after setting aside 350 tonnes to other nations. There is no such agreement with the Faroes, but so far, their share of the total catch has been small (Figure below[128]). Since 2011, the Greenland share of the total catch has been 2 to 9%, and the Faroese 0.3 to 1.1% (165-493 tonnes), except in 2017, where it was 2.5% (1397 tonnes).

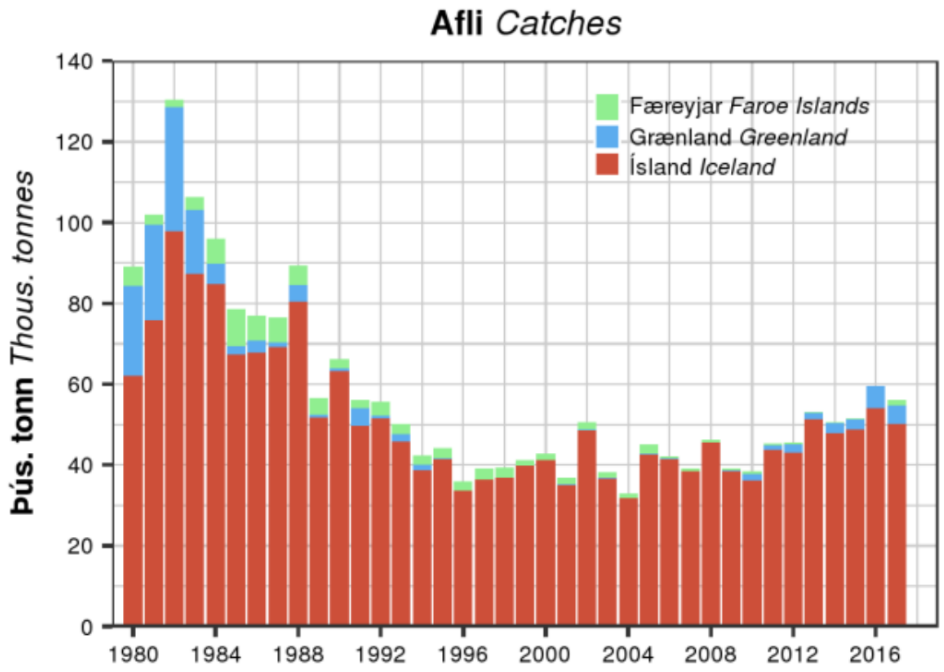



**Figure 31.** Golden redfish catches in Iceland, East Greenland and the Faroese. From 1980 to 2017.

[128] https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

In Iceland, the decision on TAC is taken by the Ministry of Industry and Innovation, based on advice from ICES and MFRI. The national TAC has been overshot since 2014, when the management plan has been in effect in 2014, by an average of with 2.7 – 11.5% (Table 5). The reasons for these overages and their effect are explained in clause 1.5.8.

**Table 5.** Recommended TAC, National TAC, and catches (tonnes). Note that Icelandic waters is on fishing year whereas catch in other areas and total catch is calendar year.

| Fiskveiðiár *Fishing year* | Tillaga *Recommended TAC* | Aflamark fyrir Íslandsmið *National TAC* | Afli á Íslandsmiðum *Catch Icelandic waters* | Afli á öðrum miðum[1] *Catch other areas[1]* | Afli alls[1] *Total catch[1]* |
|---|---|---|---|---|---|
| 2010/11 | 30 000 | 37 500 | 39 432 | 1498 | 45 271 |
| 2011/12 | 40 000 | 40 000 | 44 514 | 2508 | 45 597 |
| 2012/13 | 45 000 | 45 000 | 46 549 | 1871 | 53 201 |
| 2013/14 | 52 000 | 52 000 | 52 451 | 2907 | 50 676 |
| 2014/15 | 48 000[2] | 45 600 | 48 349 | 2832 | 51 601 |
| 2015/16 | 51 000[2] | 48 500 | 54 818 | 5607 | 59 648 |
| 2016/17 | 52 800[2] | 47 205 | 48 532 | 5889 | 56 017 |
| 2017/18 | 50 800[2] | 45 450 | | | |
| 2018/19 | 43 600[2] | | | | |

[1] Almanaksár. *Calendar year.*

[2] Aflaregla fyrir Austur-Grænland/Ísland/Færeyjar. Færeyjar standa utan samkomulagsins *Harvest control rule for East Greenland/Iceland/Faroes. The Faroe Islands are not a part of the agreement.*

| **References:** | See footnotes. |
|---|---|
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.1.5.4. Clause 1.5.4.

For shared stocks the setting of TAC shall take into consideration international agreements and scientific advice.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The stock is shared between Iceland, Greenland and the Faroes. Iceland and Greenland have agreed to share the TAC derived from the harvest rule, as derived from the stock assessment in ICES, where both nations participate.** | | | | |
| **Evidence:**<br>The stock is shared between Iceland, Greenland and the Faroes. Iceland and Greenland have agreed to share the TAC derived from the harvest rule[129], as derived from the stock assessment in ICES, where both nations participate. The agreement implies that 10% of the international quota derived according to the harvest rule is set aside for Greenland, and 350 tonnes for catches by other nations (in practice, for the Faroes). The actual catch in Greenland is not directly monitored, as redfish in Greenland is recorded as such and not by species, and the catch of golden redfish generally is bycatch in the cod fishery. | | | | |
| **References:** | See footnote. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

129 https://www.government.is/news/article/?newsid=cf30e5ad-584f-11e8-9429-005056bc4d74

### 9.1.5.5. Clause 1.5.5.

The competent fisheries management authority shall decide on TAC within the boundaries set by the adopted harvesting policy.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The TAC is set by the Ministry after advice from MFRI and consultations with the industry. The Ministry has the authority to deviate from the advice. In practice, where harvest rules are in effect, the advice has been according to the rule and the TAC set according to the advice.** | | | | |
| **Evidence:**<br>The TAC is set by the Ministry after advice from MFRI and consultations with the industry. The Ministry has the authority to deviate from the advice. However, in practice, since 2015 when the harvest control rule came into effect, the advice has been according to the rule and the TAC set according to the advice. | | | | |
| **References:** | See clause 1.5.3. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

### 9.1.5.6. Clause 1.5.6.

Management measures for conservation and sustainable use of the stock under consideration shall be specified in laws and regulations.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The management of golden redfish is part of the general fisheries management, stated in the suite of rules and regulations applicable to all commercial fisheries in Iceland.**

**Evidence:**

As discussed in more detail in Clause 1.1.7 - 1.1.10, the management plan for golden redfish specifies key management measures for this species[130], many of which are shared by all other groundfish commercial species (aside from the specifics of the Harvest Control Rule[131]). The management of golden redfish is part of the general fisheries management, stated in the suite of rules and regulations applicable to all commercial fisheries in Iceland.

A harvest rule is in place for golden redfish, which states how the TAC is calculated based on stock abundance estimated in an analytic stock assessment. The rule is *inter alia* published in the government web pages[132].

2018/2019 laws and regulations for fisheries management are specified here (https://www.stjornarradid.is/verkefni/allar-frettir/frett/2018/10/04/Stjorn-fiskveida-2018-2019-Log-og-reglugerdir/).

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[130] https://www.government.is/news/article/2014/04/01/FisheriesManagement-Plan-Golden-Redfish/
[131] https://www.government.is/news/article/2018/05/15/Haddock/
132 https://www.government.is/news/article/?newsid=cf30e5ad-584f-11e8-9429-005056bc4d74

### 9.1.5.7. Clause 1.5.7.

Practical implementation shall be the task of (a) designated competent institution(s).

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The practical implementation of management decisions is the task of the Directorate, which is the executive body that organizes the ITQ system and monitors catches, the Coast guard which is responsible for surveillance and enforcement at sea and the MFRI which performs assessments and provides advice.** | | | | |
| **Evidence:**<br>As described in detail under Clauses 1.1.1-3, the practical implementation of management decisions is the task of the Directorate, which is the executive body that organizes the ITQ system and monitors catches, the Coast guard which is responsible for surveillance and enforcement at sea and the MFRI which performs assessments and provides advice. Please refer to these clauses for further information. | | | | |
| **References:** | As referenced. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

### 9.1.5.8. Clause 1.5.8.

Decisions on TAC in the appropriate units shall be made and implemented in such a way as to ensure that the actual catch is as close to the intended catch as practically possible.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**There is a wide range of measures to ensure that the total catch is in accordance with the decided TAC. These include a landings obligation, catch reporting by independent, authorized personnel, and close monitoring of activities at sea. However, legal transfers of quotas between species and years may lead to catches deviating from the set quotas. Since the introduction of the management plan in 2014, catches have exceeded quotas by 2.7-11.5%.**

**Evidence:**

There is a wide range of measures to ensure that the total catch is in accordance with the decided TAC.

- There is an obligation to land all catches, discarding is prohibited. Apparently, discards of golden redfish is a minor problem, but the control is sparse.
- All landings must take place in designated ports, where the catch is weighed by authorized personnel. The approved weighs are entered directly into a database held by the Directorate, which is the primary source for catch statistics and monitoring of the quota status.
- There is a close monitoring of activities at sea
  - Direct inspections by the Coast guard and by on board inspectors from the Directorate.
  - Detailed VMS monitoring which is closely followed by the Coast Guard, for control but also for security reasons.

Since the introduction of the management plan in 2014, Icelandic catches have exceeded quotas by 2.7-11.5%. The table below shows the recent historical record of adherence to the quotas, according to the MFRI advice.

| Fiskveiðiár *Fishing year* | Tillaga *Recommended TAC* | Aflamark fyrir Íslandsmið *National TAC* | Afli á Íslandsmiðum *Catch Icelandic waters* | Afli á öðrum miðum[1] *Catch other areas[1]* | Afli alls[1] *Total catch[1]* |
|---|---|---|---|---|---|
| 2010/11 | 30 000 | 37 500 | 39 432 | 1498 | 45 271 |
| 2011/12 | 40 000 | 40 000 | 44 514 | 2508 | 45 597 |
| 2012/13 | 45 000 | 45 000 | 46 549 | 1871 | 53 201 |
| 2013/14 | 52 000 | 52 000 | 52 451 | 2907 | 50 676 |
| 2014/15 | 48 000[2] | 45 600 | 48 349 | 2832 | 51 601 |
| 2015/16 | 51 000[2] | 48 500 | 54 818 | 5607 | 59 648 |
| 2016/17 | 52 800[2] | 47 205 | 48 532 | 5889 | 56 017 |
| 2017/18 | 50 800[2] | 45 450 | | | |
| 2018/19 | 43 600[2] | | | | |

[1] Almanaksár. *Calendar year.*

[2] Aflaregla fyrir Austur-Grænland/Ísland/Færeyjar. Færeyjar standa utan samkomulagsins *Harvest control rule for East Greenland/Iceland/Faroes. The Faroe Islands are not a part of the agreement.*

Some of the overall TAC overages are due to catches of golden redfish outside Iceland.

For example, In Greenland there is no explicit TAC for golden redfish, and redfish is only recorded generally as "redfish", not by species (e.g. *S. norvegicus, mentella* etc…). There, redfish is caught mostly as by-catch in cod fisheries. Juvenile redfish can be caught in the shrimp fisheries, but is to a large extent protected by the use of sorting grids. A substantial increase in landings from East Greenland has occurred since 2010, and is now the highest since early 1990s.

In the Faroes, the main regulatory tool is effort-quotas but there is no explicit quota for golden redfish, hence any catch there contributes to the overall TAC overage.

**Reasons for overshooting TAC**

Nevertheless, there may be some deviation of final catches from the decided TAC. Some reasons for that are readily identified:

- Transfer of quotas between years, which is legal within bounds. Vessels may transfer up to 15%[133] of catch quotas for each demersal species from one year to the next.
- Transfer of quotas between species. It may happen that vessels spend part of the golden redfish quota on other species or uses quotas for other species to cover catches of golden redfish.
- Undersize fish catches shall still be landed and sold (up to 5% of other marine catches per fishing year), but the vessel gets only 20%. The reminder goes to the Fisheries Commission Project Fund or 'VS Fund'[134].

Fiskistofa communicated to the Audit Team that the main reason for recently overshooting the TAC is that there are considerable golden redfish bycatches in the targeted fisheries for cod/haddock in areas closer to the coast (as opposed to deep sea fisheries). Typically these are the small to medium sized vessels in the fleet with limited catch quota in golden redfish. As a result, they utilize the allowances for transfers between species to accommodate the redfish catches in their quota portfolio. This is a relatively large part of the fishing fleet so small catches handled in this way eventually add up.

Fiskistofa also highlighted that an attempt to incorporate these catches into the TAC (e.g. by increasing the catch quota) would mainly increase the catch quotas of the vessels that have high quota shares and are targeting the redfish but would not help the vessels that are using the transferability option. On the other hand, stronger restrictions on transfer between species for the golden redfish may only increase the temptation for discarding – which at the moment is considered negligible[135].

Some of the points illustrated above impacting on TAC overages are shown in the figure below.

[133] Act No. 116/2006 as amended by Act No. 22/2010
[134] http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Sveigjanleiki_i_aflamarkskerfinu
[135] https://www.hafogvatn.is/static/extras/images/05-ICES_NWWG_loka731445.pdf

| Species | Cod | Haddock | Saithe | Redfish |
|---|---|---|---|---|
| Alloc. quota | 203,094 | 31,746 | 47,918 | 43,042 |
| Compensations | 2,204 | 664 | 1,695 | 2,277 |
| Trfr. prev. year | 8,289 | 4,312 | 7,016 | 3,322 |
| Allowed catch | 213,587 | 36,722 | 56,629 | 48,641 |
| Catch | 213,007 | 34,460 | 48,815 | 51,430 |
| Balance | 580 | 2,263 | 7,814 | -2,788 |
| Transfers | -13 | 1,041 | -1,553 | 5,031 |
| New balance | 567 | 3,304 | 6,261 | 2,243 |
| Trfr/ next year | 407 | 2,961 | 2,793 | 1,957 |
| Over fished | 2 | 0 | 0 | 0 |
| Net quota status | 162 | 343 | 3,468 | 286 |

**Figure 32.** Fishing period Sept 207-Aug 2018, quotas, balances and transfer information for redfish.

In the figure above the 45,319 t TAC can be seen in the two first lines of allocated quota (the Compensations are basically the 5,3% subtracted from the general allocation on the basis of shares). There is a transfer of 3,322 tons from the previous year (a result of the allowed transfer between species that year). There is a catch, 2,788 tons in excess of allowed catch potentially due to juvenile landings as part of the discard ban. Transfer from other species accounts for an extra allowance of 5,031 tons which accommodates the excess catches and creates a transferable quota to next season.

**TAC overages and stock sustainability**

Apparently, the Golden stock did not tolerate the fishing mortalities around 0.2 in the 1980s and 1990s, and the catches declined accordingly (Figure 33). Towards the end of that period, the biomass stabilized thanks to two strong year classes and a gradual reduction of fishing mortality. The biomass then improved again due to a combination of better recruitment and reduced fishing mortality.

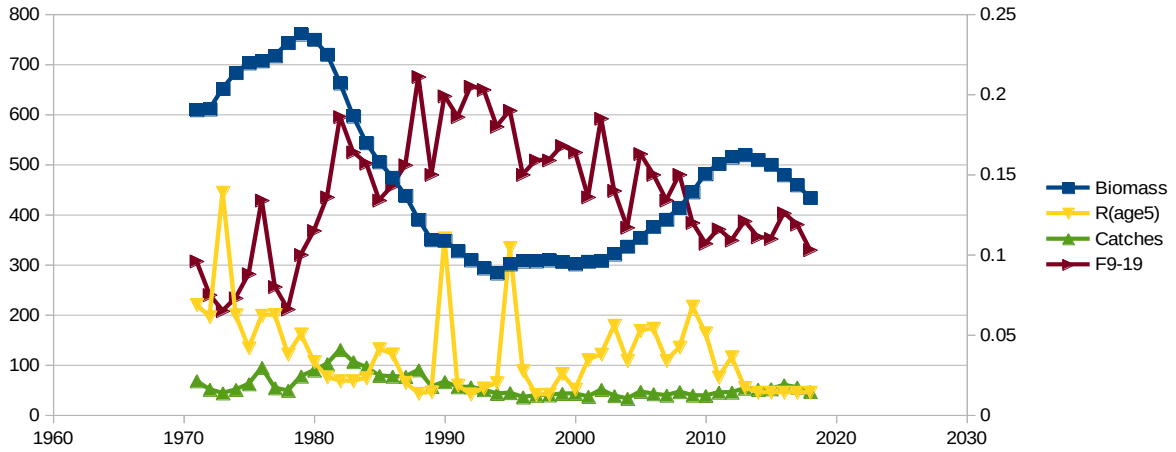



**Figure 33.** Development of biomass, recruitment, catches and fishing mortality since 1970. Source: Table 19.4.1 in 2018 NWWG report[136].

136 NWWG 2018: http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%2019_Golden%20redfish%20in%20subareas%205,%206%20and%2014.pdf

| | |
|---|---|
| Upon enquiry with the MFRI, the Audit Team was told that the overshoot of quotas were not included in the original simulations made when the HCR was decided. However, at the time they decided on an F-value that implies a low risk of passing the Btrigger reference point, which is a good deal higher than the Blim threshold. In doing that they selected a fishing mortality threshold 20% more conservative than the fishing mortality that would be associated with a 5% risk of reaching Blim. It is possible that by the next revision of the fishery management plan and HCR planned for 2020, scientists at the MFRI may employ a better methodology to include implementation error since at the time of the original evaluation Gadget was quite limited in regards to forward simulation, something that been fixed since.<br><br>Since the risk even to the trigger biomass was very low in the simulations despite considerable assessment error, it is likely that the target F is small enough to tolerate a TAC overshoot of the magnitude observed here. Accordingly, the Audit Team determined this approach to be sufficiently conservative. Furthermore, stock biomass is still well above Btrigger and almost double the Blim threshold. | |
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.1.5.9. Clause 1.5.9.

The competent fisheries management authorities shall cooperate and actively participate in competent Regional Fisheries Management Organisation(s) (RFMOs) or arrangement(s), relevant to the stock under consideration and management agreements reached shall be implemented by fisheries authority and effectively and uniformly executed.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Iceland participates in other fisheries and non-fisheries organisations/arrangements in the North Atlantic region. For golden redfish, the scientific work is organized in ICES, and Iceland and Greenland has agreed on sharing the quota derived from the harvest rule.**

**Evidence:**
Stock assessment and advice, including advice on TACs and reference points is provided by ICES. The management plan was evaluated and approved by ICES. The advice process in ICES involves all relevant nations. Greenland has an agreed share of the international quota, and 350 tonnes is set aside for catches in other water, in particular the Faroes. The advice is taken over by local authorities. In Iceland, the Ministry is advised by the MFRI, based on the ICES advice.

The general legal basis that applies to all Icelandic fish stocks also apply to golden redfish. The management measures cover setting of TAC, distributing the TAC on relevant parties in the ITQ system, control and enforcement to ensure that the actual removals correspond to the TAC, and protective measures.

Iceland participates in other fisheries and non-fisheries organisations/arrangements in the North Atlantic region such as:

- The North East Atlantic Fisheries Commission (NEAFC[137])
- The Northwest Atlantic Fisheries Organisation (NAFO[138])
- The International Council for the Exploration of the Sea (ICES[139])
- The North Atlantic Marine Mammal Commission (NAMMCO[140])

Some of Iceland´s commercially important fish stocks, including golden redfish, extend beyond its 200 nm EEZ and as a result are shared between countries/states; these shared stocks have necessitated the development of international cooperation. For golden redfish, the scientific work is organized in ICES, and Iceland and Greenland has agreed on sharing the quota derived from the harvest rule.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[137] http://www.neafc.org/
[138] http://www.nafo.int/
[139] http://www.ices.dk/Pages/default.aspx
[140] http://www.nammco.no/

### 9.1.5.10. Clause 1.5.10.

In the absence of specific information on the stock under consideration, generic evidence based on similar stocks may be used for fisheries with low risk to that stock under consideration. However, the greater the risk the more specific evidence is necessary to ascertain the sustainability of intensive fisheries[141].

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**Stock abundance is estimated by a full analytic assessment. Accordingly, using generic evidence as a fall back is not necessary.** | | | | |
| **Evidence:**<br>Stock abundance is estimated by a full analytic assessment[142]. Accordingly, using generic evidence as a fall back is not necessary. | | | | |
| **References:** | See footnote. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

[141] FAO Guidelines (2009), para. 30.4.

[142] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf

## 9.2. Section 2: Compliance and Monitoring

### 9.2.1. Clause 2.1. Implementation, Compliance, Monitoring, Surveillance and Control

#### 9.2.1.1. Clause 2.1.1.

An effective legal and administrative framework at the local, national or regional level, as appropriate, shall be established for the fishery and compliance shall be ensured through effective mechanisms for monitoring, surveillance, control and enforcement[143].

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**An effective legal and administrative framework exists which is implemented by the Fisheries Directorate, part of the Ministry of Industries and Innovation. The Directorate works closely with the Coast Guard and Port Authorities. Key legislation underpinning the framework comprises the Fisheries Management Act (No. 116/2006), the Act on Fishing in Iceland's Exclusive Economic Zone (no. 79/1997) and the Act concerning the Treatment of Commercial Marine Fish Stocks (no. 57/1996). Effective mechanisms for monitoring, surveillance, control and enforcement exist involving at-sea and land-based monitoring of fishing activity, catches and landings by the Coast Guard and Fisheries Directorate Inspectors, supported by Port Authorities. Offences are recorded and enforcement action is taken. This largely comprises administrative penalties ranging from guidance letters and reprimands to suspension of fishing permits and weighing licenses. More serious cases are sent to the police for prosecution under the criminal system which can result in imprisonment.**

**Evidence:**

The Icelandic Directorate of Fisheries is an independent administrative body responsible to the Fisheries Minister, responsible for the day to day implementation of the Act on Fisheries Management and related legislation, for day-to-day management of fisheries and for supervising the enforcement of fisheries management rules. More specifically, the Directorate of Fisheries works in accordance with the following Acts, the Directorate of Fisheries Act (no. 36/1992)[144], the Fisheries Management Act (no. 116/2006), the Act on Fishing in Iceland's Exclusive Economic Zone (no. 79/1997), the Act concerning the Treatment of Commercial Marine Fish Stocks (no. 57/1996) and the Act on a Special Fee for Illegal Marine Catch (no. 37/1992). Accordingly, it issues fishing permits to vessels and allocates catch quotas, imposes penalties for illegal catches, supervises the transfer of quotas and quota shares between fishing vessels, monitors vessels using the VMS system e-logbooks, controls the reporting of data on the landings of individual vessels and monitors the weighing of catches. It also provides supervision on board fishing vessels and in ports of landing (i.e. shore based monitoring), which involves inspecting the composition of catches, fishing equipment and handling methods. It works closely with the Icelandic Coast Guard, which carries out fisheries inspection at sea, monitors the EEZ and receives required notifications from vessels (see Icelandic Redfish FMP[145]), Port Authorities and the MFRI.

The Directorate has 61 staff (2017) located at 6 offices throughout the country with its headquarters in Akureyri. It has 3 core divisions: Salmon and Trout Fishing, the Fisheries Management Division (Fisheries

[143] 2005 FAO Guidelines for Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries.

[144] https://www.althingi.is/lagas/149a/1992036.html

[145] https://www.government.is/news/article/?newsid=e747dac7-fb88-11e7-9423-005056bc4d74

Inspectorate) and the Service and Information division, and two support divisions: Information Technology and Human Resources and Finance (**Error! Reference source not found.**below).

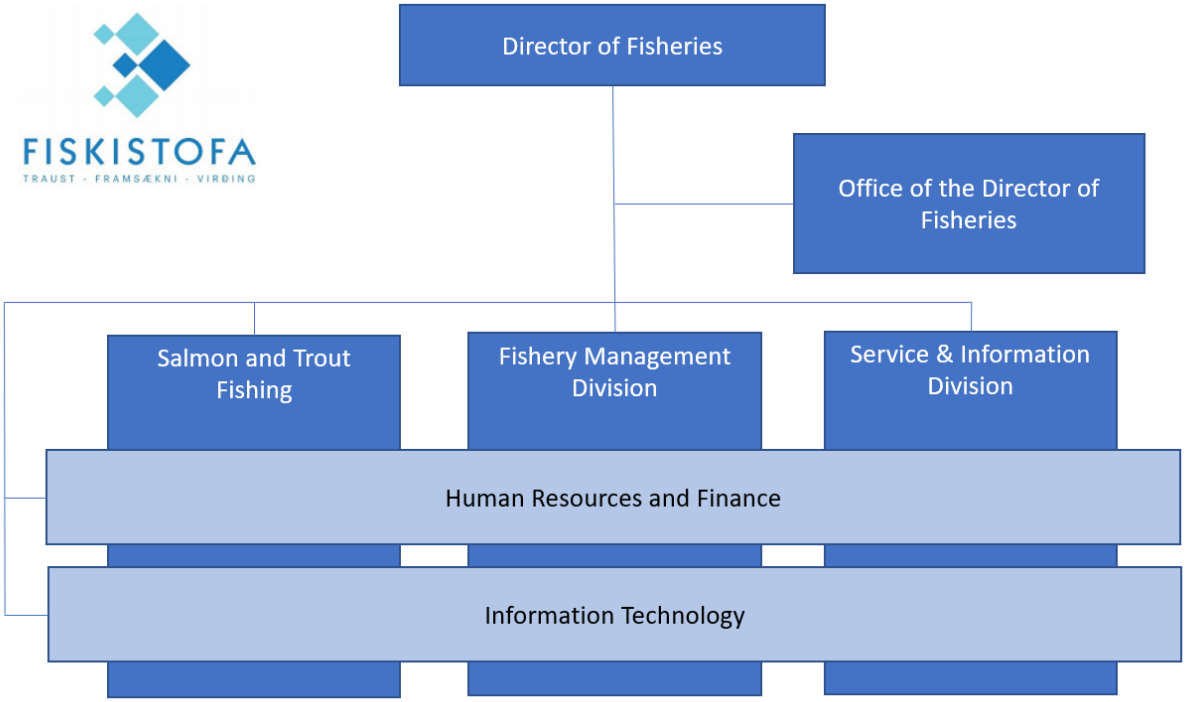



**Figure 34.** Directorate of Fisheries organisational chart and staff (Source: SAIG, modified from http://www.fiskistofa.is/umfiskistofu/skipurit/).

The primary legislative instrument relating to fisheries management in Iceland and the basis for the ITQ system is the Fisheries Management Act No.116/2006[146]. It supersedes the Fisheries Management Act 1990 and established allocation harvest rights and permit requirements for all participating commercial fishing vessels. These permit requirements represent the initial legal requirement without which a vessel may not obtain the quota necessary to fish for Icelandic quota stocks, such as redfish. General fishing permits are of two types, a general fishing permit with a catch quota or a general fishing permit with a hook-and-line catch quota. A vessel may only hold one type of fishing permit each fishing year. Commercial fishing permits are cancelled if a fishing vessel has not been fishing commercially for 12 months (Article 4).

Commercial fishing permits may only be granted to fishing vessels holding certificates of seaworthiness and registered in the Registry of Vessels (Article 5). This Registry is administered by the Maritime Division of the Icelandic Transport Authority (ICETRA)[147].

The Fisheries Management Act sets out penalties for the violation of its provisions, or rules adopted by virtue of it, which are provided in detail in the Act Concerning the Treatment of Commercial Marine Fish Stocks (Act No. 57 1996[148]). Provisions of the Act on a Special Fee for Illegal Marine Catch[149] are also applied as appropriate. Penalties range from the issue of reprimands by the Directorate of Fisheries and the

[146] https://www.ecolex.org/details/legislation/fisheries-management-act-1990-lex-faoc003455/
[147] https://www.icetra.is/maritime/ships-and-cargoes/
[148] https://www.althingi.is/lagas/149a/1996057.html
[149] https://www.althingi.is/lagas/149a/1992037.html

suspension of commercial fishing permits to fines and, in cases of serious or repeated deliberate violation, imprisonment for up to six years (Article 24 and 25 of Act No. 116/2006).

The Act governing fishing activities within the Icelandic EEZ (Act No. 79/1997)[150] specifies the Icelandic EEZ and prohibits foreign vessels from fishing within Iceland's EEZ (unless by prior agreement). It sets out the areas vessels are permitted to fish within the EEZ according to fishing vessel size and power index category (Article 5 of Act No. 79/1997). It grants powers to the Minister to limit fishing to prevent localised overfishing of a specific stock or excessive by-catch of non-target species (Article 7) and requires the Minister to take measures to prevent harmful fishing practices and to preserve sensitive areas (Article 9). It requires the MFRI to be notified of harmful fishing, particularly where the proportion of undersized fish in the catch exceeds advised reference levels, grants powers to the MFRI to declare temporary closures and sets out how these should be implemented (Articles 10 and 11). It grants powers to the Minister to set rules on the minimum size of marine animals which can be caught (Article 14) and sets out penalties for violation of the provisions of the Act (Articles 15-17) which include the power to confiscate fishing gear and catch in the case of major or repeated violations. The Act stipulates that fines assessed in accordance with the Act as well as the value of any confiscated catch and fishing gear, shall accrue to the Icelandic Coast Guard Fund.

Control of discarding of fish is provided for by the Treatment of Commercial Marine Stocks Act No. 57 1996, which prohibits discarding and fishing without sufficient quota. The Act requires the Directorate of Fisheries to monitor and publish information on catches of the fleet (Articles 2-3). Furthermore, the Act stipulates that all fish caught within the Icelandic EEZ, or during trips where a proportion of fishing activities take place in the EEZ, must be landed in an officially recognised port. Some of the recognised ports are outside Iceland (i.e. Faroese) (Article 5).

Within two hours of landing catches are officially separated, weighed and recorded by accredited weighing stations and reported against the appropriate quota allocation following provisions outlined in the Act No 57, 1996 concerning the Treatment of Commercial Stocks, and Regulation No. 745/2016 on Weighing and Recording of Marine Resources[151]. The Fishery Management Act also makes provisions for processing at sea, weighing by auction houses and the transfer of quotas to cover landings.

As required by Article 10 of Regulation No. 745/2016, each landing generates a weighing receipt[152,153] recording:

- Vessel name, registration number and district number;
- Landing port and date of landing;
- Name of seller, buyer and recipient of the catch;
- Official weight by species of catch;
- Proportion of undersize fish in catch;
- Number, type and weight of tubs/boxes/barrels;
- Fishing gear used;
- Total number of pallets of platforms;
- Registration number and tare of transport vehicle;
- Whether catch is to be re-weighed;

[150] extwprlegs1.fao.org/docs/texts/ice89476.doc
[151] https://www.stjornartidindi.is/Advert.aspx?RecordID=884be309-64a5-4367-9e4d-f5e7216b6f40
[152] https://www.fmis.is/blank
[153] http://www.unuftp.is/static/fellows/document/pan09prf.pdf

- Whether any of the catch is un-gutted and needs to be either weighed after gutting or converted to a gutted weight using coefficients provided by Directorate.

The scale operator has 10 minutes to enter the info within the system before it locks. There is a formal process involving the port authorities and the Directorate's service centre to make corrections. The system flags where weighing/re-weighing occurs and is checked by the Directorate's service centre once or twice a day to determine whether flagged items are acceptable. If not, the service centre refers them to inspectors for further checks (Fisheries Directorate, pers. com. site visit November 2018).

The weight registration document for each vessel is transmitted to the Fisheries Directorate who record it on their Catch Registration System (the Fisheries Directorate and Landing Ports database GAFL). The Directorate also receives the e-logbook information. These two sets of information are then compared, and the appropriate reduction is made to the vessel quota. Any transfer under the ITQ system for each vessel is also monitored to ensure that any additional quota requirements are rented from other vessels within a 3-day period required by law. The reporting system is not real time but is very near real time (circa. 24 hours).

Weighing is undertaken on official port scales certified by the Fisheries Directorate and operated by individuals authorised by the Directorate. In circumstances where there are significant difficulties in using a port scale, private weighing scales can be used provided the company involved has been approved by the port authority, the scales and operators using them are certified and Fisheries Directorate inspectors have unimpeded access to the facilities. This is known as a 'Home-weighing license'. Fish markets can also be authorised to weigh catches by the Directorate. These private companies and fish markets are required to send weighing information to the relevant port authority who then submit it to the Fisheries Directorate's catch registration system. There are also legal requirements covering the licensing of the re-weighing of catch or weighing after gutting on land which are also monitored.

Processed at sea catch are registered as processed weights using an officially approved yield. This is monitored and verified by the Directorate staff. Weights at landing are checked at the processing base by Directorate staff. Processed weights are converted to live weight equivalents for deduction from each vessels quota and management purposes by staff at the Directorate. Adjustments can be made by the Directorate to correct for errors – the system is transparent in so far that anyone can enter a vessel registration number on the Directorates website and obtain the catch, species, quota, remaining quota, quota rents for any vessel. The Directorate notes on the website that the information may be corrected by staff at later time post original posting of the information.

A December 2018 report from the Icelandic National Audit Office (NAO)[154] on certain aspects of the Icelandic enforcement system highlighted that more quantitative data are needed to substantiate the conclusions that discards are low and that there are few irregularities in connection with re-weighing of catches after de-icing. Although available evidence (e.g. data from scientific cruises held up against information reported by the vessels) still indicates that discards are low and re-weighing irregularities not significant, the Directorate of Fisheries has recently placed new staff to control re-weighing at processing plants at risk and has started to publish information on its website showing catch composition reported by fishing vessels on trips with and without an inspector on board, with a view to roll this out more widely to

[154] https://rikisendurskodun.is/wp-content/uploads/2019/01/Eftirlit-Fiskistofu-Stjornsysluuttekt.pdf

several fishing fleets in Iceland. *The Assessment Team will continue to review the actions implemented to improve some of the shortcoming identified in this report, in upcoming surveillances.*

During the site visit on the 27th November 2018, the assessors visited a fish market and were shown the landed fish, weighing scales and the information recorded on the system which goes to the Port Authority who then submit it to the Fisheries Directorate's catch registration system. Both the weighing scales and their operators are licensed and audited by the Directorate. The system is developed to standardise weights and tares for ice and tubs (a standard tub is used throughout Iceland for fresh fish such as cod and has a capacity of 280-300 kg). The tubs are labelled for the purposes of traceability. The Audit Team were also shown the equipment used to measure ice.

The ITQ system has rules and flexibilities to allow for corrective management measures and adjustments to be incorporated. For example, a vessel can transfer some of its quota between fishing years but its quota is lost if it catches less than 50% of its total quota, measured in "cod equivalents", in two subsequent years. There is also a requirement that within the year, the net transfer of quota from any vessel must not exceed 50% (Article 15, Act No. 116/2006).

A separate hook and line quota system (Aflamark - krókaaflamark) is available for small vessels less than 15 gross tonnage (GT). These are only allowed to fish with handlines or longlines. These boats get quotas for all the major demersal species and can freely transfer the quota within the hook and line system. However, to prevent consolidation of fishing rights these quotas cannot be transferred to the catch quota management system. The hook and line quota is limited to 700 vessels[155].

Each fishing year the Minister shall have available harvest rights amounting to up to 12,000 tonnes of ungutted demersal species (Article 10, Act No. 116/2006), which he may use:

1. to offset major disturbances which are anticipated because of sizeable fluctuations in the catch quotas of individual species;
2. for regional support, in consultation with the Regional Development Institute, through allocations;
    a) to smaller communities which are facing difficulties due to downturns in fisheries and which are dependent upon demersal fishing or processing;
    b) to communities which have suffered unexpected cutbacks in the total catch quotas of fishing vessels operating from and landing their catch in the communities in question, which has had a substantial impact on the employment situation in these communities.

Vessels may fish in excess of their catch quota for individual demersal species, with the result that their catch quota for other demersal species will be reduced in proportion to the relative value of each species. This authorisation is limited to 5% of the total value of the demersal quota held by the vessel, but no more than 1.5%[156] of the quota held for each individual demersal species. However, this authorisation does not apply to fishing in excess of the allocated catch quota of cod.

[155] http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Krokaaflamarksbatar
[156] Act No. 116/2006 as amended by Act No. 70/2011 (http://vefbirting.oddi.is/raduneyti/fiskveidar2018/11/index.html#zoom=z)

Vessels may also fish up to 5% in excess of their catch quota for each demersal species with the result that the excess catch will be deducted from their allocated catch quota for the following fishing year.

Vessels may transfer up to 15%[157] of catch quotas for each demersal species from one year to the next.

Vessels may also decide not to include part of the vessels catch in its catch quota. This is limited to no more than 0.5% of the vessel's pelagic catch and 5% of other marine catches per fishing year. Furthermore, this catch, known as 'VS catch', must be kept separate from the rest of the vessel's catch and weighed and recorded separately; it must be sold at an approved auction and the bulk of the proceedings of the sale must go to the Fisheries Commission Project Fund or 'VS Fund' (established by Act No. 37/1992), 20% going to the vessel (Article 11, Act No. 116/2006)[158]. The maximum of 20% return on VS catches means that there are limited incentives to land it; however, having the VS catch provisions within the fisheries management system allows the flexibility for vessels to land small catches which are outside their specific quota, preventing discards, improving the treatment of the fishery resource and promoting responsible fishing practices.

At sea surveillance is primarily the remit of the Icelandic Coast Guard. The Icelandic Coast Guard monitors commercial fishing vessels in Iceland's EEZ on a continuous basis. There are requirements surrounding the reporting of vessel position (manually or using VMS systems) and the reporting of catch on entering or leaving Icelandic waters. The figure below shows the number of boardings undertaken by the Coast Guard since 2005. In 2017, the Coast Guard conducted 155 vessel boardings, a decrease on the corresponding number of 216 in 2016. The Coast Guard also undertake aerial surveillance, amounting to 166 hours in 2017 which is lower than 2015-2016 when over 200 hours were flown (Figure 36).

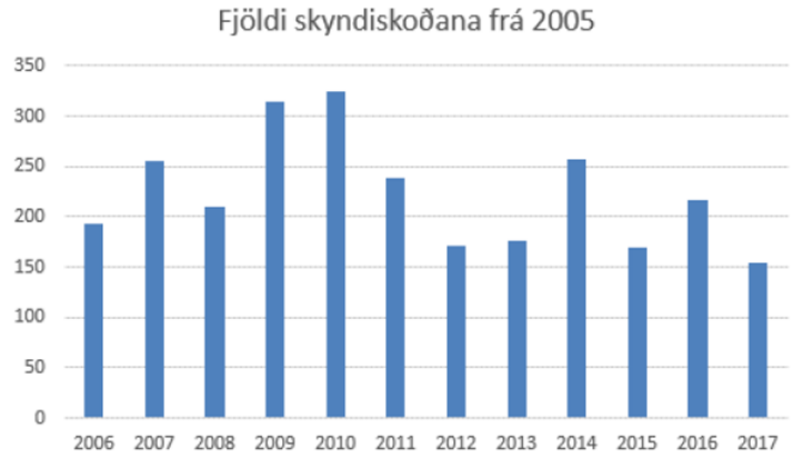



**Figure 35.** Number of inspections by the Coast Guard from 2005 (Source: Coast Guard presentation provided to the assessment team, December 2018).

[157] Act No. 116/2006 as amended by Act No. 22/2010

[158] http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Sveigjanleiki_i_aflamarkskerfinu

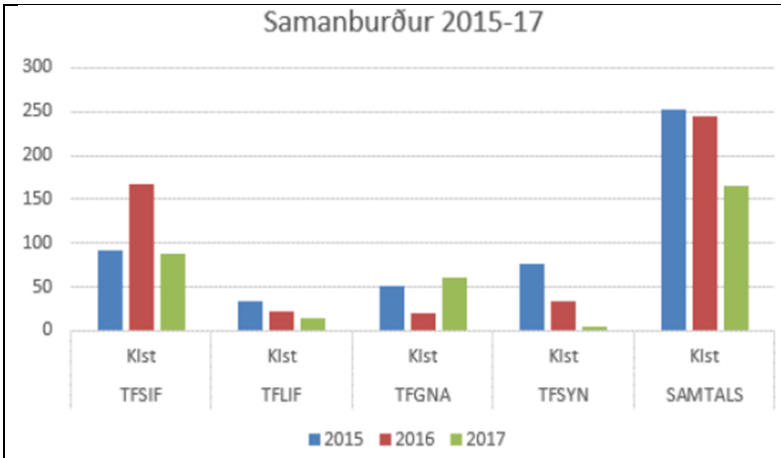



**Figure 36.** Air surveillance 2015-2017. The final column (Samtals) shows total hours air surveillance flown, whilst the other columns show hours by individual aircraft (Source: Coast Guard presentation provided to the assessment team, December 2018).

Days spent by Fisheries Directorate inspectors at sea inspecting vessels as a proportion of total fishing effort is shown in the table below**Error! Reference source not found.**.

**Table 6.**Directorate inspector days on fishing vessels (Source: Directorate of Fisheries, November 2018 site visit)

| Fishery type | Bottom Trawl | Longline | Gillnet (include lumpfish fishery and cod fishery) |
|---|---|---|---|
| 2017/2018 days | 570 | 202 | 152 |
| 2017/2018 coverage % | 1.93% | 0.64% | 3.64% |

Vessel logbooks are inspected during random unannounced boardings both at sea (by the coastguard) or at the quayside (by Fisheries Directorate inspectors) which may include a comparison of catch and logbook entries. Between 2014 and 2017 there have been 97 infringements recorded by the Coast Guard. The main reasons for the generation of remarks during Coast Guard inspections have largely remained consistent in recent years or declined (below**Error! Reference source not found.**). The most significant numbers of nfringements related to manning lists (lögskráningar) and seaworthiness (Haffæri). Only one infringement relating to fisheries (Veiðar) was recorded in 2017. Foreign vessels are also inspected – both in the Icelandic EEZ and further afield as part of Iceland's contribution to monitoring and surveillance as a member of NEAFC. In 2017, 18 foreign vessels were inspected which, in relation to fishing activities in the Icelandic EEZ, led to remarks to 2 Norwegian capelin fishing vessels due to gear infringements and to a Faroe Islands handline/jigger vessel for logbook infringement.

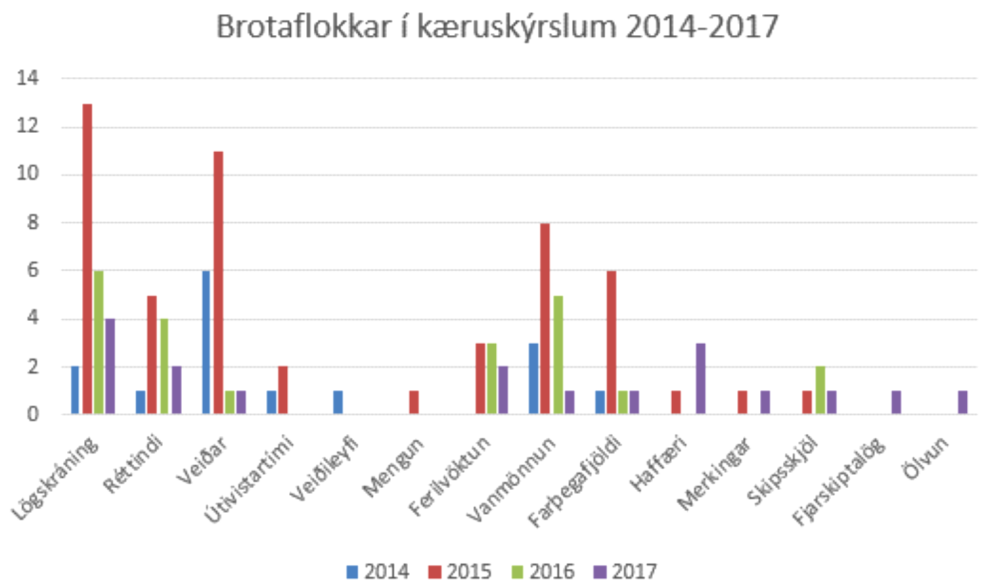



**Figure 37.** Reasons for the generation of remarks, by no. of remarks generated, during Coast Guard inspections in 2014-2017; Lögskráningar – Manning list, Réttindi – License, Veiðar – Fishing , Útivistartími – Time limits , Veiðileyfi – Fishing permit, Mengun – Pollution, Ferilvöktun – VMS, Vanmönnun – Manning, Farþegafjöldi – Passengers, Haffæri – Sea worthiness, Merkingar – Marking, Skipsskjöl – Ship's papers, Fjarskiptalög – telecommunications, Ölvun - intoxication (Source: presentation provided to the assessment team by the Coast Guard).

In their annual report, the Fisheries Directorate publish a comprehensive summary of suspected offenses recorded during maritime surveillance and the enforcement action subsequently taken (Tables below). A comparison of some of the enforcement action taken in recent years is shown in Figure 3838. By far the main suspected offenses detected relate to logbooks, specifically not submitting them in the required timeframes (674 incidences in 2017), and fishing in excess of or without quota (1201 incidences in 2017). Much of the former arises from late submission of logbooks each month by small vessels using paper logbooks, with each instance registered as an offence. Similarly, the quota infringement relates to each incidence detected of vessels that have taken longer than the 3 days required by law to balance their quota where they have landed fish in excess of their quota (proceeding to fish without quota is a separate offence) (Pers. com. Fiskistofa).

Where a suspected violation of the fisheries management legislation has occurred, the case is referred to the Directorate's Legal Department for enforcement action. In 2017, 220 cases where referred, 131 in 2016. Breaches of the law are handled in several ways. Some cases are dropped and no further action taken, otherwise action taken ranges from the issue of reprimands, application of administrative fines, suspension or revocation of fishing permits and weighing licenses or, in a small number of cases, sent to the police for criminal action to be taken. There is also a specific chapter in the Annual Report summarising the imposition and collection of fees for illegal catches of fish in that year.

**Table 7.** Overview of suspected offenses recorded in Icelandic fisheries (Source: Fiskistofa Annual Reports 2017[159] and 2016[160]).

| Offenses recorded by Fiskistofa | 2017 | 2016 |
|---|---|---|
| Violation of landing rules (broken down into:) | 52 | 60 |
| • *Not landing fish at official landing location* | *5* | 4 |
| • *Weighing container* | *10* | 13 |
| • *Misreporting (Landing full size fish as part of catches of juveniles)* | *9* | 22 |
| • *Incorrect specification of species* | *11* | 4 |
| • *Other* | *17* | 17 |
| Discarding catch | 8 | 4 |
| Violation of fishing license rules | 36 | 15 |
| Violation of lumpfish fishery rules | 19 | 11 |
| Violation of coastal fishery rules | 10 | 46 |
| Logbooks (broken down into:) | 719 | 689 |
| • *Not submitting logbooks on time* | *674* | 657 |
| • *Other* | *45* | 31 |
| Fishing in excess of or without quota | 1201 | 1,060 |
| Violation of law on salmon and trout fishing | 1 | 2 |
| Other violations | 45 | 14 |
| **TOTALS** | **2,080** | **1,901** |

**Table 8.** Enforcement action taken (Source: Fiskistofa Annual Reports 2017[159] and 2016[160]).

| Offences | 2017 | 2016 |
|---|---|---|
| Violation of fishing rules | 97 | 31 |
| Violation of weighing and landing rules | 71 | 50 |
| Violation of logbook rules | 45 | 31 |
| Violation of processing catch rules | 0 | 2 |
| Case sent to Police | 1 | 4 |
| Reprimands issued (broken down below) | 96 | 79 |
| Due to violation of fishing rules | 50 | 14 |
| Due to violations of weighing and landing rules | 12 | 31 |
| Due to violation of logbook rules | 33 | 26 |
| Due to other violations | 3 | 8 |
| Suspension of fishing permit | 31 | 14 |
| Suspension of weighing license | 4 | 1 |
| Guidance letter sent | 6 | 6 |
| No action taken | 33 | 20 |

[159] Fiskistofa 2017 Annual Report, Chapter 8. http://www.fiskistofa.is/media/arsskyrslur/medferd_mala_og_urskurdir.pdf
[160] Fiskistofa 2016 Annual Report, Chapter 8. http://www.fiskistofa.is/media/arsskyrslur/kafli8_2016.pdf

| | | |
|---|---|---|
| Case sent to another authority | 1 | 1 |
| Procedure still in progress | 46 | 8 |
| Case returned to the inspectors | 2 | No data |
| **Fees** | | |
| Reminder letter sent for unpaid fishing fees 2017 | 231 | 145 |
| Resulting in suspension of fishing permits | 89 | 85 |
| Fees imposed for illegal catches | 1201 | 130 |
| Resulting in suspension of fishing permits | 25 | 65 |

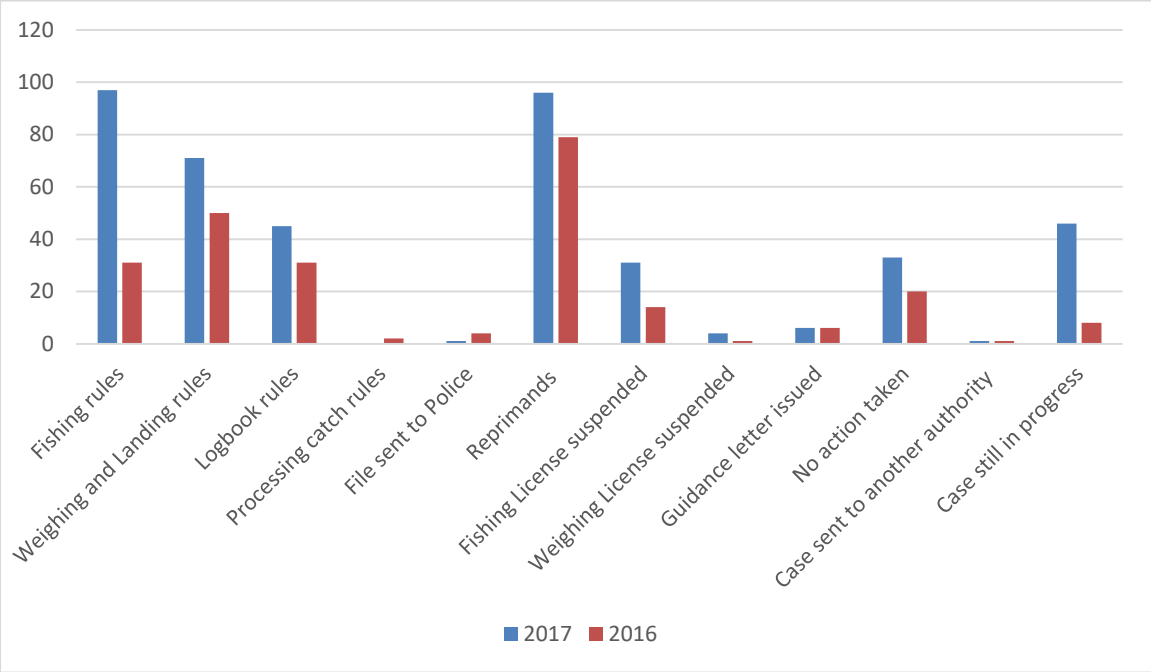



**Figure 38.** Comparison of some of the main areas of enforcement action taken by the Fisheries Directorate in recent years. The first four columns show the offence and the remaining columns show the enforcement action subsequently taken (Source: SAIG, based on Fiskistofa Annual Report 2017 and 2016).

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.1.2. Clause 2.1.2.

Laws and regulations concerning conservation and management measures shall be publicly available and effectively disseminated.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Acts and regulations concerning conservation and management measures are publicly available and effectively disseminated through a number of government websites including via an annual law gazette. The Fisheries Directorate website provides current information on management of the fishery including, for example, in relation to allocation of quota, opening and closure of fisheries and license revocations. Temporary and long-term fishery closures are published on-line and scientific advice on the fisheries is available on the MFRI and ICES websites.**

**Evidence:**
Acts/Laws and Regulations may be accessed by searching by Act/Law/Regulation No./Year (e.g. 116/2006) at http://www.althingi.is/lagasafn/ (for Acts/Laws) or https://www.reglugerd.is/ (for Regulations). In addition to their being easily accessible and searchable online laws and regulations are also effectively disseminated through an online law gazette which provides the most up to date versions of the legislation (i.e. incorporates latest amendments)[161].

The Fisheries Directorate website also prominently displays announcements relating to the management of the fishery including, for example, in relation to allocation of quota, opening and closure of fisheries, license revocations, reminders about legal requirements etc.[162]

All scientific advice is available online[163]. Harvest control rules are scrutinised on request by an independent scientific body (ICES) with reports being published online[164] [165].

Up-to-date maps of fisheries closures are available on-line on the Fisheries Directorate website[166]. Temporary closures are announced by the Coastguard on VHF radio on a specified wavelength and also on the radio before the news and weather (Fisheries Directorate pers. com. site visit November 2018). They are also published on the MFRI website[167] .

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[161] http://vefbirting.oddi.is/raduneyti/fiskveidar2018/108/
[162] http://www.fiskistofa.is/
[163] http://ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf
[164] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/Special%20Requests/Iceland_Faroe_Islands_Greenland_Evaluation_of_ltmp_for_golden_redfish.pdf
[165] http://www.ices.dk/sites/pub/CM%20Doccuments/CM-2013/Theme%20Session%20H%20contributions/H2913.pdf
[166] http://www.fiskistofa.is/fiskveidistjorn/veidibann/reglugerdarlokanir/
[167] https://www.hafogvatn.is/is/skyndilokanir

### 9.2.2. Clause 2.2. Concordance between actual Catch and allowable Catch

#### 9.2.2.1. Clause 2.2.1.

Concordance between the Total Allowable Catch (TAC) and actual total catch from stock under consideration shall be ensured through control, enforcement, documentation, correction and verification.[168]

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Landings must be recorded in logbooks at sea and these are verified and standardised through physical weighing at accredited weigh stations in landings ports throughout Iceland. Registered weights for each landing are sent to the Fisheries Directorate, recorded on their catch registration database (GAFL), and the appropriate amount is subtracted from the vessels quota. ITQ transfers are also monitored to ensure that vessels either have or source sufficient quota to cover the entirety of their catch within 3 days of landing. Compliance is checked through at-sea and on-land monitoring by the Coast Guard and Fisheries Directorate inspectors with enforcement action taken where non-compliance occurs (detailed in clause 2.1.1). Due to flexibility measures and to facilitate adherence to the discard ban catches in recent years have been consistently higher than the TAC set by the Ministry.**

**Evidence:**

Catches and landings in Iceland are monitored and recorded in a number of complementary ways. Logbooks, either electronic (e-logs) or standard paper based, depending on the vessel, record landings at sea and these are verified and standardised through physical weighing at accredited weigh stations in landings ports throughout Iceland.

Logbooks are compulsory as required by Regulation No.746/2016[169]. These must be electronic (e-logs) except for smaller vessels which are permitted to still use paper logbooks. Catch data must be entered on the e-log using a Fisheries Directorate-approved programme and all changes to entries must be visible and traceable. It is prohibited to start a fishing trip without a logbook on board. Vessel masters are required to record the following information in their logbooks:

- Ship name, ship registration number and call sign.
- Fishing gear, type and size.
- Location determination (latitude and longitude) and time when fishing gear is placed in the sea.
- Catch by quantity and species.
- Harvesting.
- Landing.
- Seabirds bycatch by species and species.
- Marine mammals bycatch by number and species.

[168] For long-lived species, this can include flexibility provisions such as legal allowance and adjustment for limited transfer of vessel quotas between adjacent management periods (years) as well as provisions providing incentives against discards.

[169] https://www.stjornartidindi.is/Advert.aspx?RecordID=42a16a67-60a7-4ae7-ad7c-0f53fc254654

The e-logs in use are developed and serviced by TrackWell, an Icelandic electronic systems service company; which also provide satellite Vessel Monitoring Systems (VMS) and electronic reporting systems. These systems generate mandatory reports to the Directorate, with data on catches and landings available in near real-time providing a valuable management reporting system for fleet management. The vessel log book system requires that the operator of a vessel reports information for each haul of the fishing gear to the Directorate including; haul number, date, time, latitude, longitude, catch by species, zone, water depth, seafloor, wind direction, wind speed, gear used, as well as other information. There are also other elements of the system which allow fishing companies to compile the data from their vessel(s) to facilitate better targeting of fishing activity in terms of area, species or size class of product dependent on the market demands at the time and also to ensure better traceability of product. Information is fed from a secure central server to a shared database that is accessible by both the Directorate (for management/ enforcement purposes) and the MFRI (for scientific purposes).

Logbooks are verified at sea by Fisheries Directorate inspectors and by the Coastguard and also on land by inspectors and through physical weighing at accredited weigh stations in landings ports.

Landings must be weighed within 2 hours of landing by an official weigher using calibrated scales. Following allowances for ice the official weight is forwarded to the Directorate where it is compared with the relevant e-logbook entry before an appropriate deduction is made to that vessels remaining quota. The officially weighed catches are the official catch of record with e-log information being used as a secondary source to ensure accuracy. If a vessel does not have sufficient quota to cover it has a number of options available to it such as renting in additional quota or transferring quota between species; however, the landings must be fully covered within 3 working days as required by law (Act No. 57/1996). The time restrictions attached to landing, recording and rationalising catch and quota mean that while the system is not real time it is very close (circa. 24 hours)[151].

Fishing seasons in Iceland run from 1st September to 31st August the following year. Following the setting of the overall TAC each vessel is allocated a certain share of the overall TAC based on the number of shares in the Icelandic system of ITQs it possesses. Before catch is allocated proportions of the TAC of some species is removed for various reasons such as for the coastal fisheries which any small boat in possession of a licence may access, for research purposes or for chartered angling vessels.

MFRI and ICES advised in 2017 that golden redfish catches for the 2017/2018 season should be no more than 50,800 t. The TAC set by Icelandic authorities for redfish in the quota year 2017/2018 was 45,450 t with the remainder being allocated to Greenland as part of the management agreement. In all recent years, except for 2010/11, the TAC set by the authorities have been equal to or less than the recommended TAC (table below).

**Table 9.**Recommended TAC, national TAC, and catches (tonnes) of Golden redfish. Note that catch in Icelandic waters is based on the Icelandic fishing year whereas catch in other areas and total catch is on calendar year (Source: MFRI[170]).

[170] https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

| Fiskveiðiár *Fishing year* | Tillaga *Recommended TAC* | Aflamark fyrir Íslandsmið *National TAC* | Afli á Íslandsmiðum *Catch Icelandic waters* | Afli á öðrum miðum[1] *Catch other areas[1]* | Afli alls[1] *Total catch[1]* |
|---|---|---|---|---|---|
| 2010/11 | 30000 | 37500 | 39432 | 1498 | 45271 |
| 2011/12 | 40000 | 40000 | 44514 | 2508 | 45597 |
| 2012/13 | 45000 | 45000 | 46549 | 1871 | 53201 |
| 2013/14 | 52000 | 52000 | 52451 | 2907 | 50676 |
| 2014/15 | 48000[2] | 45600 | 48349 | 2832 | 51601 |
| 2015/16 | 51000[2] | 48500 | 54818 | 5607 | 59648 |
| 2016/17 | 52800[2] | 47205 | 48532 | 5889 | 56017 |
| 2017/18 | 50800[2] | 45450 | | | |
| 2018/19 | 43600[2] | | | | |

[1] Almanaksár. *Calendar year.*

[2] Aflaregla fyrir Austur-Grænland/Ísland/Færeyjar. Færeyjar standa utan samkomulagsins *Harvest control rule for East Greenland/Iceland/Faroes. The Faroe Islands are not a part of the agreement.*

Catches of Golden redfish in Icelandic waters in the 2016/2017 season were 48,532 t or 2.7% in excess of the TAC. Since the introduction and implementation of the Golden Redfish Fishery Management Plan (FMP) and Harvest Control Rule therein, Icelandic catches have exceeded the overall TAC by an average of 6.6% (2.7 to 11.5%, figure below) due in part to catch transfer flexibility measures (i.e. between species and years) and to facilitate adherence to the discard ban.

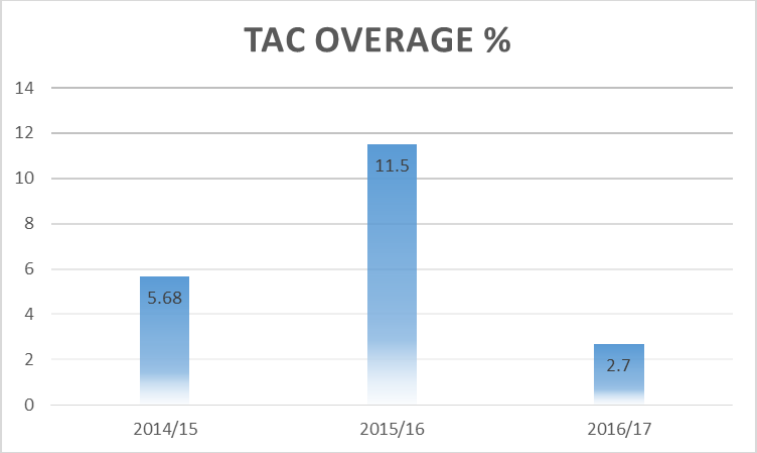



**Figure 39.** Total Icelandic landings of golden redfish % over TACs (2014/15-2016/17). [170]

**Greenland and Faroes catches**

Some of the overall TAC overages are due to catches of golden redfish outside Iceland. For example, In Greenland there is no explicit TAC for golden redfish, and redfish is only recorded generally as “redfish”, not by species (e.g. *S. norvegicus, mentella* etc…). There, redfish is caught mostly as by-catch in cod fisheries. Juvenile redfish can be caught in the shrimp fisheries, but is to a large extent protected by the use of sorting grids. A substantial increase in landings from East Greenland has occurred since 2010, and is now the highest since early 1990s.

In the Faroes, the main regulatory tool is effort-quotas but there is no explicit quota for golden redfish, hence any catch there contributes to the overall TAC overage.

**Reasons for overshooting TAC in Iceland**

Reasons for deviation of catch from TACs include:

- Transfer of quotas between years, which is legal within bounds. Vessels may transfer up to 15%[171] of catch quotas for each demersal species from one year to the next.
- Transfer of quotas between species. It may happen that vessels spend part of the golden redfish quota on other species or uses quotas for other species to cover catches of golden redfish.
- Undersize fish catches shall still be landed and sold (up to 5% of other marine catches per fishing year), but the vessel gets only 20%. The reminder goes to the Fisheries Commission Project Fund or 'VS Fund'[172].

Fiskistofa communicated to the Audit Team that the main reason for recently overshooting the TAC is that there are considerable golden redfish bycatches in the targeted fisheries for cod/haddock in areas closer to the coast (as opposed to deep sea fisheries). Typically these are the small to medium sized vessels in the fleet with limited catch quota in golden redfish. As a result, they utilize the allowances for transfers between species to accommodate the redfish catches in their quota portfolio. This is a relatively large part of the fishing fleet so small catches handled in this way eventually add up.

Fiskistofa also highlighted that an attempt to incorporate these catches into the TAC (e.g. by increasing the catch quota) would mainly increase the catch quotas of the vessels that have high quota shares and are targeting the redfish but would not help the vessels that are using the transferability option. On the other hand, stronger restrictions on transfer between species for the golden redfish may only increase the temptation for discarding – which at the moment is considered negligible[173].

Some of the points illustrated above impacting on TAC overages are shown in the figure below.

| Species | Cod | Haddock | Saithe | Redfish |
|---|---|---|---|---|
| Alloc. quota | 203,094 | 31,746 | 47,918 | 43,042 |
| Compensations | 2,204 | 664 | 1,695 | 2,277 |
| Trfr. prev. year | 8,289 | 4,312 | 7,016 | 3,322 |
| Allowed catch | 213,587 | 36,722 | 56,629 | 48,641 |
| Catch | 213,007 | 34,460 | 48,815 | 51,430 |
| Balance | 580 | 2,263 | 7,814 | -2,788 |
| Transfers | -13 | 1,041 | -1,553 | 5,031 |
| New balance | 567 | 3,304 | 6,261 | 2,243 |
| Trfr/ next year | 407 | 2,961 | 2,793 | 1,957 |
| Over fished | 2 | 0 | 0 | 0 |
| Net quota status | 162 | 343 | 3,468 | 286 |

**Figure 40.** Fishing period Sept 207-Aug 2018, quotas, balances and transfer information for redfish.

[171] Act No. 116/2006 as amended by Act No. 22/2010
[172] http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Sveigjanleiki_i_aflamarkskerfinu
[173] https://www.hafogvatn.is/static/extras/images/05-ICES_NWWG_loka731445.pdf

In the figure above the 45,319 t TAC can be seen in the two first lines of allocated quota (the Compensations are basically the 5,3% subtracted from the general allocation on the basis of shares). There is a transfer of 3,322 tons from the previous year (a result of the allowed transfer between species that year). There is a catch, 2,788 tons in excess of allowed catch potentially due to juvenile landings as part of the discard ban. Transfer from other species accounts for an extra allowance of 5,031 tons which accommodates the excess catches and creates a transferable quota to next season.

Since the risk even to the trigger biomass was very low in the ICES modelling simulations despite considerable assessment error, it is likely that the target F is small enough to tolerate a TAC overshoot of the magnitude observed in recent years.

**2018/19 Advice and TAC**

In June 2018 MFRI and ICES advised that catches of golden redfish in the 2018/2019 fishing season, based on the 2018 stock assessment and in accordance with the accepted HCR and management plan, should be no more than 43,600 t, implying an Icelandic TAC of not more than 39,240 t (90% of TAC to Iceland based on an agreement between Greenland and Iceland). The TAC has been set in line with this advice, as set out in the Regulation on fishing for the year 2018/2019 (No. 674/2018)[174].

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[174] https://www.stjornartidindi.is/Advert.aspx?RecordID=4819cdde-0a89-4f80-b21a-46bb071dd15f

### 9.2.2.2. Clause 2.2.2.

Monitoring, surveillance and information feed-back shall be used to collate information on actual catch.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Monitoring, surveillance and information feed-back is used to collate information on actual catch. The registered weight for each landing is sent to the Fisheries Directorate, where it is compared to the e-logbook data for the fishing trip, before the appropriate amount is subtracted from the vessels quota. The official weights used are the standardised registered landing weight with logbook records being used as a supplementary source to cross-check landings.**

**Evidence:**
As noted in clause 2.2.1, monitoring and surveillance information is used to collate information on actual catch. The system provides information on catch through recording catch information in logbooks, weighing of catch at landing and also records of the subsequent sale of the catch, which are compared to verify actual catches made. This is checked by surveillance at sea by the Coast Guard and inspectors of the Fisheries Directorate (for example, correct recording of catch in logbooks corresponding to composition of hauls) and also on land by inspectors (check logbooks and correct weighing of landings). Information from logbooks and landings is submitted to the Fisheries Directorate catch registration system (GAFL). See evidence presented in clause 2.2.1.

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.2.3. Clause 2.2.3.

Corrective management measures and/or appropriate adjustments in management decisions shall be implemented when the need is indicated by the relevant information.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Corrective management measures and/or appropriate adjustments in management decisions are implemented when the need is indicated by the relevant information.**

**Evidence:**

The golden redfish stock is currently well above the Btrigger reference point and almost twice above Blim levels, indicating that the Fishery Management Plan and Harvest Control Rule therein are effective. Appropriate adjustments to TAC opportunities are made to reflect flexibility measures in the ITQ system and to ensure adherence to the discard ban.

An example of corrective management measures can be shown in the low recruitment issue recognised in recent years, as highlighted in the Golden redfish NWWG 2018 report[175] section 19.17 Proposal for Benchmark in 2020. A number of other management, biological and ecological issues and proposed corrective actions are also highlighted in that same section.

A December 2018 report from the Icelandic National Audit Office (NAO)[176] on certain aspects of the Icelandic enforcement system highlighted that more quantitative data are needed to substantiate the conclusions that discards are low and that there are few irregularities in connection with re-weighing of catches after de-icing. Although available evidence (e.g. data from scientific cruises held up against information reported by the vessels) still indicates that discards are low and re-weighing irregularities not significant, the Directorate of Fisheries has recently implemented some corrective measures by placing new staff to control re-weighing at processing plants at risk, and has started to publish information on its website showing catch composition reported by fishing vessels on trips with and without an inspector on board, with a view to roll this out more widely to several fishing fleets in Iceland. The Assessment Team will continue to review the actions implemented to improve some of the shortcoming identified in the NAO report, in upcoming surveillances.

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

[175] https://www.hafogvatn.is/static/extras/images/05-ICES_NWWG_loka731445.pdf
[176] https://rikisendurskodun.is/wp-content/uploads/2019/01/Eftirlit-Fiskistofu-Stjornsysluuttekt.pdf

### 9.2.2.4. Clause 2.2.4.

Participating companies shall:

2.2.4.1. Ensure that they have been issued with all required permits;

2.2.4.2. Operate in compliance with the relevant rules and regulations;

2.2.4.3. Limit the catches of their vessels in accordance with their catch quota.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Participating companies must ensure that they have been issued with all required permits; operate in compliance with the relevant rules and regulations; and limit the catches of their vessels in accordance with their catch quota. These are legal requirements which are monitored by the Fisheries Directorate, Coastguard and Port Authorities and enforcement action is taken.**

**Evidence:**

Vessels must ensure that they have been issued with all required permits; operate in compliance with the relevant rules and regulations; and limit the catches of their vessels in accordance with their catch quota. These are legal requirements, for example vessels must have a license to fish and cannot leave port if they do not have sufficient quota. If they fish in excess of their quota they must arrange any transfers required within strict time limits or they cannot resume fishing.

Compliance with these rules is monitored by the Fisheries Directorate and Coast Guard. Evidence presented by the Fisheries Directorate and the Icelandic Coast Guard shows that vessel operators and companies are generally compliant with the relevant legislation and ensure catches by their vessels are in accordance with their catch quota. Where violations are confirmed, enforcement action is taken. Most cases are on the lower end of the scale of seriousness and addressed by administrative penalties, in particular by reprimands. Relatively few cases involve the more serious penalties such as suspension of fishing permits or weighing licenses or prosecution by the police.

See evidence presented in clause 2.1.1.

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.3. Clause 2.3. Monitoring and Control

#### 9.2.3.1. Clause 2.3.1. Vessel registration and catch quotas

##### 9.2.3.1.1. Clause 2.3.1.1.

Allocated catch quotas by species are assigned in such a way that the combined quotas conform with the currently effective decision on TAC.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**As the share of the TAC allocated to vessels is based on the number of shares for that particular species that the vessel owns the overall value of quota allocated cannot in the first instance exceed the TAC set by the Icelandic authorities (i.e. the currently effective decision on TAC). Note that within fishing seasons additional inter-annual, inter-species and/or inter-vessel transfers may cause the amount a particular vessel is allowed to catch to increase or decrease.**

**Evidence:**

Quotas conform to the overall decision on TAC, through the individual vessel quota share and other allocations. The headline TAC for a species is determined first and all subsequent allocations are in effect subdivisions of that figure. As a result, the allocated catch quotas for a species (when quotas are initially allocated) are assigned in such a way that the combined quotas for that species conform to the currently effective decision on TAC.

Catches by vessel are monitored and recorded in near real-time in a central database maintained by the Fisheries Directorate[177]. The official weight of the catch is subtracted from that vessels individual quota share for a particular species. Should a vessel not have sufficient quota to cover its landings it may rent in quota, transfer quota between species based on the cod equivalent values of each species, keep 20% of the value of the overage while forfeiting the remainder to scientific research or transfer a limited amount to the following fishing season where it is taken off that vessels individual quota share for that species.

| | |
|---|---|
| **References:** | See footnote. |
| **Non-Conformance Number (if relevant)** | **NA** |

[177] http://www.fiskistofa.is/veidar/aflaheimildir/aflahlutdeildalisti/

#### 9.2.3.1.2. Clause 2.3.1.2.

Commercial fishing shall be solely conducted with registered vessels authorised to participate in the fishery by the competent authorities.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Commercial vessels participating in the fishery require a permit issued by the Fisheries Directorate. Permits are only granted to fishing vessels holding certificates of seaworthiness and registered in the Registry of Vessels.**

**Evidence:**

Commercial vessels participating in the fishery require a permit issued by the Fisheries Directorate. This is a requirement of the Fisheries Management Act No.116/2006. These permits represent the initial legal requirement without which a vessel may not obtain the quota necessary to fish for Icelandic quota stocks, such as redfish. General fishing permits are of two types, a general fishing permit with a catch quota or a general fishing permit with a hook-and-line catch quota. A vessel may only hold one type of fishing permit each fishing year. Commercial fishing permits are cancelled if a fishing vessel has not been fishing commercially for 12 months (Article 4 of Act No. 116/2006). Foreign vessels are prohibited from fishing in Icelandic waters unless a right of access has been granted (e.g. Greenland, Faroe Islands) (Act on fishing in Iceland's EEZ, No. 79/1997).

Commercial fishing permits may only be granted to fishing vessels holding certificates of seaworthiness and registered in the Registry of Vessels (Article 5 of Act No. 116/2006). This Registry is administered by the Maritime Division of the Icelandic Transport Authority (ICETRA)[147].

| | |
|---|---|
| **References:** | See footnote. |
| **Non-Conformance Number (if relevant)** | **NA** |

#### 9.2.3.1.3. Clause 2.3.1.3.

The catch quota of each vessel or vessel group for each fish species and fishing year shall be recorded in the official central data base in a transparent manner.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**The catch quota of each vessel for each fish species and fishing year is available on the Fisheries Directorate website. The Fisheries Directorate maintain a catch registration system (GAFL database) which is updated with information on registered catches from ports of landing and information on catches exported unprocessed. The catch statistics are published, subject to change, once they have been compared to submitted logbooks and reports from buyers, and are available on the Fisheries Directorate website.**

**Evidence:**

The catch quota of each vessel or vessel group for each fish species and fishing year is available on the Fisheries Directorate website. For each vessel the information available for each species is:

1. Allocated quota (initial allocation of quota from the overall TAC based on no. of shares)
2. Compensations (quota gained/lost through compensations)
3. Quota transferred from the previous year (Note this may be a negative balance)
4. Quota transferred between vessels (a negative balance indicates an outward transfer of quota (i.e. quota transferred to other vessels) while a positive balance indicates an inward transfer of quota (i.e. quota gained from other vessels)
5. Allowed catch (the sum of 1 to 4 above)
6. Catch (vessels landings in the season to date of that species)
7. Balance (Allowed catch - Catch)
8. Overfished

For illustrative purposes, the table below shows the first 10 lines of the publicly available data on individual vessels' quota allocations of golden redfish in the 2017/2018 fishing season. Accordingly, information on the size and composition of the fleet of fishing vessels is available and documented, and the catch quota of each vessel or vessel group, along with the fishing year is recorded in the official central database (GAFL) in a transparent manner and is publicly accessible.

**Table 10.** First 10 lines of table showing the Icelandic golden redfish fleet TAC allocation, transfer, balances and catches for the 2017/2018 fishing season (Source:[178]).

| Reg. no. | Vessel | Class | Alloc. quota | Compensations | Trfr. prev. year | Trfr. b/t vessels | Allowed catch | Catch | Balance | Over fished |
|---|---|---|---|---|---|---|---|---|---|---|
| 78 | Ísborg ÍS 250 | A | 0 | 4,439 | 0 | -4,439 | 0 | 0 | 0 | 0 |
| 89 | Grímsnes GK 555 | A | 0 | 0 | 0 | 0 | 0 | 12,254 | -12,254 | 0 |
| 173 | Sigurður Ólafsson SF 44 | A | 7,449 | 0 | 2,321 | 26,900 | 36,670 | 55,425 | -18,755 | 0 |
| 177 | Fönix ST 177 | A | 0 | 2,176 | 0 | 0 | 2,176 | 117 | 2,059 | 0 |
| 182 | Vestri BA 63 | A | 230 | 2,098 | 0 | 23,340 | 25,668 | 38,602 | -12,934 | 0 |
| 233 | Erling KE 140 | A | 8,148 | 100 | 0 | -4,529 | 3,719 | 2,497 | 1,222 | 0 |
| 253 | Hamar SH 224 | A | 3,449 | 2,516 | 7 | 0 | 5,972 | 8,109 | -2,137 | 0 |

[178] http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/aflastodulisti.jsp?lang=en

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 264 | Hörður Björnsson ÞH 260 | A | 3,449 | 61,661 | 215 | -65,325 | 0 | 38,958 | -38,958 | 0 |
| 288 | Jökull SK 16 | A | 0 | 2,028 | 0 | -2,028 | 0 | 0 | 0 | 0 |
| 363 | Maron GK 522 | A | 0 | 0 | 0 | 0 | 0 | 312 | -312 | 0 |

Registered catches are based on information from ports of landing and information on catches exported unprocessed. The catch statistics are published, subject to change, once they have been compared to submitted logbooks and reports from buyers, and are available on the Fisheries Directorate website[179].

| **References:** | See footnotes. |
|---|---|
| **Non-Conformance Number (if relevant)** | **NA** |

[179] http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/aflastodulisti.jsp?lang=en

### 9.2.3.1.4. Clause 2.3.1.4.

Information on the size and composition of the fleet of fishing vessels shall be available, documented and include the following provisions:

1) An officially maintained fishing vessel registry;
2) Participation in the fishery must be subject to licence;
3) Only vessels on the fishing vessel registry shall be authorised to participate in the fishery;[180]
4) For the stock under consideration, the allowed catch by species for each vessel or vessel group shall be specified.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Information on the size and composition of the fleet of fishing vessels is available and documented and includes an official fishing vessel registry maintained by the Icelandic Transport Authority (ICETRA). Participation in the commercial fisheries in Icelandic waters requires a fishing permit granted by the Fisheries Directorate and only vessels on the fishing vessel registry can be granted a permit. The allowed catch of golden redfish for each vessel or vessel group is specified on the Fisheries Directorate website.**

**Evidence:**

As noted in clause 2.3.1.2 vessels participating in the fishery require a fishery permit and must be registered on the ICETRA. Foreign vessels are prohibited unless agreement has been reached to allow access. See clause 2.3.1.2 for further information.

Current quota share and TAC allocations by species, including golden redfish, as well as running catch totals and remaining quota for the season for each vessel are freely available on the Directorates website meaning the system is very transparent[181].

| | |
|---|---|
| **References:** | See footnote. |
| **Non-Conformance Number (if relevant)** | **NA** |

[180] Foreign registered vessels may be allowed to fish in Icelandic waters by international agreement; such vessels require specific permit from the Icelandic authorities and their catches are strictly monitored.

[181] http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/aflastodulisti.jsp?lang=en

### 9.2.3.2. Clause 2.3.2. Fishing vessel monitoring and control systems

#### 9.2.3.2.1. Clause 2.3.2.1.

A program for the monitoring and control of fishing vessel activities shall be operated and enforcement shall be in place to prevent fishing by unauthorised vessels.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**The Icelandic Coast Guard, working closely with the Fisheries Directorate, administers an integrated monitoring, control and surveillance system which covers the activities of Icelandic and foreign fishing vessels. It involves several different but complementary electronic vessel monitoring systems including satellite-based systems, comprising VMS and use of satellite imagery, the monitoring of coastal activity through a dedicated land-based very high frequency (VHF) system and the use of the Automatic Identification System (AIS). The integrated system uses all available data such as identification of the vessel, its movements, IUU (illegal, unreported and unregulated) lists, notifications, reports, fishing licenses, permits, port State control reports, etc. to detect and prevent unauthorised fishing in the Icelandic Exclusive Economic Zone (EEZ) and the North Atlantic Ocean.**

**Evidence:**

The Icelandic Coast Guard administers the VMS for all Icelandic vessels and for all foreign vessels (including fishing vessels) that enter Icelandic waters as part of an integrated monitoring, control and surveillance system. The purposes of the system are numerous and it incorporates several related services including maritime traffic control, marine search and rescue, fisheries enforcement, coastal radio and border control in a single Operations Centre[182]. The importance of the fisheries sector to the Icelandic economy and the need for greater efficiency, due to the relatively small size of the institutions involved, has led to high levels of collaboration and integration resulting in creative and dedicated approaches to fisheries management and enforcement. For example, the Directorate of Fisheries produce a risk analysis for the Coast Guard, enabling a strategic, risk-led approach to surveillance and best use of available resources over the large area monitored. The fisheries MCS system in Iceland has at its core the effective use of available technology meaning relatively small staff numbers can achieve extensive monitoring of the Icelandic fishing industry.

The integrated system uses all available data such as identification of the vessel, its movements, IUU lists, notifications, reports, fishing licenses, permits, port State control reports, etc. and has proved to be effective in combating and eliminating IUU fishing in the EEZ and the North Atlantic Ocean. Bilateral tracking agreements are in place with Greenland, Faroe Islands, Norway and Russia whose vessels must follow automatic procedures and report catches daily.

The Coast Guard uses several different but complementary electronic vessel monitoring systems including satellite-based systems comprising VMS and use of satellite imagery, the monitoring of coastal activity through a dedicated land-based very high frequency (VHF) system and the use of the Automatic

[182] http://www.lhg.is/media/LHG80/Landhelgisgasla_Islands_enska2_.pdf

Identification System (AIS). During the February 2018 site visit, the assessment team visited the Operation Centre and witnessed these systems in use.

The VHF and AIS systems have a range of 30 – 60 nautical miles while the satellite-based VMSs can be used anywhere in the world. The use of complementary systems ensures that the limitations that arise when any one system is used in a standalone capacity are mitigated. These electronic MCS systems are further backed up by more traditional methods of surveillance such as patrol vessels and aircraft; indeed the use of electronic systems in the effective targeting of traditional surveillance methods increases the efficiency of these systems. Recently satellite imagery has been added to the list of surveillance methods (80 images are taken each month) which can be used for example in detection of the uncommon occurrence of vessels not using VMS (Coast Guard pers. comm., site visit November 2018).

Emphasis is placed on data analysis including the use of VMS data in conjunction with other sources (e.g. IUU vessel lists, vessel registries, fishing licences, permits, port State control reports). The schematic below outlines the main inputs which make up the integrated MCS system in Iceland (figure below).

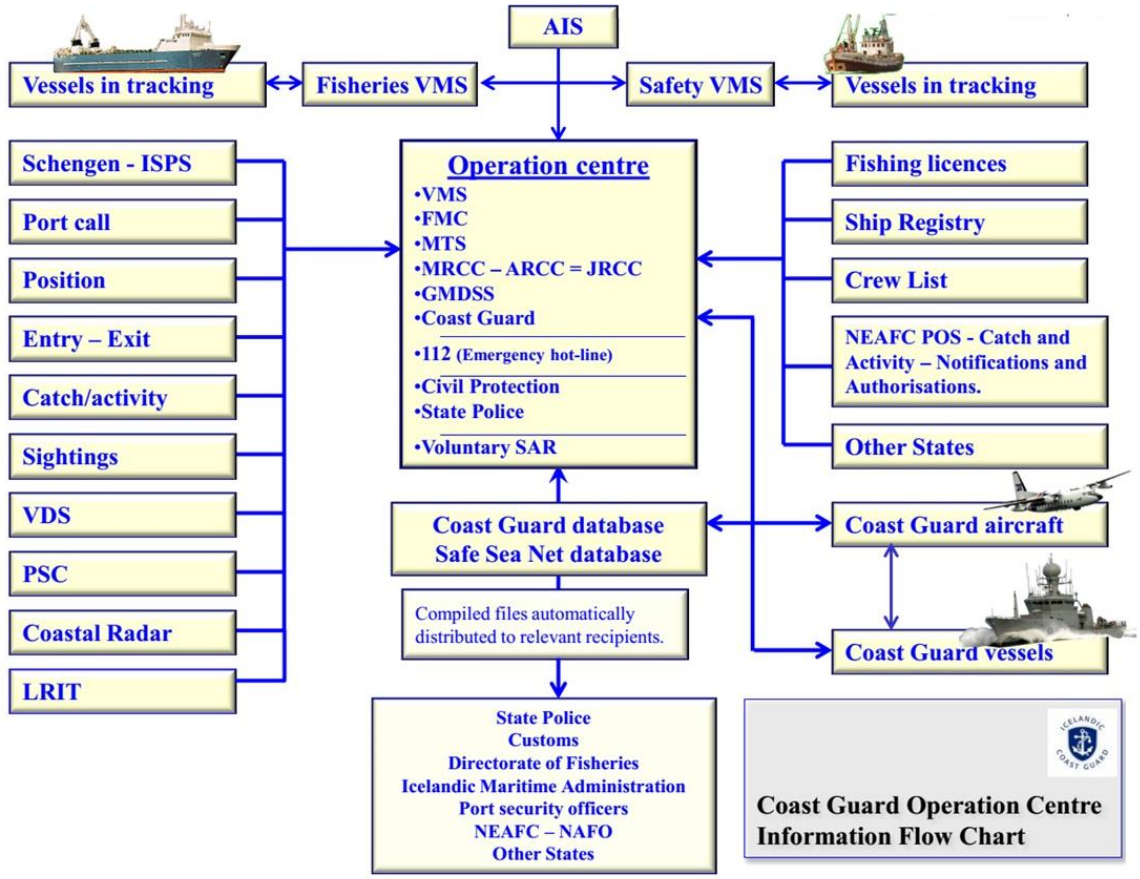



**Figure 41.** Schematic outlining the inputs which make up the integrated Monitoring, Control and Surveillance (MCS) system in Iceland (Source: presentation entitled Iceland's application for membership of the EU. Chapter 13, 28 February Icelandic Coast Guard ERS/VMS/AIS[183]).

[183] https://slideplayer.com/slide/4644333/

The Coastguard conduct unannounced at-sea vessel boarding's in order to inspect gear, catch and catch records including logbooks as well as to perform inspections of mandatory safety equipment. The Coast Guard is currently investigating additional means to enhance detection of discarding to enhance the confidence of current discard estimates.

Data on coastguard enforcement activity in the past year has been provided in Clause 2.1.

Inspectors of the Fisheries Directorate also accompany fishing vessels at sea during which they check fishing methods and catches, including gear configuration, mesh sizes, validity of fishing permits, the weighing and recording of catches as well as the species and size composition of the catch. The catch of vessels that are permitted to fully process catches on board is converted into a live weight based on the measured utilisation of the catch. The inspectors check that samples taken to monitor this process are correctly taken and accurately reflect the processing utilisation[184],[185].Days spent by inspectors of the Fisheries Directorate at sea inspecting vessels as a proportion of total fishing effort is shown in the table below. Most effort is directed at the highest risk gillnet fisheries. Inspectors also undertake in-port inspections, to inspect logbooks and monitor the landing of catches and ensure that they are correctly weighed and recorded, according to legal requirements.

**Table 11.** Inspector days on fishing vessels (Source: Directorate of Fisheries, November 2018 site visit).

| Fishery type | Bottom Trawl | Longline | Gillnet (include lumpfish fishery and cod fishery) |
|---|---|---|---|
| 2017/2018 days | 570 | 202 | 152 |
| 2017/2018 coverage % | 1.93% | 0.64% | 3.64% |

Fisheries Directorate Inspectors also measure the length of the fish caught and if the percentage of fish below the minimum legal size in the catch exceeds a specified threshold, a proposal is submitted to the MFRI to temporarily close the fishing grounds with immediate effect. This closures generally lasts for two to three weeks. The decision to temporarily close an area does not require Ministerial approval. If there is considered to be sufficient reason to close the fishing grounds for a longer period such as three temporary closures in the same area, the Minister may issue a regulation to this effect. Both temporary and long-term closures are primarily monitored and enforced by the Icelandic Coast Guard using the VMS system; while the main role of VMS tracking is geared towards safety the spatial nature of the available data allows closed areas to be monitored remotely. Vessels fishing in proximity to closed areas are monitored at the Coast Guard operation centre and vessels are directly contacted if they encroach on prohibited areas; this is the first point at which the Coast Guard operator may issue a warning to the vessel and decide to escalate if necessary.

[184] The Icelandic Directorate of Fisheries – Responsibilities and main tasks. Page 8. http://www.fiskistofa.is/media/utgefid_efni/DOF.pdf

[185] Fiskistofa Annual Report, 2017. Maritime surveillance chapter. http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/eftirlit-a-sjo/

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.3.2.2. Clause 2.3.2.2.

The fishing gear shall be subject to inspection, as well as the composition of the catch and its handling onboard the fishing vessels.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Fishing gear is subject to inspection, as well as the composition of the catch and its handling onboard the fishing vessels. At-sea inspections are undertaken during boardings by the Coast Guard and on fishing trips accompanied by the inspectors of the Fisheries Directorate.**

**Evidence:**
As noted in clause 2.1.1 and 2.3.2.1 fishing vessels are subject to surveillance at sea by the coastguard and Inspectors of the Fisheries Directorate.

The Coastguard conduct unannounced at-sea vessel boarding's in order to inspect gear, catch and catch records including logbooks as well as to perform inspections of mandatory safety equipment.

The Directorate's inspectors also accompany vessels on fishing trips during which they check fishing methods and catches, including gear configuration, mesh sizes, validity of fishing permits, the weighing and recording of catches as well as the species and size composition of the catch. The catch of vessels that are permitted to fully process catches on board is converted into a live weight based on the measured utilisation of the catch. The inspectors check that samples taken to monitor this process are correctly taken and accurately reflect the processing utilisation[186],[187].

On land, inspectors from the Directorate of Fisheries inspect logbooks and monitor the landing of catches and ensure that they are correctly weighed and recorded, according to legal requirements.

Surveillance is strategic and risk-based, using information supplied by the Fisheries Directorate to identify highest risk activities where monitoring effort is then concentrated. For example, at present inspector coverage is focussed on the gillnet fisheries (3.64% of trips accompanied by inspectors) compared to 1.93% and 0.64% of bottom trawl and longline fishing trips, respectively (see **Error! Reference source not found.**in lause 2.3.2.1).

Further information is presented in clauses 2.1.1 and 2.3.2.1.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[186] The Icelandic Directorate of Fisheries – Responsibilities and main tasks. Page 8. http://www.fiskistofa.is/media/utgefid_efni/DOF.pdf

[187] Fiskistofa Annual Report, 2017. Maritime surveillance chapter. http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/eftirlit-a-sjo/

### 9.2.3.2.3. Clause 2.3.2.3.

Areas closed from fishing shall be monitored by the authorities.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**Areas closed to fishing are monitored by the Coast Guard using the VMS system. Vessels fishing in proximity to closed areas are monitored at the Coast Guard Operation Centre and vessels are directly contacted if they encroach on prohibited areas.** | | | | |
| **Evidence:**<br>Both temporary and long-term closures are primarily monitored and enforced by the Icelandic Coast Guard using the VMS system. Vessels fishing in proximity to closed areas are monitored at the Coast Guard Operation Centre and vessels are directly contacted if they encroach on prohibited areas; this is the first point at which the Coast Guard operator may issue a warning to the vessel and decide to escalate if necessary.<br><br>Further information on the Coast Guard Monitoring, Control and Surveillance system is presented in clause 2.3.2.1. | | | | |
| **References:** | As referenced. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

#### 9.2.3.2.4. Clause 2.3.2.4.

Catch amounts by species and fishing area shall be estimated and continually recorded in fishing logbooks on-board the fishing vessels.

| **Evidence Rating:** | Low ☐ | **Medium** ☑ | | High ☐ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | **Minor** ☑ | None ☐ |

**Summary Evidence:**

**Although required by legislation, there is some evidence of non-reporting/under-reporting of seabirds and marine mammals bycatch such that the Assessment Team cannot be fully confident that catch amounts by species and fishing area (of marine mammals and seabirds) are estimated and continually recorded in fishing logbooks. Therefore, the Assessment Team have deemed a Minor Non-conformance to be appropriate in this instance. Following the issuance of this non-conformance, and in accordance with rules of the IRF Programme, the Client has submitted a Corrective Action Plan (CAP) to address the non-conformance raised within a defined period. Corrective Actions in place are to be reviewed annually at surveillance audits.**

**Evidence:**

Vessel operators are required by law to up-date and transmit data on fishing activity after each haul (fishing event occasion). For small vessels that operate without an electronic logbook (below 6GRT) a report of catches must be submitted on landing.

The recording of marine mammals and seabirds by number and species is required by Icelandic regulation[188]. Despite the implementation of new mandatory logbook reporting procedures for seabird and marine mammal bycatch, available evidence suggests that far fewer incidences of seabird and marine mammal bycatch are reported via the electronic logbook system than would be expected given the levels reported by onboard observers. This suggests significant levels of under-reporting and/or non-reporting of seabird and marine mammal bycatch. Examples of available evidence to support this conclusion include the findings of Pálsson *et al.* 2015[189] and the March 2018 MFRI report entitled: "Bycatch of Seabirds and Marine Mammals in lumpsucker gillnets 2014-2017".

Pálsson *et al.* 2015 highlighted the fact that their bycatch estimates were based on limited data that needed to be increased and improved with a functioning reporting system for the fishery and better follow up.

The MFRI 2018 report found that although reported bycatch in E-logbooks by the fleet has increased (suggesting better compliance with reporting requirements) the overall bycatch rates are still much lower

[188] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967
[189] https://www.hafogvatn.is/static/research/files/fjolrit-178pdf

than observed in the trips by inspectors. Overall, the marine mammal and seabird bycatch rate during inspector trips was around 4 times higher than reported by the fleet in 2017[190].

Furthermore, according to a 2017 presentation to NAMMCO's Working group on bycatch of marine mammals in Iceland; *"logbooks have unfortunately proven unreliable"* and *"bycatch of birds and marine mammals* [is] *18x higher when observer is present vs logbook records"*.[191]

While much of the evidence related to non-compliance with reporting requirements may relate to the lumpsucker fishery, this fishery is still part of the management system under review and in addition there is insufficient evidence to show that compliance in the fisheries under assessment here is better; therefore, the Assessment Team have deemed a Minor Non-conformance to be appropriate in this instance. As this represents the first non-conformances raised in this assessment, this non-conformance will be termed Non-conformance #1.

**Non-conformance #1 (Clause 2.3.2.4: Minor Non-conformance)**
Although required by legislation, there is some evidence of non-reporting/under-reporting of seabirds and marine mammals bycatch such that the Assessment Team cannot be fully confident that catch amounts by species and fishing area (of marine mammals and seabirds) are estimated and continually recorded in fishing logbooks.

**Status: Open, Corrective Actions in place to be reviewed annually at surveillance audits**.

A corrective action plan against this non-conformance has been provided under the Non Conformances and Corrective Action Section of this report. Please refer to it for further detail.

| **References:** | See footnotes. |
|---|---|
| **Non-Conformance Number (if relevant)** | **#1** |

[190] https://www.hafogvatn.is/static/files/skjol/techreport-bycatch-of-birds-and-marine-mammals-lumpsucker-en-final-draft.pdf
[191] https://nammco.no/wp-content/uploads/2017/04/nammco-meeting-iceland-gms.pptx

### 9.2.3.2.5. Clause 2.3.2.5.

Fishing logbooks shall be subject to unannounced inspection.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The Coast Guard undertakes unannounced inspections at sea and check logbooks during these boardings. Fisheries Directorate inspectors also make unannounced checks of logbooks during port inspections.** | | | | |
| **Evidence:**<br>It is a legal requirement that vessels give inspectors of the Fisheries Directorate and the Coast Guard access to their logbooks (Regulation on Catch Books No. 746/2016)[192]. As noted in clause 2.3.2.2, the Coast Guard undertakes unannounced inspections at sea and check logbooks during these boardings. Fisheries Directorate inspectors also make unannounced checks of logbooks during port inspections as well as checking them during fishing trips at sea. | | | | |
| **References:** | See footnote. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

[192] https://www.stjornartidindi.is/Advert.aspx?RecordID=42a16a67-60a7-4ae7-ad7c-0f53fc254654

### 9.2.3.2.6. Clause 2.3.2.6.

The timely and correct recording of catches in fishing logbooks shall be monitored by comparing the recorded catch amounts with the catch stored aboard the vessel at time of inspection.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The timely and correct recording of catches in fishing logbooks is monitored by comparing the recorded catch amounts with the catch stored aboard the vessel at time of inspection. Inspections involve at-sea boardings by the Coast Guard and on fishing trips accompanied by Fisheries Directorate inspectors. Directorate inspectors also perform checks in port.**

**Evidence:**

The timely and correct recording of catches in fishing logbooks is monitored during random unannounced vessel boardings both at sea or at the quayside. These inspections include a comparison of the recorded catch amounts with the catch stored aboard the vessel at time of inspection. As noted in clause 2.3.2.2, the Coastguard conduct unannounced at-sea vessel boarding's during which catch and catch recording is checked. The Fisheries Directorate's inspectors accompany vessels on fishing trips during which they also check catches and the weighing and recording of catches – including on vessels that process their catch on board. Checks are also performed by inspectors in port.

The results of some of these inspections can be seen in the supporting evidence for Clause 2.1.1 which presents the main reasons for the generation of remarks during Coast Guard inspections in 2017. Remarks related to discrepancies between declared and actual catch fall under the "Veiðar" or "Catch" category. Clause 2.1.1 also presents information on the results of inspections by the Fisheries Directorate including monitoring of logbooks and the detection of violations and enforcement action subsequently taken.

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.3.2.7. Clause 2.3.2.7.

Discarding of catch from stock under consideration shall be prohibited. Discarding that may occur shall be monitored, e.g. by estimating amount of catch discarded due to size based high grading by species, season, gear type and area as feasible. The method for the monitoring of discards shall be specified.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Discarding of golden redfish is prohibited. Discarding is monitored, by comparing the catches of vessels fishing in the vicinity of each other and, where unusual activity is detected, implementing closer surveillance of the vessel/s involved. Discarding of undersized golden redfish is considered highly unlikely because there are very few under-sized fish in Icelandic waters since 2009 due to an absence of recruitment.**

**Evidence:**

Discarding of commercial species is prohibited by law in Iceland (Article 2 of the Act Concerning the Treatment of Commercial Marine Fish, No. 57/1996) and this includes golden redfish. This means that if vessels do not have sufficient quota to cover the species they have caught they are required to attain quota through the quota transfer system. Consequently, if vessels do not have sufficient catch quotas for their probable catches they must suspend all fishing activities. Discarding is subject to penalty[193] (400,000 to 8,000,000 ISK or about 3,000 to 60,000 EUR). As noted in previous clauses, catches are monitored and should the composition of the catch (species, size) or its quality differ from other vessels fishing in the vicinity, the Fisheries Directorate has powers to place the vessel under closer surveillance by placing an inspector on board for one day or fishing trip. The vessel must pay the Directorate's costs (e.g. inspector wages) if this occurs more than once in a fishing year (Article 13 of Act No. 57/1996).

The discard ban has some inbuilt flexibility, as any 5% of demersal catches from a fishing trip (called VS catch), irrespective of fish species or size, may be excluded from quota restriction (which means that VS catches are additional to the TAC). On sale of VS catches in public fish markets 20% of the revenue generated is paid to the vessel with the remaining 80% going to a designated research and development fund (the Fisheries Commission Project or 'VS fund', under the auspices of the Ministry). The maximum of 20% return on VS catches means that there are limited incentives to land it; however, having the VS catch provisions within the fisheries management system allows the flexibility for vessels to land small catches which are outside their specific quota, preventing discards, improving the treatment of the fishery resource and promoting responsible fishing practices.

A discard project has been established by the Fisheries Directorate, in collaboration with the MFRI, to examine and evaluate discarded fish under a specific length and with a specific fishing gear. The project

| |
|---|
| focusses on cod and haddock. The results of the research are published in MFRI's annual report. In 2017, discards were measured from bottom trawl and line gear.[194]<br><br>Discarding of golden redfish was last measured in 2007 by Pálsson et. al (2007)[1] when no measurable discarding was recorded[195]. The MFRI note (email from Gudmundur Thordarson, Head of Demersal Division, 15 March 2019) that this was consistent with measurements in previous years (2002-2007) when discarding was extremely low / almost undetectable. MFRI further note that discarding of undersized fish is highly unlikely at present as there are virtually no undersized fish due to a lack of recruitment In Icelandic waters – this has been the case since 2009[196].<br><br>Coast Guard are also investigating other ways to enhance the detection of discarding drawing on experience elsewhere (Norway) and other technologies including aerial surveillance (pers. com. site visit, November 2018). |

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[194] Fiskistofa Annual Report, 2017. Maritime Surveillance section. http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/eftirlit-a-sjo/

[195] Pálsson *et al*., 2007. MFRI Report Series No. 142. Measurements of discards of demersal fish in 2007. https://www.hafogvatn.is/static/research/files/fjolrit-142pdf

[196] ICES, 2018. Report of the North Western Working Group (NWWG). https://www.hafogvatn.is/static/extras/images/05-ICES_NWWG_loka731445.pdf

### 9.2.3.2.8. Clause 2.3.2.8.

Vessels must comply with relevant national fishery management measures, which may include; TAC and quota allocations, effort management measures (e.g. days at sea, access limitation, gear restrictions, maximum allowable proportion of undersized fish, closure of areas with a high proportion of fish recruiting to the fishery, etc.), and technical conservation measures (e.g. mesh size and other gear selectivity measures).

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**Vessels are required by law to comply with relevant national fishery management and technical conservation measures.** | | | | |
| **Evidence:**<br>Vessels are required by law to comply with fishery management and technical conservation measures, through the laws and regulations summarised in clause 2.1.1 and compliance is monitored through remote surveillance and inspections at sea and on land by the Coast Guard and the Fisheries Directorate with penalties applied where violations are detected. See evidence presented in clause 2.1.1 (section **Error! eference source not found.**). | | | | |
| **References:** | As referenced. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

### 9.2.3.2.9. Clause 2.3.2.9.

Monitoring and control measures shall be in place and shall be conducted in a manner to encourage and demonstrate compliance (and deter unreported landings).

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Monitoring and control and surveillance measures are in place. The Icelandic management model has been designed to promote compliance through reporting and includes provisions which create flexibility, enabling fishers to avoid non-compliance with rules and regulations and effectively encourages compliance. The rapid reporting system further encourages compliance through near real-time information on the catch of each vessel, quota allocation and transfers. This transparency in effect introduces an element of 'self-policing' into the management system.**

**Evidence:**

The monitoring, control and surveillance system has been described in clause 2.1.1. The Icelandic 'management model' has been designed to promote compliance through reporting. There are provisions within the system which create flexibility, enabling fishers to avoid non-compliance with rules and regulations and effectively encourages compliance.

The system is transparent with information relating to quota allocations and performance of individual vessels in the fleet being readily publicly available[197]. The rapid reporting system encourages compliance through near real-time information of catch for each vessel, quota allocation and transfers. This transparency in effect introduces an element of 'self-policing' into the management system.

| | |
|---|---|
| **References:** | See footnote. |
| **Non-Conformance Number (if relevant)** | **NA** |

[197] http://www.fiskistofa.is/fyrirspurnatorg/fyrirspurnir-tengdar-afla/

### 9.2.3.2.10. Clause 2.3.2.10.

Catches shall be landed in authorised fishing ports. Authorised fishing ports provide the necessary facilities for handling and weighing of the catch.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Law requires that all catches by Icelandic vessels from Icelandic waters must be landed and weighed in an Icelandic port. Weighing is undertaken on official port scales, or on other approved scales at private companies or Fish Markets, that have been certified by the Fisheries Directorate and operated by individuals authorised by the Directorate. The Fisheries Directorate maintains a list on their website, organised by port, of all official Icelandic weighing license holders that they audit and the type of weighing license held.**

**Evidence:**

The Treatment of Commercial Marine Stocks Act 57/1996 and Regulation No. 745/2016 on the weighing and registration of marine catch require that all catches by Icelandic vessels from Icelandic waters must be landed and weighed in an Icelandic port. Exceptions are made for special circumstances e.g. serious engine failure in which case the Fisheries Directorate may authorise landings abroad (Article 5 of Act No. 57/1996).

The Directorate maintains a list, organised by port, of all official Icelandic weighing license holders that they audit and the type of weighing license held on their website[198]. Landings were previously permitted at authorised foreign ports but this is no longer the case following Regulation No. 745/2016 (Article 1)[199].

Weighing is undertaken on official port scales certified by the Fisheries Directorate and operated by individuals authorised by the Directorate. Weighing may also occur on one of the other approved systems such as private companies or Fish markets authorised by the Fisheries Directorate under the provisions of the Regulation No. 745/2016 on Weighing and Recording of Marine Resources.

During the site visit on the 27th November 2018, the assessors visited a fish market and were shown the landed fish, weighing scales and the information recorded on the system which goes to the Port Authority who then submit it to the Fisheries Directorate's catch registration system (GAFL).

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

[198] http://www.fiskistofa.is/fiskveidistjorn/vigtunafla/

[199] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/0745-2016

### 9.2.3.2.11. Clause 2.3.2.11.

In cases of mixed species catches, all commercial species shall be landed.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Discarding of commercial species is prohibited by law and all commercial species must be landed. All commercial species are separated and declared by logbook and landed weight. This is monitored by Fisheries Directorate inspectors and penalties are in place for non-compliance.**

**Evidence:**

Discarding of commercial species is prohibited by law and all commercial species must be landed (Act Concerning the Treatment of Commercial Marine Fish, No. 57/1996). All commercial species are separated and declared by logbook and landed weight (Article 9, Act No. 57/1996). This is monitored by Fisheries Directorate inspectors and penalties are in place for non-compliance. Species within the Icelandic quota system are as set out in the table below and include a number of demersal species that are likely to be landed with golden redfish.

**Table 12.** Species in the Icelandic quota system (Source:[200])

| | | |
|---|---|---|
| Cod *Þorskur* | Haddock *Ýsa* | Saithe *Ufsi* |
| Golden redfish *Karfi/gullkarfi* | Ling *Langa* | Blue ling *Blálanga* |
| Tusk *Keila* | Atlantic wolffish *Steinbítur* | Spotted wolffish *Hlýri* |
| Angler *Skötuselur* | Greater Argentine *Gulllax* | Greenland halibut *Grálúða* |
| Plaice *Skarkoli* | Lemon sole *Þykkvalúra / Sólkoli* | Witch flounder *Langlúra* |
| Common dab *Sandkoli* | Long rough dab *Skrápflúra* | Atlantic herring *Síld* |
| Norway lobster *Humar* | Shrimp – Offshore *Rækja – Úh.* | Shrimp - Arnarfjord *Rækja – Arn.* |
| Shrimp – Djúp *Rækja - Djúp* | Shrimp – Snæfellsnes *Rækja Sn.* | Norway redfish *Litli karfi* |
| Scallop – Breidafjord *Skel - Breid.* | Deepwater redfish *Djúpkarfi* | |

In addition to formal quota species, there are a suite of other commercial species which are landed. The Directorate's website has a public search function which lists 65 of these species[201]. Some of these are species for which there is a ban on direct fishing (e.g. Atlantic halibut, certain sharks, etc…) but that are landed as part of the discarding prohibition. Others do not have a formal National TAC but are landed and sold commercially.

During the site visits, the Assessment Team witnessed one Atlantic halibut landed at the Reykjavik Fish Market.

| **References:** | See footnote |
|---|---|
| **Non-Conformance Number (if relevant)** | **NA** |

[200] http://www.fiskistofa.is/english/quotas-and-catches/total-catch-and-quota-status/
[201] http://www.fiskistofa.is/veidar/aflaupplysingar/afliallartegundir/

### 9.2.3.2.12. Clause 2.3.2.12.

Landings shall be monitored. Harbor officials and fisheries inspectors shall monitor the correct weighing and registration of the catch.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Landings are monitored. Port authority officials and Fisheries Directorate inspectors monitor the correct weighing and registration of the catch. New powers have been enacted through legislation to address the risk posed by incorrect weighing of ice.**

**Evidence:**
The legal requirements on the monitoring of landings and the weighing and registration of catch are comprehensive. They are set out in Act No. 57/1996 concerning the Treatment of Commercial Stocks, and Regulation No. 745/2016 on Weighing and Recording of Marine Resources. Inspectors from the Directorate of Fisheries inspect logbooks and monitor the landing of catches and ensure that they are correctly weighed and recorded according to the legal requirements. Port authorities also have a role in this process.

All Icelandic catches from Icelandic waters must be landed and weighed in an Icelandic port. Exceptions are made for special circumstances e.g. serious engine failure in which case the Fisheries Directorate may authorise landings abroad (Article 5 of Act No. 57/1996).

Separation by species (if not already done on board), weighing and recording of the catch must occur within two hours of landing. Weighing is undertaken on official port scales certified by the Fisheries Directorate and operated by individuals authorised by the Directorate.

As required by Article 10 of Regulation No. 745/2016, each landing generates a weighing receipt[202,203] recording:

- Vessel name, registration number and district number;
- Landing port and date of landing;
- Name of seller, buyer and recipient of the catch;
- Official weight by species of catch;
- Proportion of undersize fish in catch;
- Number, type and weight of tubs/boxes/barrels;
- Fishing gear used;
- Total number of pallets of platforms;
- Registration number and tare of transport vehicle;
- Whether catch is to be re-weighed;
- Whether any of the catch is un-gutted and needs to be either weighed after gutting or converted to a gutted weight using coefficients provided by Directorate.

The information is sent within 1 day by port authorities to the Fisheries Directorate who record it on their Catch Registration System. The Directorate also receives the e-logbook information. These two sets of

[202] https://www.fmis.is/blank
[203] http://www.unuftp.is/static/fellows/document/pan09prf.pdf

information are compared, and the appropriate reduction is made to the vessel quota. Any transfer under the ITQ system for each vessel is also monitored to ensure that any additional quota requirements are rented from other vessels within a 3-day period. The reporting system is not real time but is very near real time (circa. 24 hours). Adjustments can be made by the Directorate to correct for errors – the system is transparent in so far that anyone can enter a vessel registration number on the Directorates website and obtain the catch, species, quota, remaining quota, quota rents for any vessel.

In circumstances where there are significant difficulties in using a port scale, private weighing scales can be used provided the company involved has been approved by the port authority, the scales and operators using them are certified and Fisheries Directorate inspectors have unimpeded access to the facilities. This is known as a 'Home-weighing license'[204]. Fish markets can also be authorised to weigh catches by the Directorate. These private companies and fish markets are required to send weighing information to the relevant port authority who then submit it to the Fisheries Directorate's catch registration system. There are also legal requirements covering the licensing of the re-weighing of catch or weighing after gutting on land which are also monitored.

Processed at sea catch are registered as processed weights using an officially approved yield. This is monitored and verified by the Directorate staff. Weights at landing are checked at the processing base by Directorate staff. Processed weights are converted to live weight equivalents for deduction from each vessels quota and management purposes by staff at the Directorate.

Monitoring of weighing license holders is risk-based with the aim of directing surveillance where it is most needed. Assessment of risk is based on various factors such as the quantity weighed, number of weighings, the number of vessels that land with the licensee concerned, etc. Recently, attention has been focussed on the percentage of ice measured during weighing of catches by weighing licensees. After gross weighing on the port scale, it is permissible to send catch for re-weighing in fish processing companies or on a fish market which has been authorized for re-weighing catch. The catch is then either balanced or sampled according to certain rules, ice is separated, and the net weight of the fish is found. Monitoring by the Directorate found significant deviations in the percentage of ice recorded in the catch when inspectors were present compared to when they were not[205]. The results of this monitoring are published on the 'news' page of Directorate's website[206] as bi-monthly reports[207].

To address the risk posed by incorrect weighing of ice, in 2017 the Act on the Treatment of Marine Fish Stocks (Act No. 57/1996) was amended by Act No. 48/2017 (Act amending the Act on the Treatment of Marine Fish Stocks and the Act on the Directorate of Fisheries (monitoring of weighing license holders))[208]. The Act empowers the Fisheries Directorate to monitor all weighing by a weighing license holder for a period of up to six weeks in cases where monitoring of the weighing license holder by the Directorate detects a

[204] http://www.fiskistofa.is/fiskveidistjorn/vigtunafla/
[205] Fiskistofa Annual Report 2017. http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/eftirlit-a-landi/
[206] http://www.fiskistofa.is/umfiskistofu/frettir/
[207] http://www.fiskistofa.is/umfiskistofu/frettir/ishlutfall-i-november-og-desember
[208] https://www.althingi.is/altext/stjt/2017.048.html

| | |
|---|---|
| significant deviation of the percentage of ice in the vessel's catch in a particular fish species, compared to the average ice percentage for that vessel. The license holder is required to pay all the costs of this monitoring. Repeated infringements can result in result in suspension of the weighing license holder for up to a year. The Directorate of Fisheries began applying this measure in the autumn of 2017. | |
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.3.2.13. Clause 2.3.2.13.

Catch shall be weighed by species at landing.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Within two hours of landing catches are officially separated, weighed and recorded by accredited weighing stations and reported against the appropriate quota allocation following provisions outlined in law.**

**Evidence:**

As noted in clause 2.1.1, within two hours of landing, catches are officially separated, weighed and recorded by accredited weighing stations and reported against the appropriate quota allocation following provisions outlined in the Act No 57, 1996 concerning the Treatment of Commercial Stocks, and Regulation No. 745/2016 on Weighing and Recording of Marine Resources.

As required by Article 10 of Regulation No. 745/2016, each landing generates a weighing receipt, recording:

- Vessel name, registration number and district number;
- Landing port and date of landing;
- Name of seller, buyer and recipient of the catch;
- Official weight by species of catch;
- Proportion of undersize fish in catch;
- Number, type and weight of tubs/boxes/barrels;
- Fishing gear used;
- Total number of pallets of platforms;
- Registration number and tare of transport vehicle;
- Whether catch is to be re-weighed;
- Whether any of the catch is un-gutted and needs to be either weighed after gutting or converted to a gutted weight using coefficients provided by Directorate.

During the site visit on the 27th November 2018, the assessors visited a fish market and were shown the landed fish, weighing scales and the information recorded on the system which goes to the Port Authority who then submit it to the Fisheries Directorate's catch registration system (GAFL). Both the weighing scales and their operators are licensed and audited by the Directorate. Fish are stored in crates with the catch labelled for the purposes of traceability. We were also shown the equipment used to measure ice.

See Clause 2.1.1 for further information.

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.3.2.14. Clause 2.3.2.14.

The weight (whole weight or gutted weight) by species of all catches of stock under consideration and by-catch species shall be measured by authorised harbour officials at landing and recorded in the official central data base (date, vessel, gear type, location, species, quantity).

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The weight (whole weight or gutted weight) by species of all catches and by-catch species is measured by authorised harbour officials at landing and recorded in the Fisheries Directorate's catch registration system.**

**Evidence:**

As noted in clause 2.1.1, within two hours of landing catches are officially separated, weighed (whole weight or gutted weight) and recorded by accredited weighing stations and reported against the appropriate quota allocation following provisions outlined in the Act No 57, 1996 concerning the Treatment of Commercial Stocks, and Regulation No. 745/2016 on Weighing and Recording of Marine Resources.

Processed at sea catch are registered as processed weights using an officially approved yield. This is monitored and verified by the Directorate staff. Weights at landing are checked at the processing base by Directorate staff. Processed weights are converted to live weight equivalents for deduction from each vessels quota and management purposes by staff at the Directorate.
See evidence presented in clause 2.3.2.13

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.3.2.15. Clause 2.3.2.15.

There is systematic monitoring of landing, weighing and registration of catches and discrepancies/deviations shall be recorded.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**There is systematic monitoring of landing, weighing and registration of catches with all catches being weighed and recorded at the port of landing by an official weigher using licensed scales before the official catch is recorded on a central catch registration system. The Fisheries Directorate compares information on catches from the portside official weighing system with the corresponding logbook entry for that landing and discrepancies/deviations are recorded and investigated.**

**Evidence:**

As noted in clause 2.1.1, there is systematic monitoring of landing, weighing and registration of catches with all catches being weighed and recorded at the port of landing by an official weigher using licensed scales before the official catch is recorded on a central catch registration system (The Fisheries Directorate and Port Authorities database, GAFL).

The Fisheries Directorate compares information on catches from the portside official weighing system with the corresponding logbook entry for that landing before the appropriate reduction is made to the vessel's quota. At this point in the discrepancies/deviations between the declared and official records of a landing are detectable if present and are recorded. Depending on the nature of the discrepancy/deviation the Fisheries may then decide whether or not further action is warranted.

See Clause 2.1.1 for further information.

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.3.2.16. Clause 2.3.2.16.

Reasons for deviations shall be analysed and corrections made to reduce the likelihood of recurrence.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Data related to landings are processed in the Directorate´s database and catches are subtracted from vessels' quotas. Deviations where they occur can sometimes be rectified using the flexibility within the system (e.g. by using inter-annual, inter-vessel or inter-species transfers to cover catches of a species for which the vessel did not already have quota). Excess catches which are not corrected using these flexibility measures can result in a revocation of fishing licenses and fines.**

**Evidence:**

As noted in clause 2.1.1, data related to landings are processed in the Directorate´s database and catches are subtracted from vessels' quotas. The system is designed such that reports are received in near real-time so that the Directorate can act quickly if vessels are approaching the end of their quotas. In addition, vessels are aware or can easily check online their current quota status for a particular species. All processors purchasing fish, be it directly or at auction, are obliged to submit monthly reports to the Directorate. In addition, the fish auction reports all sales of fish directly to the Directorate.

Deviations where they occur can sometimes be rectified using the flexibility within the system (e.g. by using inter-annual, inter-vessel or inter-species transfers to cover catches of a species for which the vessel did not already have quota). Excess catches which are not corrected using these flexibility measures can result in a revocation of fishing licenses and fines.

In addition to the landing, weighing and registration system for catches, export documentation provides an independent comparative check on catch quantities. Analysis of catches includes the comparison of reported catches with the amount of sold or exported products to verify independently that reported landings aligned accurately with those reported. If comparison reveals discrepancies in reported and actual landings received from quayside weighing by registered weighers corrective action is taken as appropriate.

See Clause 2.1.1 for further information.

| | |
|---|---|
| **References:** | As referenced. |

| | |
|---|---|
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.3.2.17. Clause 2.3.2.17.

In cases of passive fishing gear left unattended at sea, there shall be regulation that requires fishing gear to be marked so that the owner can be identified, where relevant.[209]

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The golden redfish fishery is predominantly caught by bottom trawl but is also caught as by-catch in gillnet fisheries. There are regulations that require passive fishing gear left unattended at sea to be marked so that the owner can be identified.**

**Evidence:**

Golden redfish is predominantly (92%)[Error! Bookmark not defined.] caught by the Icelandic bottom trawl fleet in a irected fishery. However, it is also caught as by-catch in longline, Nephrops trawl and gillnet fisheries. Longline and gillnet fisheries are relevant to this clause.

There are a number of initiatives and regulations in place to avoid the loss of fishing gear and subsequent ghost fishing of lost and abandoned gear. Where the Fishing Directorate finds and recovers lost or abandoned gear they recover the cost of recovery from the gears' owner. The Coastguard also reports any buoys it feels might represent lost or abandoned fishing gear to the Directorate. All regulations relating to fishing gear may be found in the various Articles of Fisheries Management 2018 Laws and regulations[210]. During the November 2018 site visits, the directorate confirmed that gear loss (e.g. longlines, gillnets) and as such ghost fishing is not considered an issue and that reporting lost gear is compulsory.

In Iceland there are specific gear marking regulations for anchored bottom set gillnets targeting cod. These provisions are contained in Regulation No. 115 of 13 February 2006[211]. Article 4 states that all anchors for set nets must be marked with the district registration and number of the boat. Buoys must be fixed at both ends of the nets and buoys must be marked clearly with district registrations and the number of the boat. Article 5 states that the buoy attached at the west end of the nets must be marked with a net-ring (a floating ring ~ 20 cm in diameter). If nets are set in an area where bottom trawling also occurs the west end buoy must be marked with one white blinking light.

Other regulations with specific requirements for gear marking include:

- No. 202/2016, Lumpfish-fishing (Articles 7 and 11)[212]
- No. 1012/2013, on fishing whelk in traps (Paragraph 5)[213]

[209] This clause is applicable to gillnets, traps and pots.
[210] http://vefbirting.oddi.is/raduneyti/fiskveidar2018/108/
[211] http://www.reglugerd.is/reglugerdir/allar/nr/115-2006
[212] http://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/20032
[213] https://www.stjornartidindi.is/Advert.aspx?RecordID=024102ac-de04-45ce-99e3-5e83af6d6aae

- No. 1070/2015 the fishing of crabs in the inner Faxaflói (Paragraph 4)[214]
- No. 923/2010, Monkfish-fishing (Paragraph 4)[215]
- No. 449/2013 Regulation of equipment and nets fishing for trout (Paragraph 6)[216]

Another important factor that contributes to low levels of lost fishing gear is the high price of that gear. This means that fishers are careful to avoid losing their gear. In the case of trawls the majority of vessels carry special grapples onboard that allow them to retrieve lost gear even when both towing warps have parted, which is a rare situation.

The Icelandic ITQ system allows for a slower paced fishery than would be expected if there was only an overall TAC with all boats fishing against it. The system allows fishers to target their efforts in optimum weather conditions leading to decreased rates of lost fishing gear.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[214] http://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/19883
[215] https://www.stjornartidindi.is/Advert.aspx?RecordID=437308e0-8ad1-4009-98cb-10266317ed3e
[216] http://www.reglugerd.is/reglugerdir/allar/nr/449-2013

### 9.2.3.3. Clause 2.3.3. Catches are subtracted from relevant quotas

#### 9.2.3.3.1. Clause 2.3.3.1.

Landed catches shall be subtracted from the relevant quotas (allowable catch) of the vessel or vessel group.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Landed catches are subtracted from the relevant quotas (allowable catch) of the vessel or vessel group. Vessels must weigh catch within two hours of landing. The official weighed catch for each vessel is then submitted by the Port Authority to the Fisheries Directorate's catch registration system and deducted from the vessel's quota. Comparison of the official weighed catch is made with the vessels logbook as part of this process. Transfers of quota to meet any shortfall are also monitored to ensure any additional quota required is secured. Processed at sea catch is also monitored, including its conversion to live weights which are then deducted from the vessel's quota.**

**Evidence:**

As noted in clause 2.1.1, information from fresh fish landings is collected through the portside official weighing system which is carried out by official staff and calibrated systems. Vessels must weigh catch within two hours of landing on the quay. The system is developed to standardise weights and tares for ice and tubs (a standard tub is used throughout Iceland for fresh fish such as cod and has a capacity of 280-300 kg). The weight registration document for each vessel is transmitted to the Directorate which also receives the e-logbook information. These two sets of information are then compared, and the appropriate reduction is made to the vessel quota. Any transfer under the ITQ system for each vessel is also monitored to ensure that any additional quota requirements are rented from other vessels within a 3-day period as required by law (Act No. 57/1996). The reporting system is not real time but is very near real time (circa. 24 hours).

The officially weighed catches are the official catch of record on which subsequent deductions from vessels' quota is based with e-log information being used as a secondary source to ensure accuracy.

Processed at sea catch is registered as processed weights using an officially approved yield. This is monitored and verified by the Directorate staff. Weights at landing are checked at the processing base by Directorate staff. Processed weights are converted to live weight equivalents for deduction from each vessel's quota and management purposes by staff at the Directorate.

See clause 2.1.1 for further information.

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.3.3.2. Clause 2.3.3.2.

Limited allowance may be made for the use of quota for one species to count against landings of another species, with the objective of providing the necessary minimum flexibility and discouraging discards.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Some flexibility occurs in the quota management system so that the species composition of catches may be matched with the quota portfolio available to individual fishing vessels and to discourage discarding. This includes provision for some limited quota transfer between different species using 'cod-equivalents'.**

**Evidence:**
Discarding is prohibited by law in Icelandic fisheries (Act No. 57/1996). The same law also prohibits going to sea without sufficient quota.

As the Icelandic groundfish fishery is a mixed fishery it is necessary to incorporate a degree of flexibility in the quota management system so that the species composition of catches may be matched with the quota portfolio available to individual fishing vessels and to discourage discarding. There are a variety of provisions in place to facilitate flexibility and reduce any potential incentives relating to the discarding of fish.

In addition to within-species quota transfers between vessels and/or fishing seasons the system also makes provision for some limited quota transfer between different species. Interspecies transfers of quota are based on 'cod-equivalents' a nominal value based around the market value of cod which is set annually by the Ministry as set out in Article 19 of Act No. 116/2006[217]. Note that it is not possible to convert quota of other species for cod quota (e.g. cod quota may be exchanged for redfish quota, but redfish quota may not be exchanged for cod).

The cod-equivalent values of a number of representative species during the 2012/2013 to 2018/2019 season are presented in the table below. As can be seen the cod-equivalent value for more commercially valuable species is consistently higher across seasons. Cod equivalent values change seasonally; for the 2018/2019 season the cod-equivalent value of golden redfish is 0.63.

**Table 13.** Cod-equivalent values of representative species during the recent fishing seasons (Source: http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/thorskigildisstudlar/ ).

| **Species** | **Cod Equivalents** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Season** | **2012/2013** | **2013/2014** | **2014/2015** | **2015/2016** | **2016/2017** | **2017/2018** | **2018/2019** |
| *Cod (Þorskur)* | *1.00* | *1.00* | *1.00* | *1.00* | *1.00* | *1.00* | *1.00* |
| Haddock (Ýsa) | 0.92 | 1.15 | 1.30 | 1.23 | 1.04 | 1.07 | 1.05 |
| Saithe (Ufsi) | 0.73 | 0.82 | 0.81 | 0.77 | 0.79 | 0.72 | 0.62 |
| **Golden redfish (Gullkarfi)** | **0.82** | **0.89** | **0.85** | **0.79** | **0.69** | **0.60** | **0.63** |

[217] http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/thorskigildisstudlar/

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Norway lobster (Humar) | 4.70 | 6.46 | 5.98 | 5.98 | 6.10 | 8.12 | 9.54 |
| Greenland halibut (Grálúða) | 2.47 | 2.67 | 2.59 | 2.48 | 2.65 | 2.61 | 2.43 |
| Anglerfish (Skötuselur) | 1.74 | 1.98 | 2.27 | 2.05 | 2.17 | 2.1 | 1.76 |
| Ling (Langa) | 0.59 | 0.73 | 0.76 | 0.68 | 0.68 | 0.73 | 0.74 |
| Tusk (Keila) | 0.39 | 0.52 | 0.51 | 0.47 | 0.42 | 0.38 | 0.40 |

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

#### 9.2.3.3.3. Clause 2.3.3.3.

When a vessel's quota is used up, additional quota must be transferred to the vessel from other vessels or the vessel stops fishing.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**It is illegal to fish without quota and this is monitored by the Coast Guard and inspectors of the Fisheries Directorate. The quota management system includes a degree of flexibility so that the species composition of catches may be matched with the quota portfolio available to individual fishing vessels. Flexibility is facilitated by a number of provisions including the ability to use a limited amount of the following season's quota or to transfer a limited amount of unused quota to the following season, or transfer quota between species. Where a vessel has exhausted these options it must transfer quota from other vessels and if unable to do this it must stop fishing.**

**Evidence:**
As the Icelandic groundfish fishery is a mixed fishery there is a degree of flexibility in the quota management system so that the species composition of catches may be matched with the quota portfolio available to individual fishing vessels. There are a variety of provisions in place to facilitate this flexibility and reduce any potential incentives relating to the discarding of fish:

A vessel can exceed its allocation for a particular species in a fishing season by up to, but not exceeding, 5%; the excess is then deducted from that vessels allocation for that species in the following fishing season.

Additionally, a decision may be taken to postpone fishing up to 15% of a vessel's quota for a particular species in a fishing season and transfer the balance to the following season; this measure may be particularly beneficial to the growth of long-lived species in maximising the return from strong year classes.

It is also possible to make some limited quota transfer between different species. Interspecies transfers of quota are based on 'cod-equivalents' a nominal value based around the market value of cod which is set annually by the Ministry as set out in Article 19 of Act No. 116/2006[218]. Note that it is not possible to convert quota of other species for cod quota (e.g. cod quota may be exchanged for redfish quota, but redfish quota may not be exchanged for cod).The results of some of inter-vessel and inter-seasonal transfers aimed at balancing catches and quotas may be seen in under Clause 2.3.1.

Vessels may also decide not to include part of the vessels catch in its catch quota. This is limited to no more than 0.5% of the vessel's pelagic catch and 5% of other marine catches per fishing year. Further this catch, known as 'VS catch', must be kept separate from the rest of the vessel's catch and weighed and recorded separately; it must be sold at an approved auction and the bulk of the proceedings of the sale must go to the Fisheries Commission Project Fund (established by Act No. 37/1992), 20% going to the vessel (Article

[218] http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/thorskigildisstudlar/

| | |
|---|---|
| 11, Act No. 116/1996).[219] The maximum of 20% return on VS catches means that there are limited incentives to land it; however, having the VS catch provisions within the fisheries management system allows the flexibility for vessels to land small catches which are outside their specific quota, preventing discards, improving the treatment of the fishery resource and promoting responsible fishing practices.<br><br>Icelandic law prohibits fishing vessels going to sea without sufficient quota (Act No. 57/1996). This is monitored by the Fisheries Directorate inspectors and Coast Guard and penalties apply under the Act for violations of its provisions including suspension of the commercial fishing license (Article 14), the requirement to have an inspector on board the vessel for a period of time up to two months paid for by the vessel (Article 16), fines, and in the event of major or repeated deliberate violation, imprisonment for up to 6 years (Article 23). See clause 2.1.1 for further information on the results of this surveillance and enforcement. Consequently, where a vessel has exhausted its quota (including availing of all the additional quota it is allowed to generate within the rules) the only option it is left at that point is to transfer additional quota from other vessels and where it is unable to do so the vessel must stop fishing. | |
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

[219] http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Sveigjanleiki_i_aflamarkskerfinu

#### 9.2.3.3.4. Clause 2.3.3.4.

Transfer of quota between vessels shall take effect only after it has been authorised and recorded to the official central data base.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**All transfers of quota must be authorised by the Fisheries Directorate and does not come into effect until they have confirmed it. Information on the catch quota, including quota transfers, of each vessel or vessel group, is recorded in the Fisheries Directorate's official central database.**

**Evidence:**
All transfers of quota must be authorised by the Fisheries Directorate. The Directorate of Fisheries must be notified of the transfer of quota and must receive this no later than 15 days after the end of the fishing season. The transfer does not take effect until the Fisheries Administration has confirmed them (Article 15, Act No. 116/2006). Application forms for the transfer of quota are available online[220] and must be transmitted directly to the Directorate for authorisation of the transfer[Error! Bookmark not defined.]. Information on he catch quota, including quota transfers, of each vessel or vessel group, is recorded in the official central database (GAFL) (see evidence presented in clause 2.3.1.3).

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

[220] http://www.fiskistofa.is/eydublod/flutningurveidiheimilda/

### 9.2.3.3.5. Clause 2.3.3.5.

Information on each vessels' catch quota and quota use shall be updated regularly and made public and accessible to all on the official web-site, thus ensuring transparency.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Information on each vessels' catch quota and quota use is updated in near real-time and is made public and accessible to all on the Fisheries Directorates web-site, thus ensuring transparency.**

**Evidence:**
As discussed previously, catch statistics are published by individual vessel and are readily available online in near real-time thus ensuring transparency[221]. For each vessel the information available for each species is:

1. Allocated quota (initial allocation of quota from the overall TAC based on no. of shares)
2. Compensations (quota gained/lost through compensations)
3. Quota transferred from the previous year (Note this may be a negative balance)
4. Quota transferred between vessels (a negative balance indicates an outward transfer of quota (i.e. quota transferred to other vessels) while a positive balance indicates an inward transfer of quota (i.e. quota gained from other vessels)
5. Allowed catch (the sum of 1 to 4 above)
6. Catch (vessels landings in the season to date of that species)
7. Balance (Allowed catch - Catch)
8. Overfished

For illustrative purposes see the table in the supporting evidence for 2.3.1.3 showing the first 10 lines of the publicly available data on individual vessels' quota allocations of golden redfish in the 2017/2018 fishing season.

| | |
|---|---|
| **References:** | See footnote. |
| **Non-Conformance Number (if relevant)** | **NA** |

221 http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/aflastodulisti.jsp?lang=en

### 9.2.3.4. Clause 2.3.4. Rules are enforced

#### 9.2.3.4.1. Clause 2.3.4.1.

Rules shall be enforced. There shall be penalties for serious infractions.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**There is a clearly established legal framework which sets out rules and regulations relating to fishing activity within Icelandic waters and the penalties for violation of these rules. It gives powers to the Ministry, the Fisheries Directorate, the Coast Guard and the MFRI to monitor fishing activities and enforce these rules. Penalties exist for serious infractions. This largely comprises administrative penalties ranging from guidance letters and reprimands to suspension of fishing permits and weighing licenses. More serious cases are sent to the police for prosecution under the criminal system which can result in imprisonment.**

**Evidence:**

There is a clearly established legal framework which sets out rules and regulations relating to fishing activity within Icelandic waters and gives powers to the Ministry, the Fisheries Directorate, the Coast Guard and the MFRI to monitor fishing activities and enforce these rules. The penalties for violation of the laws and regulations have been described in clause 2.1.1 and range from the issue of reprimands by the Directorate of Fisheries and the suspension of commercial fishing permits to confiscation of gear and catch, fines and, in cases of serious or repeated deliberate violation, imprisonment for up to six years (for example, Articles 24 and 25 of Act No. 116/2006[146]; Articles 15-17 of Act No. 79/1997[150]; Chapter 4 of Act no. 57/1996[148]).

On a day-to-day basis rules are primarily enforced by the Directorate through powers to collect levies, monitor, inspect, report and gather evidence for prosecution purposes where violations are suspected. All prosecutions resulting from enforcement activities are conducted via the Icelandic legal process (Ministry of Justice). Other at sea monitoring and inspection duties reside with the Coast Guard. In addition, the MFRI also has the legal power to enact temporary spatial closures.

A breakdown of inspection activities in 2017 with comparison with previous years was provided to the assessment team by the Coast Guard and is summarised in clause 2.1.1, alongside details of Fisheries Directorate Inspections.

Between 2014 and 2017 there have been 97 infringements recorded by Coast Guard monitoring and surveillance activity. The infringements detected have largely remained consistent in recent years or declined (figure below). In 2017, the most significant numbers of infringements related to manning lists (lögskráningar) and seaworthiness (Haffæri). Only one infringement relating to fishing (Veiðar) was recorded in 2017. Foreign vessels are also inspected – both in the Icelandic EEZ and further afield as part of Iceland's contribution to monitoring and surveillance as a member of NEAFC. In 2017, 18 foreign vessels were inspected which, in relation to fishing activities in the Icelandic EEZ, led to remarks to 2 Norwegian capelin fishing vessels due to gear infringements and to a Faroe Islands handline/jigger vessel for logbook infringement.

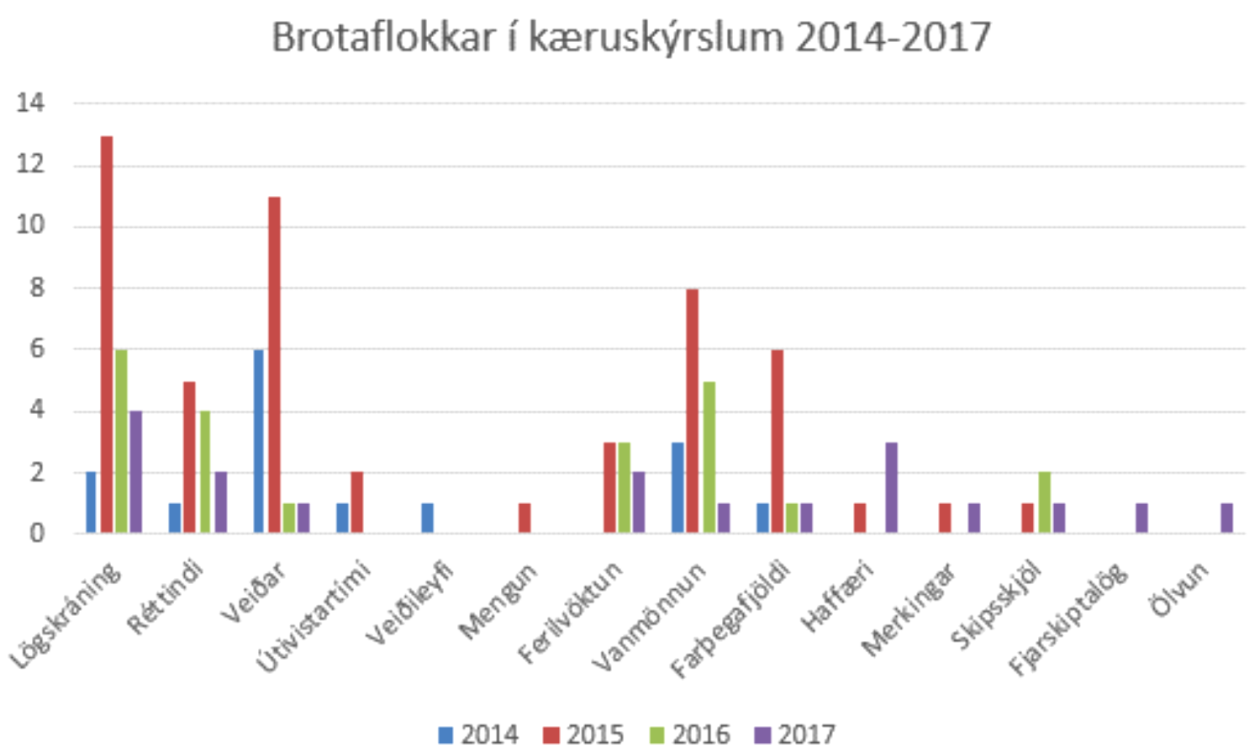



**Figure 42.** Reasons for the generation of remarks, by no. of remarks generated, during Coast Guard inspections in 2014-2017; Lögskráningar – Manning list, Réttindi – License, Veiðar – Fishing, Útivistartími – time limits for fishing, Veiðileyfi – Fishing permit, Mengun – Pollution, Ferilvöktun – VMS, Vanmönnun – Manning, Farþegafjöldi – Passengers, Haffæri – Sea worthiness, Merkingar – Marking, Skipsskjöl – Ship's papers, Fjarskiptalög – telecommunications, Ölvun - intoxication (Source: Coast Guard presentation provided to the assessment team, December 2018).

In their annual report, the Fisheries Directorate publish a comprehensive summary of suspected offenses recorded during maritime surveillance and the enforcement action subsequently taken (tables below). A comparison of some of the enforcement action taken in recent years is shown in. By far the main suspected offenses detected relate to logbooks, specifically not submitting them in the required timeframes (674 incidences in 2017), and fishing in excess of or without quota (1201 incidences in 2017). Much of the former arises from late submission of logbooks each month by small vessels using paper logbooks, with each instance registered as an offence. Similarly, the quota infringement relates to each incidence detected of vessels that have taken longer than the 3 days required by law to balance their quota where they have landed fish in excess of their quota (proceeding to fish without quota is a separate offence) (Pers. com. Fiskistofa).

Where a suspected violation of the fisheries management legislation has occurred, the case is referred to the Directorate's Legal Department for enforcement action. In 2017, 220 cases where referred, 131 in 2016. Breaches of the law are handled in several ways. Some cases are dropped and no further action taken, otherwise action taken ranges from the issue of reprimands, application of administrative fines, suspension or revocation of fishing permits and weighing licenses or, in a small number of cases, sent to the police for criminal

action to be taken. There is also a specific chapter in the Annual Report summarising the imposition and collection of fees for illegal catches of fish in that year.

**Table 14.** Overview of suspected offenses recorded (Source Fiskistofa Annual Reports 2017[222] and 2016[223]).

| Offenses recorded by Fiskistofa | 2017 | 2016 |
|---|---|---|
| Violation of landing rules (broken down into:) | 52 | 60 |
| • *Not landing fish at official landing location* | *5* | 4 |
| • *Weighing container* | *10* | 13 |
| • *Misreporting (Landing full size fish as part of catches of juveniles)* | *9* | 22 |
| • *Incorrect specification of species* | *11* | 4 |
| • *Other* | *17* | 17 |
| Discarding catch | 8 | 4 |
| Violation of fishing license rules | 36 | 15 |
| Violation of lumpfish fishery rules | 19 | 11 |
| Violation of coastal fishery rules | 10 | 46 |
| Logbooks (broken down into:) | 719 | 689 |
| • *Not submitting logbooks on time* | *674* | 657 |
| • *Other* | *45* | 31 |
| Fishing in excess of or without quota | 1201 | 1,060 |
| Violation of law on salmon and trout fishing | 1 | 2 |
| Other violations | 45 | 14 |
| **TOTALS** | **2,080** | **1,901** |

**Table 15.** Enforcement action taken (Source: Fiskistofa Annual Reports 2017[159] and 2016[160]).

| Offences | 2017 | 2016 |
|---|---|---|
| Violation of fishing rules | 97 | 31 |
| Violation of weighing and landing rules | 71 | 50 |
| Violation of logbook rules | 45 | 31 |
| Violation of processing catch rules | 0 | 2 |
| Case sent to Police | 1 | 4 |
| Reprimands issued (broken down below) | 96 | 79 |
| Due to violation of fishing rules | 50 | 14 |
| Due to violations of weighing and landing rules | 12 | 31 |
| Due to violation of logbook rules | 33 | 26 |
| Due to other violations | 3 | 8 |
| Suspension of fishing permit | 31 | 14 |
| Suspension of weighing license | 4 | 1 |

[222] Fiskistofa 2017 Annual Report, Chapter 8. http://www.fiskistofa.is/media/arsskyrslur/medferd_mala_og_urskurdir.pdf
[223] Fiskistofa 2016 Annual Report, Chapter 8. http://www.fiskistofa.is/media/arsskyrslur/kafli8_2016.pdf

| | | |
|---|---|---|
| Guidance letter sent | 6 | 6 |
| No action taken | 33 | 20 |
| Case sent to another authority | 1 | 1 |
| Procedure still in progress | 46 | 8 |
| Case returned to the inspectors | 2 | No data |
| **Fees** | | |
| Reminder letter sent for unpaid fishing fees 2017 | 231 | 145 |
| Resulting in suspension of fishing permits | 89 | 85 |
| Fees imposed for illegal catches | 1201 | 130 |
| Resulting in suspension of fishing permits | 25 | 65 |

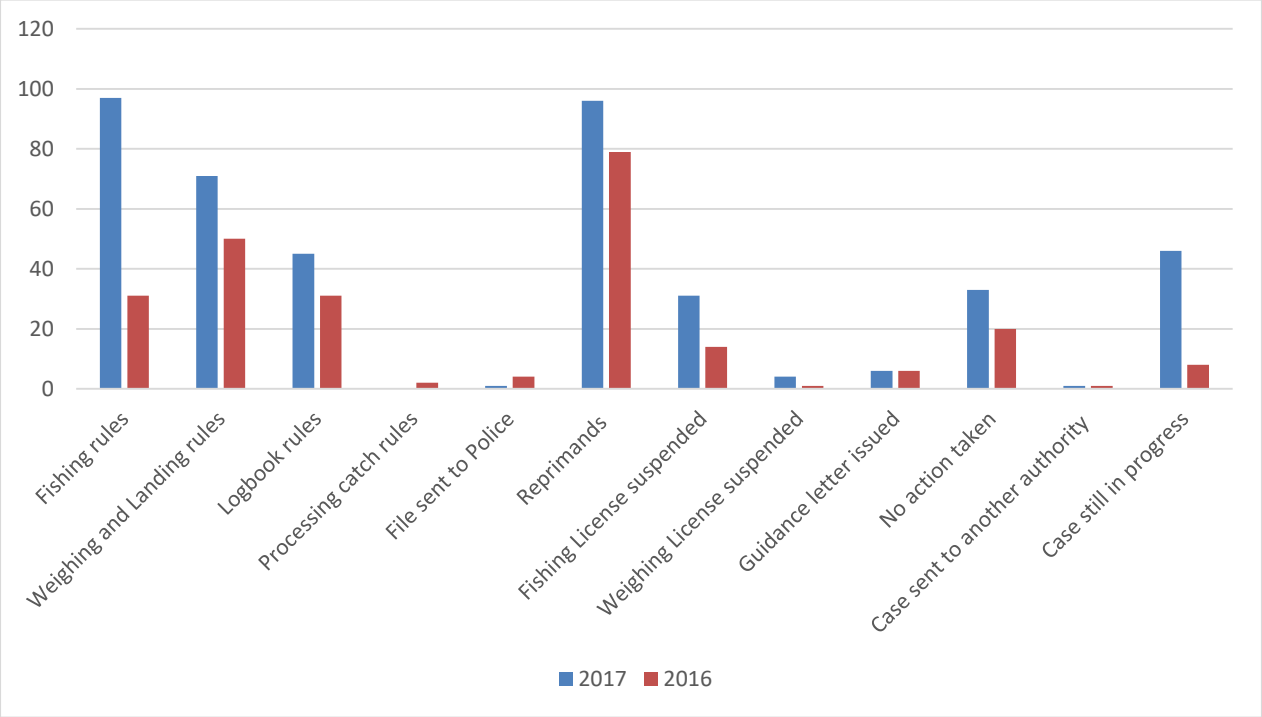



**Figure 43.** Comparison of some of the main areas of enforcement action taken by the Fisheries Directorate in recent years. The first four columns show the violation and the remaining columns show the enforcement action subsequently taken (Source: SAIG, based on Fiskistofa Annual Report 2017 and 2016).

| | |
|---|---|
| **References:** | See footnotes |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.3.5. Clause 2.3.5. Analysis is carried out

#### 9.2.3.5.1. Clause 2.3.5.1.

Analysis shall be carried out with the aim of detecting any deviations that may occur of the actual total catch from the Total Allowable Catch (TAC). Measures are available and are adopted when indicated.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Analysis shall be carried out with the aim of detecting any deviations that may occur of the actual total catch from the Total Allowable Catch (TAC). Measures are available and are adopted when indicated.**

**Evidence:**

Given the fact that all catches are recorded on the central database any deviations between actual total catch and the TAC for a particular species are easily detectable. Note that deviations may be attributable to the legitimate inter-species, inter-vessel or inter-annual quota transfers but, in any case, where there are anomalies analysis is carried out to determine the root cause of the deviation.

The ITQ system has rules and flexibilities to allow for corrective management measures and adjustments to be incorporated. For example, a vessel can transfer some of its quota between fishing years but its quota is lost if it catches less than 50% of its total quota, measured in "cod equivalents", in two subsequent years. There is also a requirement that within the year, the net transfer of quota from any vessel must not exceed 50% (Article 15, Act No. 116/1996).

As noted in clause 2.2.1, seasonal TACs are set by the Minister of Fisheries and Agriculture, based on the recommendations from the MFRI. ICES also provides advice on all important Icelandic stocks, such as cod, haddock, saithe and golden redfish. Following the setting of the overall TAC each vessel is allocated a certain share of the overall TAC based on the number of shares in the ITQ system it possesses.

In all recent years, except for 2010/11, the TAC set by the authorities have been equal to or less than the recommended TAC. Icelandic catches have been higher than the TAC in all recent years, ranging from 2.7 - 11.5% since the 2014/15 season. These measured is allowed for by flexibility in the ITQ system. The golden redfish stock is currently considered healthy.

Related to TAC, some relevant adjustments in management decision are shown in the figure below.

| Species | Cod | Haddock | Saithe | Redfish |
|---|---|---|---|---|
| Alloc. quota | 203,094 | 31,746 | 47,918 | 43,042 |
| Compensations | 2,204 | 664 | 1,695 | 2,277 |
| Trfr. prev. year | 8,289 | 4,312 | 7,016 | 3,322 |
| Allowed catch | 213,587 | 36,722 | 56,629 | 48,641 |
| Catch | 213,007 | 34,460 | 48,815 | 51,430 |
| Balance | 580 | 2,263 | 7,814 | -2,788 |
| Transfers | -13 | 1,041 | -1,553 | 5,031 |
| New balance | 567 | 3,304 | 6,261 | 2,243 |
| Trfr/ next year | 407 | 2,961 | 2,793 | 1,957 |
| Over fished | 2 | 0 | 0 | 0 |
| Net quota status | 162 | 343 | 3,468 | 286 |

**Figure 44.** Fishing period Sept 207-Aug 2018, quotas, balances and transfer information for redfish.

| | |
|---|---|
| In the figure above the 45,319 t TAC can be seen in the two first lines of allocated quota (the Compensations are basically the 5,3% subtracted from the general allocation on the basis of shares). There is a transfer of 3,322 tons from the previous year (a result of the allowed transfer between species that year). There is a catch, 2,788 tons in excess of allowed catch potentially due to juvenile landings as part of the discard ban. Transfer from other species accounts for an extra allowance of 5,031 tons which accommodates the excess catches and creates a transferable quota to next season. | |
| **References:** | As referenced/see footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.2.3.5.2. Clause 2.3.5.2.

Anyone purchasing and/or selling catches shall be obligated to present reports to the appropriate authorities, containing information on the purchase, sale and other disposition of fish catches. If analysis reveals discrepancy between the information stated in the reports and the information received from the harbour weighing, corrective measures shall be taken when this is deemed appropriate.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**All processors purchasing fish, be it directly or at auction, are obliged to submit monthly reports to the Directorate. In addition, the fish auction reports all sales of fish directly to the Directorate. Analysis of catches includes the comparison of reported catches with the amount of sold or exported products to verify independently that landings aligned accurately with those reported. If comparison reveals discrepancies in reported and actual landings received from quayside weighing by registered weighers corrective action is taken as appropriate.** | | | | |
| **Evidence:**<br>All processors purchasing fish, be it directly or at auction, are obliged to submit monthly reports to the Directorate. In addition, the fish auction reports all sales of fish directly to the Directorate.<br><br>Export documentation provides an independent comparative check on catch quantities for different species. Analysis of catches includes the comparison of reported catches with the amount of sold or exported products to verify independently that landings aligned accurately with those reported. If comparison reveals discrepancies in reported and actual landings received from quayside weighing by registered weighers corrective action is taken as appropriate. | | | | |
| **References:** | As referenced/see footnotes. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

### 9.2.3.5.3. Clause 2.3.5.3.

There shall be full traceability from catch, through processing, export and delivery on the market.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Where required, there is full traceability from catch, through processing, export and delivery on the market is possible**.

**Evidence:**
There are effective systems in place to ensure the traceability of catch. The detailed spatial information available for each fishing trip means catch may be traced directly from when it was caught through subsequent processing, export and delivery to final market. Information relating to the provenance of the catch is communicated both to the Directorate's website and directly to the purchaser.

The official registration of landings contains a unique vessel identifier relating to the fishing vessel that landed the catch allowing traceability to individual vessels. In most cases, the unique vessel identifier remains with the batch throughout production and often on the final pack. For wet fish sales, from the auction, a vessel unique number is registered within the central e-auction for tracking purposes.

Full traceability is possible using all the tools within the system, however, not all buyers require full traceability from fishing vessel to the final product.

| | |
|---|---|
| **References:** | As referenced/see footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

## 9.3. Section 3: Ecosystem Considerations

### 9.3.1. Clause 3.1. Guiding Principle

#### 9.3.1.1. Clause 3.1.1.

Adverse impacts of the fishery on the ecosystem shall be considered and appropriately assessed and effectively addressed[224], consistent with the precautionary approach[225].

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Since the Icelandic groundfish fishery is multispecies in nature with vessels simultaneously targeting numerous species, habitat and bycatch effects are generally attributed to the fishery as a whole rather than to any species in particular.**

**Most commercially fished species in Iceland, target or non target, are now part of the ITQ system and as such they are retained and accounted for within the catch accounting system operated by Fiskistofa. Discarding is prohibited. There are vulnerable and /or Endangered, Threatened and Protected (ETP) species occurring in Icelandic waters according to OSPAR.**

**E-logbooks recording of all marine mammals and seabirds catches (by species and numbers) is a legal requirement (Reg. 126/2014). A smartphone app is in development by the Directorate of Fisheries to make both reporting and identification of bycatch easier for operators in the fishery.**

**Interactions between fishing gears and the seabed are highly dependent on gear type with towed bottom gears such as demersal trawls and dredges having a greater impact than static gear such as longlines, set nets or pots. The 2017 ICES Report on the Icelandic Ecoregion Ecosystem highlights that based on analysis of electronic logbook data a total area of about 79 000 km$^2$ was fished with towed bottom-fishing gears in 2013 in Iceland, composing 10% of the ecoregion.**

**It is the policy of the Icelandic government to protect vulnerable marine ecosystems (VMEs; coldwater corals and hydrothermal vents), from significant adverse impact from bottom contacting gear. Large areas within the Icelandic EEZ are closed, either temporarily or permanently, to fishing for a variety of reasons; these include the protection of juveniles, spawning fish and VMEs. Cumulatively, a large portion of Icelandic shelf area within which fishing activities occur is closed to bottom trawling.**

[224] FAO Code of Conduct for Responsible Fisheries, Article 7.2.

[225] In this context refer to 2009 FAO Guidelines for Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries, Article 3l: Adverse impacts of the fishery on the ecosystem should be appropriately addressed. Much greater scientific uncertainty is to be expected in assessing possible adverse ecosystem impacts of fisheries than in assessing the state of target stocks. This issue can be addressed by taking a "risk assessment/risk management approach". For the purpose of development of ecolabelling schemes, the most probable adverse impacts should be considered, taking into account available scientific information, and traditional, fisher or community knowledge provided that its validity can be objectively verified. Those impacts that are likely to have serious consequences should be addressed. This may take the form of an immediate management response or further analysis of the identified risk. ...

**EVIDENCE**

The MFRI is leading in marine and freshwater research in Icelandic territories and the arctic, providing advice on sustainable use and protection of the environment with an ecosystem approach by monitoring marine and freshwater ecosystems. The main research priorities are research on marine and freshwater ecosystems, sustainable exploitation of main stocks, ecosystem approach to fisheries management, research on fishing technology and seafloor and habitat mapping. The institute employs around 190 staff, operates 2 research vessels and 10 branches around the country, including an aquaculture experimental station. MFRI was established on July 1, 2016 as a result of a merger of two Icelandic research institutes, the Institute of Freshwater Fisheries (founded in 1946), and the Marine Research Institute (founded in 1965)[226].

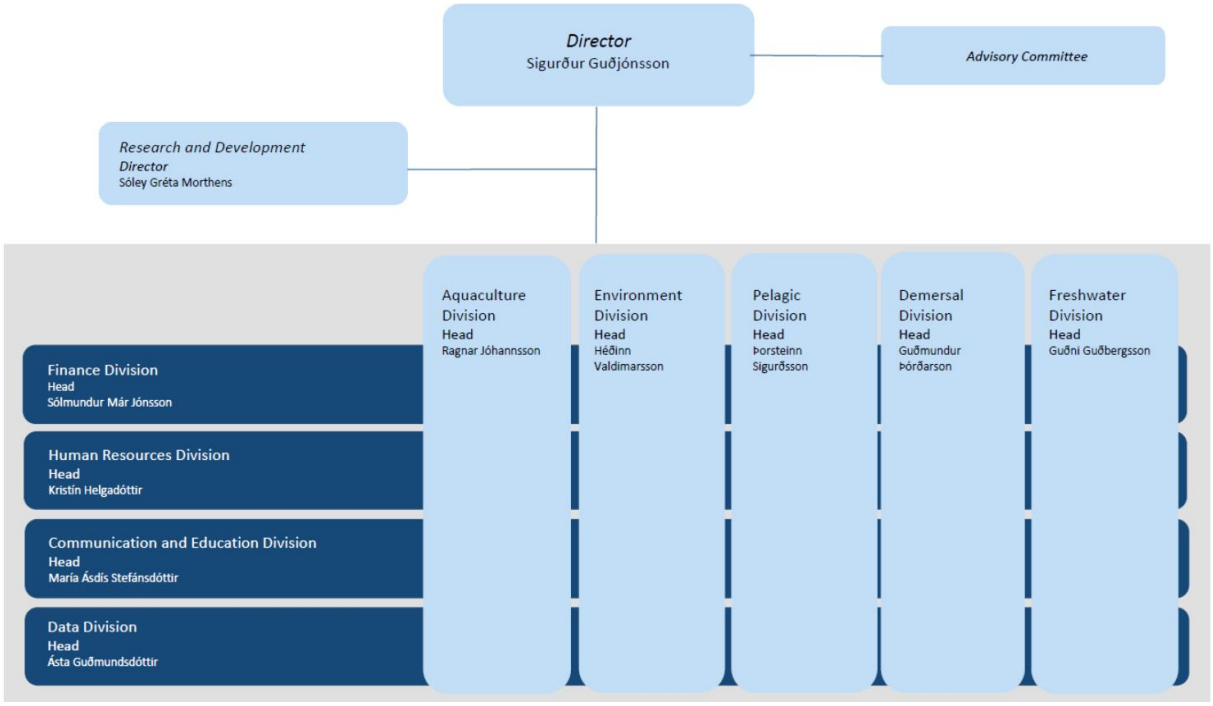



**Figure 45.** MFRI Organisational Chart[227].

Collectively, the various Sections and Divisions within MFRI work together to determine the status of commercial species in Icelandic waters and enable managers to make informed decisions as to their sustainable exploitation.

**Icelandic Waters ecoregion – Ecosystem Overview**

**Environmental conditions**

In the Icelandic Waters ecoregion, water masses of different origin mix. Relatively warm and saline Atlantic water enters the area, both in the southwest as a branch of the Irminger Current and in the east from the

[226] https://www.hafogvatn.is/en/about/mfri
[227] https://www.hafogvatn.is/static/files/enska/skipurit_hafrannsoknastofnun_enska.pdf

Norwegian Sea and over the Jan Mayen Ridge. The East Greenland Current carries cold, low salinity water from the Greenland Sea in the north into the Icelandic Waters ecoregion. The variable location of the fronts between the colder and fresher waters of Arctic origin and the warmer and more saline waters of Atlantic origin result in variable local conditions, especially on the northern part of the shelf. During the last two decades, the Atlantic water mass has been dominating, in contrast to the Arctic domination in the previous three decades.

**Key ecosystem and environmental signals in Icelandic waters in 2018 (source 2018 ICES Ecosystem Overview[228])**

- Zooplankton biomass on the northern shelf has fluctuated in the past, cycling on a five- to ten-year periodicity, with a period of generally low biomass from the 1960s to the 1990s.
- From the mid-2000s, Atlantic mackerel *Scomber scombrus* extended its feeding grounds from the Norwegian Sea to Icelandic Waters ecoregion, while the summer feeding grounds of capelin *Mallotus villosus* moved westwards from Icelandic into Greenland waters. Norwegian spring-spawning herring *Clupea harengus* has, since the early 2000s, reappeared at its traditional feeding grounds east and north of Iceland. These major changes in migration patterns have been linked to prey availability, oceanographic conditions, and stock density.
- Increased temperature in the lower water column on the western and northern part of the Icelandic shelf has resulted in changes in spatial distribution for a number of demersal species. Species like haddock *Melanogrammus aeglefinus*, anglerfish *Lophius piscatorius*, ling *Molva molva,* tusk *Brosme brosme*, dab *Limanda limanda*, and witch *Glyptocephalus cynoglossus* that have previously had Icelandic waters as their northern boundary of distribution and have mainly been recorded in the warm waters south and west of Iceland, are now showing a northward clockwise trend in their distribution along the shelf, and in some cases a distributional shift. Warming waters has led to a decline in the stock abundance and distribution of many cold-water species, while the previously rare occurrence of warm-water species in the ecoregion has increased in recent years.
- The stocks of northern shrimp *Pandalus borealis* collapsed around the year 2000 and the driving factors are thought to be increased predation by gadoids, increasing temperature, and high fishing mortality.
- Improved management measures for most of the major stocks (cod *Gadus morhua*, haddock, saithe *Pollachius virens*, redfish *Sebastes* sp., herring) have resulted in decreased fishing mortality, close to or at FMSY, and increased SSBs. This has furthermore resulted in decrease in effort and less pressure on benthic habitats.
- A recruitment failure of sandeel (Ammodytidae) was recorded in 2005 and 2006, and, with the exception of the 2007 cohort, recruitment has been at a low level since then. Fish stomach content data suggest that the decline in the sandeel population may even have started as early as around year 2000.

228 https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/IcelandicWatersEcoregion_EcosystemOverview.pdf

- The abundance of minke whales *Balaenoptera acutorostrata* has decreased on the Icelandic shelf in recent years, following changes in prey distribution. Abundance of other species, in particular fin whales *Balaenoptera physalus* and humpback whales *Megaptera novaeangliae*, have increased over the last 20 to 30 years.
- In recent decades, the breeding success of many seabird species has been poor in south and west Iceland, accompanied by declines in their breeding population sizes. These trends may be influenced by changes in density, composition, and spatial distribution of their main fish prey (i.e. sandeel).

**Associated species catch and bycatch**

The Icelandic groundfish fishery is multispecies in nature with vessels simultaneously targeting numerous species. With regards to catches, most commercially fished species in Iceland are now part of the ITQ system. Discarding is prohibited and comparison between observer measured catch compositions and self-reporting by fishers ensures that a high level of compliance with the ban on discarding is maintained. Discards of redfish are not included in the fisheries assessments as they are generally considered to be negligible.

The MFRI reports that Golden redfish catches from 2014/15 to 2016/17 have been caught in these proportions and with the following gears.

| **Golden redfish total catches** | | **Bottom Trawl** | **Longline** | **Nephrops trawl** | **Other Gear** |
|---|---|---|---|---|---|
| 2016/17[229] | 56,101 t | 92% | 2% | 4% | 2% |
| 2015/16[230] | 59,698 t | 93.1% | 2.4% | 3% | 1.5% |
| 2014/15[231] | 51,700 t | 91.5% | 3.1% | 3.5% | 1.9% |
| **Average** | | **92.2%** | **2.5%** | **3.5%** | **1.8%** |

The remainder of the catches (i.e. other gear) was taken by gillnets (also reported in the 2018 NWWG report as a gear responsible for some redfish bycatch, together with longline and Nephrops trawl), as well as Danish seines, pelagic trawls, handlines, and shrimp trawls.

Landed bycatch and associated species accounting for > 0.5% of the cumulative total for each of these gear types (i.e. bottom trawl, Nephrops trawl, longline and gillnets) targeting and/or catching golden redfish are shown in the tables below, compiled from catch data downloaded from the Directorate's website at http://www.fiskistofa.is/veidar/aflaupplysingar/bradabirgdatolur/.

[229] https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf
[230] https://www.hafogvatn.is/static/extras/images/Gullkarfi265.pdf
[231] http://www.hafro.is/Astand/2016/gullkarfi_2016.pdf

The catches include ungutted weights of the species as well as cod catches from the Barents Sea (about 10,000 tonnes caught in the 2017-18 season with different gear types, about 3.5% of the overall cod catches)[232]. Also note that fishing vessels typically land gutted fish, but the quota allotted to the vessels is in terms of ungutted weight. The ungutted weight is derived from gutted weight by raising landings based on the species specific scalars listed in the Directorate website[233].

**Table 16.** Break down of bycatch and associated species (i.e. > 0.5% of the overall catch) in bottom trawl fisheries that targeted Golden redfish in the 2017/18 season and the last 3 years average (2015/16, 2016/17 and 2017/18 season).

| Gear | Species | 2017/18 Total Catches (t) | 2017/18 catches % | Last 3 years average catches % |
|---|---|---|---|---|
| **Bottom Trawl** | Þorskur /cod | 142,639 | 47.24% | 46.96% |
| | Ufsi /saithe | 54,330 | 17.99% | 16.51% |
| | Karfi / Gullkarfi / Golden redfish | 47,314 | 15.67% | 17.28% |
| | Ýsa /haddock | 23,701 | 7.85% | 7.28% |
| | Djúpkarfi / beaked redfish | 10,536 | 3.49% | 3.44% |
| | Grálúða / Greenland halibut | 8,716 | 2.89% | 3.27% |
| | Gulllax / greater silver smelt | 4,966 | 1.64% | 1.69% |
| | Skarkoli / plaice | 2,247 | 0.74% | 0.75% |
| | Steinbítur / Atlantic wolffish | 1,662 | 0.55% | 0.61% |
| | Langa / ling | 1,538 | 0.51% | 0.60% |

**Table 17.** Break down of bycatch and associated species (i.e. > 0.5% of the overall catch) in Nephrops trawl fisheries that caught Golden redfish in the 2017/18 season and the last 3 years average (2015/16, 2016/17 and 2017/18 season).

| Gear | Species | 2017/18 Total Catches (t) | 2017/18 catches % | Last 3 years average catches % |
|---|---|---|---|---|
| **Nephrops trawl** | Þorskur /cod | 2,232 | 30.21% | 30.18% |
| | Karfi / Gullkarfi / Golden redfish | 2,214 | 29.97% | 26.07% |
| | Humar / Norway Lobster | 819 | 11.09% | 15.35% |
| | Langa / ling | 537 | 7.27% | 7.53% |
| | Ufsi /saithe | 413 | 5.59% | 5.28% |
| | Langlúra / witch | 330 | 4.47% | 4.46% |
| | Skötuselur / anglerfish | 258 | 3.49% | 3.03% |

[232] http://www.fiskistofa.is/english/quotas-and-catches/total-catch-and-quota-status/?timabil=1718&fyrirsp=4&lang=en&landhelgi=U

[233] http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/slaegingarstudlar/

| | | | | |
|---|---|---|---|---|
| | Stórkjafta / Öfugkjafta / Megrim | 209 | 2.83% | 3.02% |
| | Ýsa /haddock | 109 | 1.48% | 1.58% |
| | Steinbítur / Atlantic wolffish | 85 | 1.15% | 1.00% |
| | Lýsa / whiting | 54 | 0.73% | 0.76% |
| | Blálanga / blue ling | 43 | 0.58% | 0.67% |
| | Þykkvalúra / Sólkoli / lemon sole | 39 | 0.53% | 0.58% |

**Table 18.** Break down of bycatch and associated species (i.e. > 0.5% of the overall catch) in longline fisheries that caught Golden redfish in the 2017/18 season and the last 3 years average (2015/16, 2016/17 and 2017/18 season).

| Gear | Species | 2017/18 Total Catches (t) | 2017/18 catches % | Last 3 years average catches % |
|---|---|---|---|---|
| **Longline** | Þorskur /cod | 81,177 | 72.72% | 71.60% |
| | Ýsa /haddock | 14,391 | 12.89% | 13.10% |
| | Steinbítur / Atlantic wolffish | 5,588 | 5.01% | 4.67% |
| | Langa / ling | 4,384 | 3.93% | 4.41% |
| | Keila / tusk | 2,123 | 1.90% | 2% |
| | Karfi / Gullkarfi / Golden redfish | 1,208 | 1.08% | 1.17% |
| | Hlýri / spotted wolffish | 873 | 0.78% | 0.86% |
| | Ufsi /saithe | 653 | 0.58% | 0.66% |
| | Tindaskata / starry ray | 447 | 0.40% | 0.74% |

**Table 19**. Break down of bycatch and associated species (i.e. > 0.5% of the overall catch) in gillnet fisheries in the 2017/18 season and the last 3 years average (2015/16, 2016/17 and 2017/18 season). Note Golden redfish is just under the 0.5% threshold.

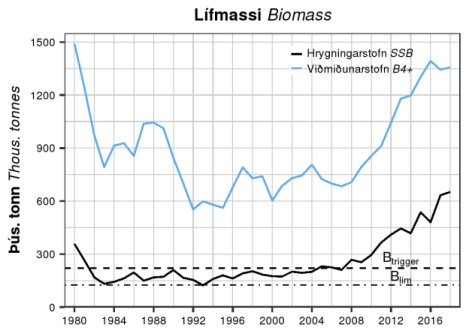
| Gear | Species | 2017/18 Total Catches (t) | 2017/18 catches % | Last 3 years average catches % |
|---|---|---|---|---|
| **Gillnet** | Þorskur /cod | 18960 | 89.02% | 81.65% |
| | Ufsi /saithe | 1318 | 5.58% | 7.41% |
| | Grálúða / Greenland halibut | 0 | 0% | *5.51% |
| | Langa / ling | 370 | 1.66% | 2.33% |
| | Ýsa /haddock | 313 | 1.43% | 1.28% |
| | Skarkoli / plaice | 182 | 0.84% | 0.75% |
| | Karfi / Gullkarfi / Golden redfish | 82 | 0.38% | 0.46% |

*Greenland halibut was only caught in the 2015/16 and 2016/17 seasons.

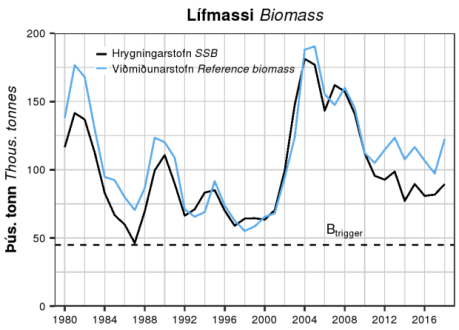
**Status of bycatch and associated species in the redfish target and non-target fisheries calculated from average catches (per relevant gear type) of the past three fishing seasons**

**ÞORSKUR – COD (*Gadus morhua*)[234]**




The MFRI and ICES advise that when the Icelandic management plan is applied, catches in the fishing year 2018/2019 should be no more than 264 437 tonnes. Estimated spawning stock biomass (SSB) has increased in recent years and has not been larger in 50 years. Harvest rate has declined and is at its lowest value in the assessment period. Recruitment since 1988 (mean = 140) is lower than the average recruitment in the period 1955–1985 (mean = 205). The increase in SSB is therefore primarily the result of lower harvest rate. The 2013 year class is estimated small, but the sizes of the 2014 and 2015 year classes are near the long-term average. **The redfish fishery does not appear to have any significant negative effects on the cod stock.**

**ÝSA – HADDOCK (*Melanogrammus aeglefinus*)[235]**

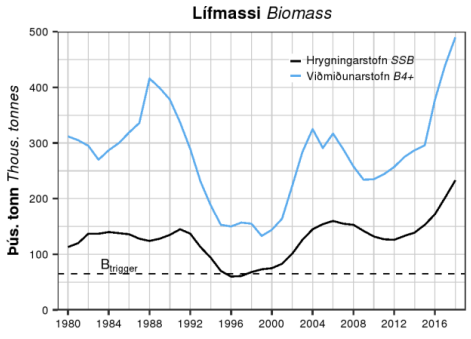



MFRI and ICES advise that when the Icelandic management plan is applied, catches in the fishing year 2018/2019 should be no more than 57 982 tonnes. SSB increased from 2001–2004, after several strong year classes, and was large until 2008. Since 2008, the SSB has decreased but in recent years has stabilised above MGT Btrigger. Harvest rate in 2015–2017 is estimated close to its lowest level in the assessment period and is currently close to HRMGT. Recruitment of 2 year old haddock in 2010–2015 was low, but is estimated high for 2016 and close to average for the last two years. **The redfish fishery does not appear to have any significant negative effects on the haddock stock.**

**UFSI – SAITHE (*Pollachius virens*)[236]**

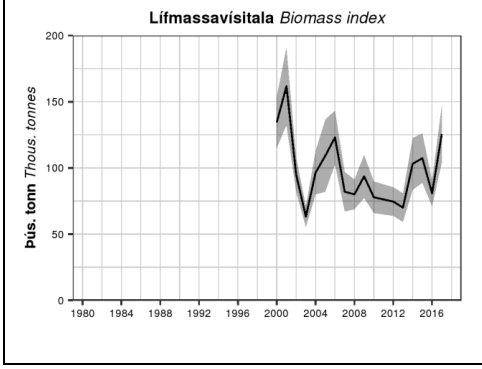
[234] https://www.hafogvatn.is/static/extras/images/%C3%9Eorskur_2018729230.pdf
[235] https://www.hafogvatn.is/static/extras/images/Ysa_2018729280.pdf
[236] https://www.hafogvatn.is/static/extras/images/Ufsi_2018729281.pdf



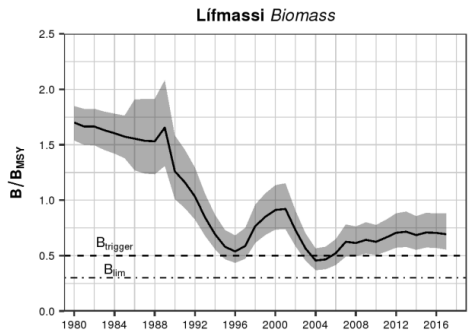

MFRI and ICES advise that when the Icelandic management plan is applied, catches in the fishing year 2018/2019 should be no more than 79 092 tonnes. The spawning-stock biomass (SSB) is currently at the time-series maximum. The harvest rate has declined from 2009 and is presently estimated below $HR_{MGT}$. Recruitment in the last decade has been high. The reference biomass (B4+) has increased since 2015 due to the large 2012 cohort and the cohorts from 2013 and 2014 are estimated to be above average. **The redfish fishery does not appear to have any significant negative effects on the saithe stock.**

## DJÚPKARFI – DEMERSAL BEAKED REDFISH (*Sebastes mentella*)[237]




MFRI and ICES advise that when the precautionary approach is applied, catches in the fishing year 2018/2019 should be no more than 13012 tonnes. The IS-SMH biomass index declined from 2001–2003 and has since been fluctuating without a trend. Since 2007, survey estimates have consistently shown very low estimates for juveniles (<30 cm). Catches in the past five years have been the lowest since 1980. **The Golden redfish fishery does not appear to have any significant negative effects on the Beaked redfish stock.**

## GRÁLÚÐA – GREENLAND HALIBUT *(Reinhardtius hippoglossoides)*[238]

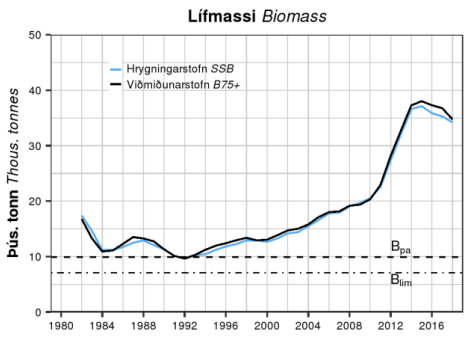



MFRI and ICES advise that when the MSY approach is applied, catches in the 2018/2019 fishing year should be no more than 24150 tonnes. According to an agreement between Iceland and Greenland, 56.4% of the TAC is allocated to Iceland. The stock was well above MSY $B_{trigger}$ in the early part of the time-series. After dropping below the MSY $B_{trigger}$ in 2004 and 2005, it has steadily increased and is currently above MSY $B_{trigger}$. Fishing mortality has decreased in recent years, and is estimated to be close to $F_{MSY}$. **The Golden redfish fishery does not appear to have any significant negative effects on the Greenland halibut stock.**

[237] https://www.hafogvatn.is/static/extras/images/Djupkarfi_2018729474.pdf
[238] https://www.hafogvatn.is/static/extras/images/Graluda_2018729471.pdf

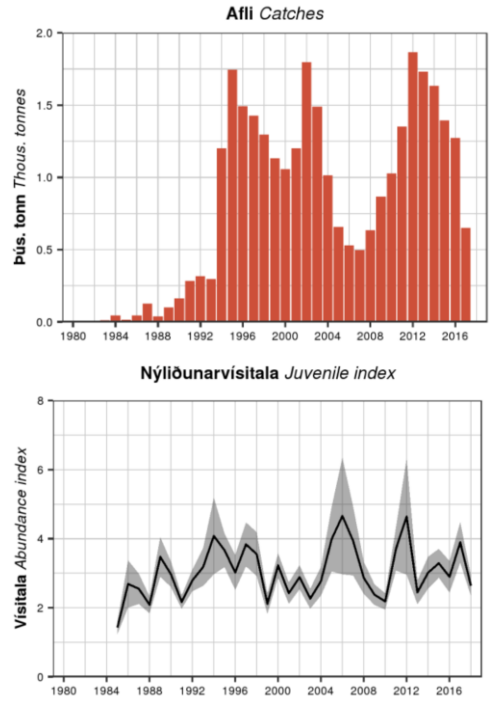
  

## LANGA – LING (*Molva molva*)[239]




MFRI and ICES advise that when the Icelandic management plan is applied, catches in the fishing year 2018/2019 should be no more than 6255 tonnes. Recruitment was high from 2004 to 2011 but has declined to the levels of the 1980s and 1990s. The spawning-stock biomass (SSB) and the reference biomass (ling >75 cm) in 2017 are among the highest in the time-series. Harvest rate (HR) has decreased since 2008 and is now the lowest in the time series, but above $HR_{MGT}$. **The Golden redfish fishery does not appear to have any significant negative effects on the ling stock.**

## TINDASKATA – STARRY RAY (*Amblyraja radiate*)[240]




Starry ray (also called Thorny skate) is listed as Vulnerable under the IUCN Red List but we note that the last assessment was conducted 15 years ago, in 2004[241]. The geographic range and assessment of this species includes US and Canada, Greenland, Iceland, the Faroese, the North Sea and Northern Europe.

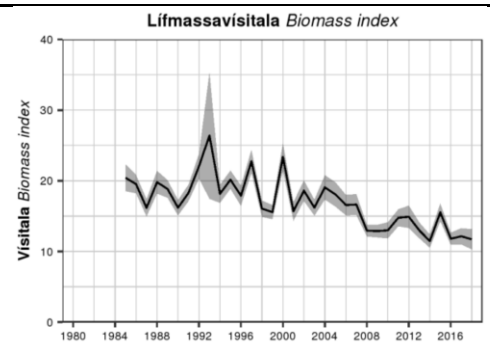
In the 2018 MFRI advice, Starry ray is reported to be an abundant species around Iceland and a common bycatch in various fishing gears, and that landings are mainly reported from the longline fishery.

Reported landings increased from 500 in 2007 to almost 1900 tonnes in 2012, but have declined since then. MFRI did not recommend a TAC for the 2018/2019 fishing year.

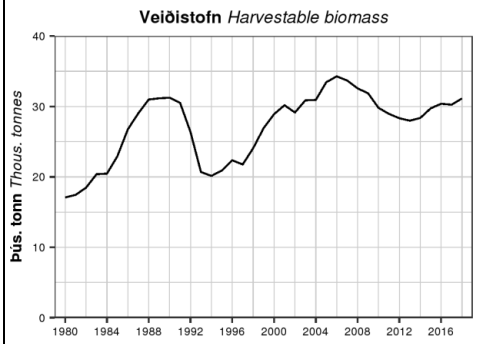
The survey biomass index (IS-SMB) shows a long term decreasing trend. Since 2008, the biomass index has been stable but at the lowest level in the time series. The abundance index of juveniles (<21 cm) appears to be stable, despite large variations. **The Golden redfish fishery does not appear to have significant negative effects on the starry ray stock.**

[239] https://www.hafogvatn.is/static/extras/images/Langa_2018729172.pdf
[240] https://www.hafogvatn.is/static/extras/images/Tindaskata_2018729532.pdf
[241] https://www.iucnredlist.org/species/161542/5447511#assessment-information

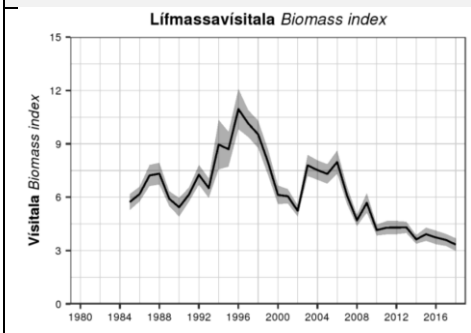



## STEINBÍTUR–ATLANTIC WOLFFISH (*Anarhichas lupus*)[242]




MFRI advises that when the MSY approach is applied, catches in the fishing year 2018/2019 should be no more than 9020 tonnes. MFRI recommends a continued closure of the spawning area off West Iceland during the spawning and incubation season in autumn and winter. Fishing mortality has been below $F_{MSY}$ since 2014. Recruitment has been low since 2006, as compared to the two preceding decades. Harvestable biomass declined from 2006–2013, but has increased since then and is now close to the highest level in the assessment history. **The Golden redfish fishery does not appear to have any significant negative effects on the Atlantic wolffish stock.**

## HLÝRI – SPOTTED WOLFFISH (*Anarhichas minor*)[243]




Spotted wolffish in Icelandic waters is caught as bycatch in the bottom trawl and longline fisheries. MFRI advises that when the precautionary approach is applied, catches in the fishing year 2018/2019 should be no more than 1001 tonnes. Biomass and juvenile indices are at their lowest levels in the time series. Fproxy has been high since 2000. This advice follows the ICES framework for stocks where reliable stock biomass indices are available, but analytical age-length based assessments is not possible (Category 3 stocks; ICES, 2012). IS-SMB biomass index of spotted wolffish, along with catch, is used to calculate Fproxy (catch/survey biomass). The target Fproxy was defined as 70% of

[242] https://www.hafogvatn.is/static/extras/images/Steinbitur_2018729531.pdf
[243] https://www.hafogvatn.is/static/extras/images/Hlyri_2018729533.pdf

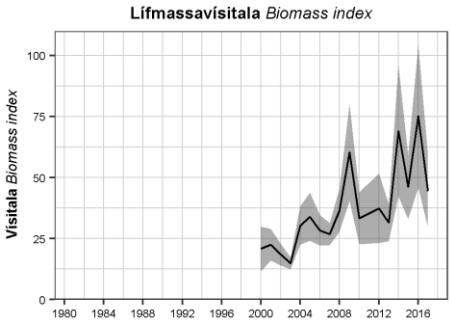
  


*Spotted wolffish. Recommended TAC, national TAC, and catches (tonnes).*

| Fiskveiðiár *Fishing year* | Tillaga *Recommended TAC* | Aflamark *National TAC* | Afli *Catches* |
|---|---|---|---|
| 2012/13 | 900 | - | 2042 |
| 2013/14 | 900 | - | 2250 |
| 2014/15 | 900 | - | 1655 |
| 2015/16 | 900 | - | 1913 |
| 2016/17 | 1128 | - | 1587 |
| 2017/18 | 1080 | - | |
| 2018/19 | 1001 | | |

the mean Fproxy from the reference period of 2001–2015 based on simulation studies. The catch advice is based on multiplying the most recent index value with the target Fproxy value. The advice is constrained by an uncertainty cap of 20% compared to the previous advice. In the 2017-2018 fishing season Icelandic vessels caught 1571 t[244] of spotted Wolffish. This is the 6th year in a row where fishing for this species occurs above the recommended TAC levels. During the site visits the Audit Team queried about the sustainability and risks to this stock. Based on MFRI communication, during the November 2018 site visits, the MFRI stated that "recommended TAC" is not a binding TAC and as such, a well monitored official TAC. However, recognising the issue the MFRI noted that this species was formally introduced into the quota system for the 2018/2019 fishing year to maintain catches within TAC limits. This species is classified as Near Threatened under the IUCN Red List[245]. **The status of this stock will be verified again by next year's assessment team to ensure an official TAC has been set and implemented and catches are within limits.**

## GULLLAX – GREATER SILVER SMELT (*Argentina silus*)[246]

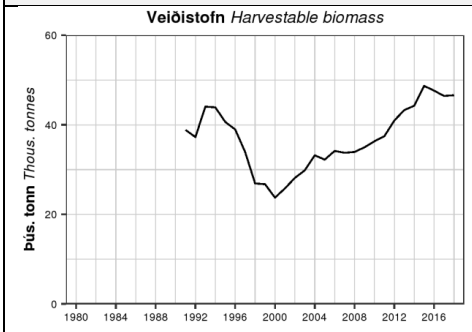



Greater silver smelt is only caught in bottom trawl. Landings increased from about 800 tonnes in 1996 to over 15 thous. tonnes in 1998 and in 1999–2007 landings were 2700–6700 tonnes. Considerable increase occurred in 2008–2010 when landings peaked at about 16 thous. tonnes. Since then, landings have decreased, partly due to increased management measures. MFRI and ICES advise that when the precautionary approach is applied, catches in the fishing year 2018/2019 should be no more than 7603 tonnes. The survey index has been high since 2014, but has fluctuated greatly. The $F_{proxy}$ has decreased since 2010 and has been below the target $F_{proxy}$ since 2014. **The Golden redfish fishery does not appear to have any significant negative effects on the Greater silver smelt stock.**

[244] http://www.fiskistofa.is/english/quotas-and-catches/catches-in-individual-species/
[245] https://www.iucnredlist.org/species/18263655/44739959#population
[246] https://www.hafogvatn.is/static/extras/images/Gulllax_2018729229.pdf

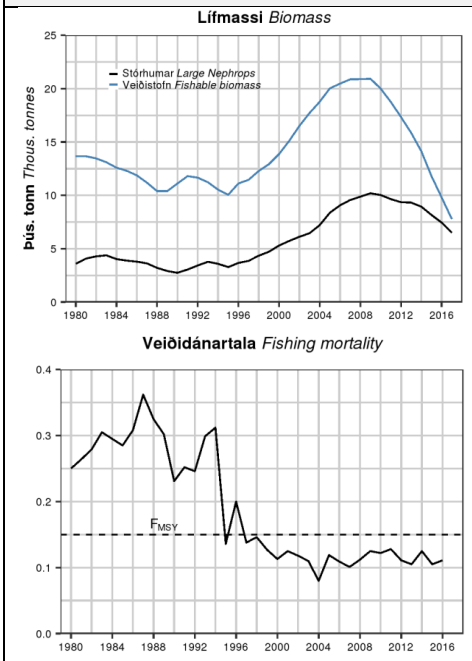
  

## SKARKOLI – PLAICE (*Pleuronectes platessa*)[247]




Demersal seine is the main fishing gear for plaice. In 1992, around half of the catch was caught in bottom trawl, but since 1996 that proportion has been 24–38%. Fishing effort has decreased and CPUE as increased, both in demersal seine and bottom trawl. MFRI advises that when the MSY approach is applied, catches in the fishing year 2018/2019 should be no more than 7132 tonnes. In addition, the MFRI recommends that regulations regarding area closures on spawning grounds remain in effect. The harvestable biomass has increased since 2000 and has never been larger in the assessment period 1991–2017. Fishing mortality has declined since 1997 and has been around FMSY since 2011. Recruitment has been stable since 1994. **The Golden redfish fishery does not appear to have any significant negative effects on the plaice stock.**

## HUMAR – NORWAY LOBSTER (*Nephrops norvegicus*)[248]




In 2004–2010 catches nearly doubled and peaked around 2500 tonnes in 2010. Since then, catches have decreased and were around 1400 tonnes in 2016. Effort has been stable from 2009. Norway lobster is entirely caught in Nephrops trawl. MFRI advises that when the MSY approach is applied, catches in the fishing year 2017/2018 should be no more than 1150 tonnes.

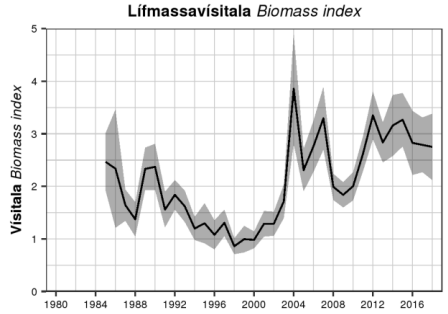
Fishing mortality has been low in recent years and is still below $F_{MSY}$. Recruitment has decreased since 2005 and has never been lower. Harvestable biomass has decreased sharply and is at its lowest level. The biomass of large specimens is high but has decreased since 2009. Catches[249] of Norway lobster in 2016/2017 and 2017/2018 have been 1185 t and 820 t (ungutted) respectively, both within the TAC set by Icelandic authorities. **Fishing mortality and catches are within set reference points (i.e. below $F_{MSY}$) and TAC limits.**

[247] https://www.hafogvatn.is/static/extras/images/Skarkoli_2018729536.pdf
[248] https://www.hafogvatn.is/static/extras/images/Humar230.pdf
[249] http://www.fiskistofa.is/english/quotas-and-catches/catches-in-individual-species/

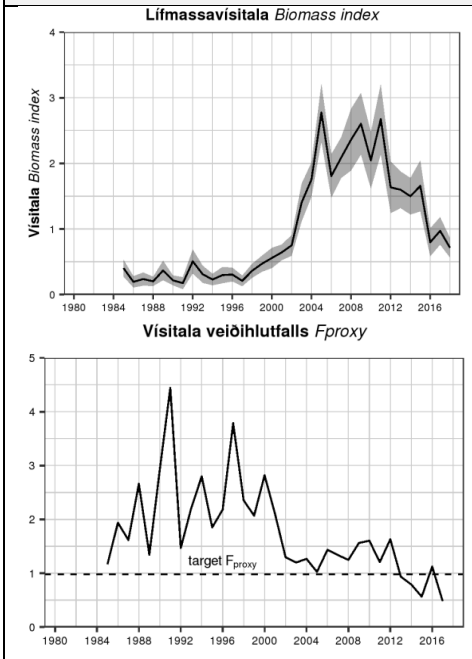
| Fiskveiðiár *Fishing year* | Tillaga *Rec. TAC* | Aflamark *National TAC* | Afli *Catches* |
|---|---|---|---|
| 2010/11 | 2100 | 2100 | 2259 |
| 2011/12 | 2000 | 2100 | 2130 |
| 2012/13 | 1900 | 1900 | 1965 |
| 2013/14 | 1750 | 1750 | 1983 |
| 2014/15 | 1650 | 1650 | 1425 |
| 2015/16 | 1500 | 1500 | 1536 |
| 2016/17 | 1300 | 1300 | |
| 2017/18 | 1150 | | |

## LANGLÚRA – *WITCH (Glyptocephalus cynoglossus)*[250]




MFRI advises that when the precautionary approach is applied, catches in the 2018/2019 fishing year should be no more than 1100 tonnes. IS-SMB biomass index has been high since 2004. The recruitment index has, however, declined since 2009, and reached an all-time low in 2016. $F_{proxy}$ has remained relatively low and stable over the last six years. Since 2010, the catch of witch has remained around 900–1300 tonnes. Witch is mainly caught in demersal seine and Nephrops trawl off the south and southwest coast. **The Golden redfish fishery does not appear to have any significant negative effects on the witch stock.**

## SKÖTUSELUR – ANGLERFISH (*Lophius piscatorius*)[251]



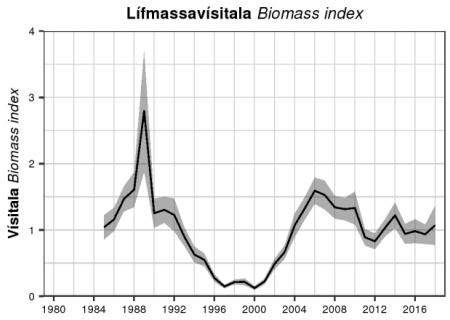

Annual landings of anglerfish in Icelandic waters have steadily decreased since peaking in 2009 and was in 2017 the lowest since the late 1980s. In recent years, about half of landings have been caught by gillnets, but in 2017 most of the monkfish catch was taken as bycatch in trawls. In 2017 most of the catch was taken south of Iceland, in contrast to 2008–2016 when the main fishing areas were in the west and northwest. MFRI advises that when the precautionary approach is applied, catches in the fishing year 2018/2019 should be no more than 722 tonnes. The biomass index was high in 2005–2011 compared to previous years, but has since then decreased substantially. Juvenile indices show strong recruitment for year classes 1998–2007, but poor recruitment before and after this period. $F_{proxy}$ was stable when the stock peaked, but has decreased in recent years and is now lower than the target. Catches in 2017/2018 have been 652 t (ungutted), within the set TAC. **Fishing mortality and catches are within set reference points (i.e. below $F_{proxy}$) and TAC limits.**

[250] https://www.hafogvatn.is/static/extras/images/Langlura_2018729538.pdf
[251] https://www.hafogvatn.is/static/extras/images/Skotuselur_2018729534.pdf

| Fiskveiðiár *Fishing year* | Tillaga *Rec. TAC* | Aflamark *National TAC* | Afli *Catches* |
|---|---|---|---|
| 2010/11 | 2500 | 3000 | 3376 |
| 2011/12 | 2500 | 2850 | 3006 |
| 2012/13 | 1500 | 1800 | 1930 |
| 2013/14 | 1500 | 1500 | 1398 |
| 2014/15 | 1000 | 1000 | 1080 |
| 2015/16 | 1000 | 1000 | 913 |
| 2016/17 | 711 | 711 | 677 |
| 2017/18 | 853 | 853 | |
| 2018/19 | 722 | | |

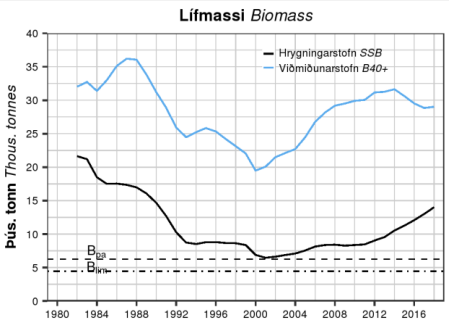
## STÓRKJAFTA –MEGRIM (*Lepidorhombus whiffiagonis*)[252]




Landed catch of megrim has been highly variable since 1980, from 38 tonnes in 1982 to 478 tonnes in 2015. Megrim is predominantly caught as bycatch in bottom trawl, Nephrops trawl and demersal seine off the South coast of Iceland.

IS-SMB recruitment index declined rapidly between 1989 and 1994. It stayed low until 1999, after which it increased and remained high until 2012 when it declined rapidly again and was very low in 2016. The biomass index has for the most part followed fluctuations in the recruitment index, but has remained high since 2006. Decline in the stock is to be expected, due to low recruitment as observed in IS-SMB in recent years. MFRI does not advise a TAC for megrim for the 2018/2019 fishing year. **The Golden redfish fishery does not appear to have any significant negative effects on this stock.**

## KEILA – TUSK (*Brosme brosme*)[253]



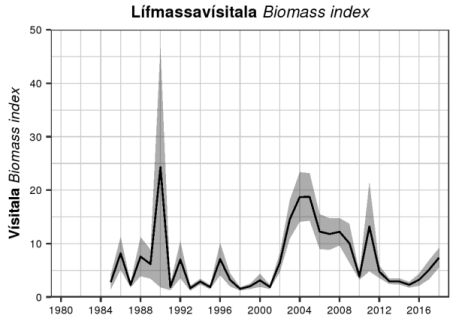

Since 1991, Icelandic vessels have caught 75–80% of the tusk catches in Icelandic waters, but Faroe Islands and Norway the rest. In 2004–2010 catches doubled and peaked around 7000 tonnes in 2008–2010. Icelandic catches amounted to 1833 tonnes in 2017, total catches were 2541 tonnes. Tusk is primarily caught by longliners. Recruitment in 2012-2015 was low, but has increased since then. Harvest rate has declined in recent years and is below $HR_{MGT}$. SSB has increased in recent years while the reference biomass (tusk >40 cm) has declined but remains at a high level. MFRI and ICES advise that when the Icelandic management plan is applied, catches in the fishing year 2018/2019 should be no more than 3776 tonnes. In addition,

[252] https://www.hafogvatn.is/static/extras/images/storkjafta_2018729539.pdf
[253] https://www.hafogvatn.is/static/extras/images/Keila_2018729226.pdf

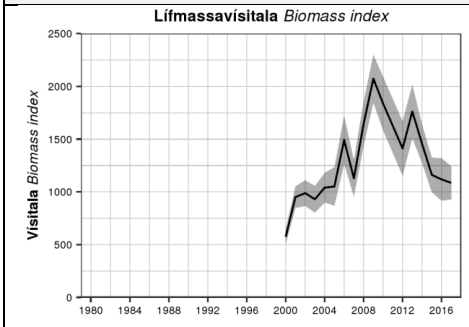
| | |
|---|---|
| | continued closure of the nursery areas off the southeast and southern coast should be maintained. **The Golden redfish fishery does not appear to have any significant negative effects on this stock.** |

**LÝSA – WHITING (*Merlangius merlangus*)[254]**




Whiting is a common bycatch in many fisheries and was historically discarded. Whiting catches increased after 2005 and peaked at 3000 tonnes in 2011. Since then, landings have decreased and were about 600 tonnes in 2017. Whiting is mostly caught at the southern and western part of the Icelandic continental shelf. The main fishing gear are bottom trawls, longline and demersal seine. Catches peaked in 2011, but have decreased since then. The recruitment index has been low since 2009. The biomass index was low in 2012–2015 but has increased since then. $F_{proxy}$ was high in 2009–2015 but has reduced in the last two years. MFRI does not give catch advice for whiting for the fishing year 2018/2019. **The Golden redfish fishery does not appear to have any significant negative effects on this stock at present.**

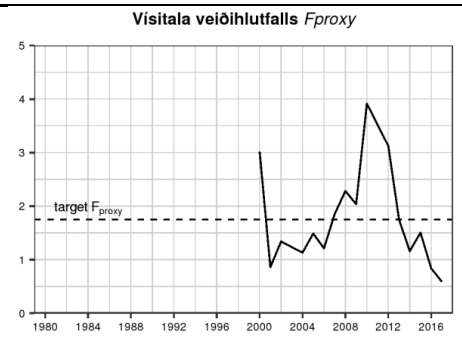
**BLÁLANGA – BLUE LING (*Molva dipterygia*)[255]**




In 2008–2011 the proportion of blue ling catches taken by longlines increased and amounted to 70% of total catches in 2011. Since then the proportion of longlines has decreased and was 27% in 2017. Blue ling is increasingly caught as bycatch in the redfish and Greenland halibut fisheries NW of Iceland. This change in distribution is also observed in the survey. The biomass index peaked in 2009 but has declined since then. Fproxy has been below the target value for the last four years indicating a relatively low harvest pressure. The juvenile index was at low levels in 2010–2016, but increased in 2017. MFRI and ICES advise that when the precautionary approach is applied, catches in the fishing year 2018/2019 should be no more than 1520 tonnes. Catches in the 2015/16, 2016/17 and 2017/18 fishing years

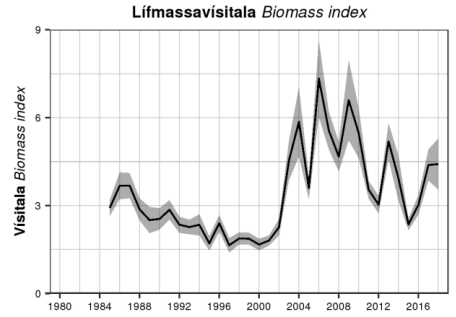
[254] https://www.hafogvatn.is/static/extras/images/Lysa_2018729530.pdf
[255] https://www.hafogvatn.is/static/extras/images/Blalanga_2018729178.pdf




where well within the national TAC. Additionally, the MFRI advises that spawning areas south of Vestmannaeyjar and Franshóll be closed to all fishing activities during spawning season (15 February to 30 April). Although biomass for this stock has been declining, National TACs have been adhered to, fishing effort has decreased below the target $F_{proxy}$ since 2013, spawning closures have been recommended and juvenile abundance is increasing since 2016. **Fishing mortality and catches are within set reference points (i.e. below $F_{proxy}$) and TAC limits.**

**ÞYKKVALÚRA – LEMON SOLE (*Microstomus kitt*)[256]**




Lemon sole is mostly caught in demersal seine and bottom trawl. Annual catches reached a maximum of 2500–2700 tonnes in 2005–2009, but have since been 1200–2000 tonnes. The main fishing grounds are located south and southwest of Iceland.
The IS-SMB biomass index has been relatively high but variable since 2003 compared to the period 1992–2002. $F_{proxy}$ has been highly variable for two decades. IS-SMB recruitment index has been high since 2002. MFRI advises that when the precautionary approach is applied, catches in the fishing year 2018/2019 should be no more than 1565 tonnes. **The Golden redfish fishery does not appear to have any significant negative effects on this stock.**

**Vulnerable and ETP species Interactions**

Further to the redfish fishery associated catches and bycatch listed above, there are other vulnerable and /or ETP species occurring in Icelandic waters according to the Convention for the Protection of the Marine Environment of the North-East Atlantic or OSPAR Convention, as reported in the 2017 ICES Ecosystem report of the Icelandic Ecoregion[257].

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| SEABIRDS | |
| *Rissa tridactyla* | Black-legged kittiwake |
| *Uria lomvia* | Thick-billed murre (or Brünnich's guillemot) |

[256] https://www.hafogvatn.is/static/extras/images/Tylura_2018729537.pdf
[257] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Ecosystem_overview-Icelandic_Waters_ecoregion.pdf

| | |
|---|---|
| FISH | |
| *Anguilla anguilla* | European eel |
| *Centrophorus squamosus* | Leafscale gulper shark |
| *Cetorhinus maximus* | Basking shark |
| *Dipturus batis* | Common skate |
| *Hoplosthethus atlanticus* | Orange roughy |
| *Lamna nasus* | Porbeagle |
| *Petromyzon marinus* | Sea lamprey |
| *Salmo salar* | Salmon |
| *Squalus acanthias* | [Northeast Atlantic] spurdog |
| MARINE MAMMALS | |
| *Balaenoptera musculus* | Blue whale |
| *Eubalaena glacialis* | Northern right whale |

OSPAR Contracting Parties are Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom, and the European Union.

The table below provides catch information for species mentioned in the OSPAR table which have relevance to the Icelandic fisheries. Further below there is additional information about some of these species.

**Table 20.** Icelandic landings in tonnes of common skate (*Dipturus batis*), Atlantic halibut (*Hippoglossus hippoglossus*), orange roughy (*Hoplosthethus atlanticus*) spiny dogfish (*Squalus acanthias* also known as spurdog), Greenland shark (*Somniosus microcephalus*) and Porbeagle shark (*Lamna nasus*) 2006 – 2017. Data downloaded from the Fiskistofa[258] website.

| Species catches (t) per year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Common skate | 136 | 123 | 127 | 128 | 117 | 125 | 145 | 153 | 141 | 157 | 132 | 139 |
| Atlantic halibut | 559 | 516 | 529 | 548 | 557 | 555 | 36 | 39 | 45 | 87 | 123 | 137 |
| Orange roughy | 0.9 | 3.7 | 0.1 | 1 | 1.5 | 19 | 56 | 13 | 6 | 5.8 | 36.6 | 18.9 |
| Spiny dogfish | 82 | 43 | 68 | 102 | 62 | 53 | 51 | 6 | 19 | 8 | 8 | 2 |
| Greenland shark | 28 | 2 | 35 | 26 | 43 | 18 | 19 | 6 | 26 | 18 | 26 | 10 |
| Porbeagle shark | 0.4 | 0.4 | 1.1 | 1 | 1.1 | 1 | 0.8 | 0.9 | 0.4 | 0.8 | 1.1 | 1.2 |

**Common skate (Grey skate)**

Recent studies have shown that the common skate in the Northeast Atlantic may actually be one of two nominal species; the smaller blue skate or grey skate (*Dipturus flossada*) and the large flapper skate (*Dipturus intermedia*); together they are more commonly referred to as the *D. batis* (listed as Critically Endangered under the IUCN Red list[259], last assessed in 2006) species-complex (Iglésias, 2009)[260]. Investigation of skates in Icelandic waters have shown that the skate currently found in Icelandic waters, and caught as bycatch in Icelandic

[258] http://www.fiskistofa.is/veidar/aflaupplysingar/afliallartegundir/
[259] https://www.iucnredlist.org/species/39397/10198950#assessment-information
[260] https://onlinelibrary.wiley.com/doi/abs/10.1002/aqc.1083

fisheries, is the smaller grey skate (*D. flossada*) (Jonbjorn Pálsson, unpublished material) with the larger sister species, the flapper skate (*D. intermedia*), believed to be almost extinct in the Atlantic.

A taxonomic revision of these species has concluded that the smaller-bodied blue skate should retain the scientific name *Dipturus batis* and the larger-bodied flapper skate is now referred to as *Dipturus intermedius* (Last et al., 2016). FAO have accepted the latter name, assigning it the ASFIS code DRJ. Flapper skate is reported predominantly from the northern North Sea and north-west Scotland and is occasionally found in the Celtic Sea. Blue skate is reported predominantly in the Celtic Sea, and its distribution extends northwards to Iceland. The southern limits of both species are uncertain[261].

The grey/blue skate used to be fairly common in Icelandic waters, but has been overfished and catches are now only about 10% of what they were 50 years ago. Total catch of skate in Icelandic waters in 2017/18 was 139 tonnes, very close to the 10 years average.
No TAC is available for this species because there is no directed fishery for it. It is caught as bycatch in mainly longline, bottom trawl and Danish seine gear. On average, the majority of catches are taken in longline fisheries targeting cod (see figure below).

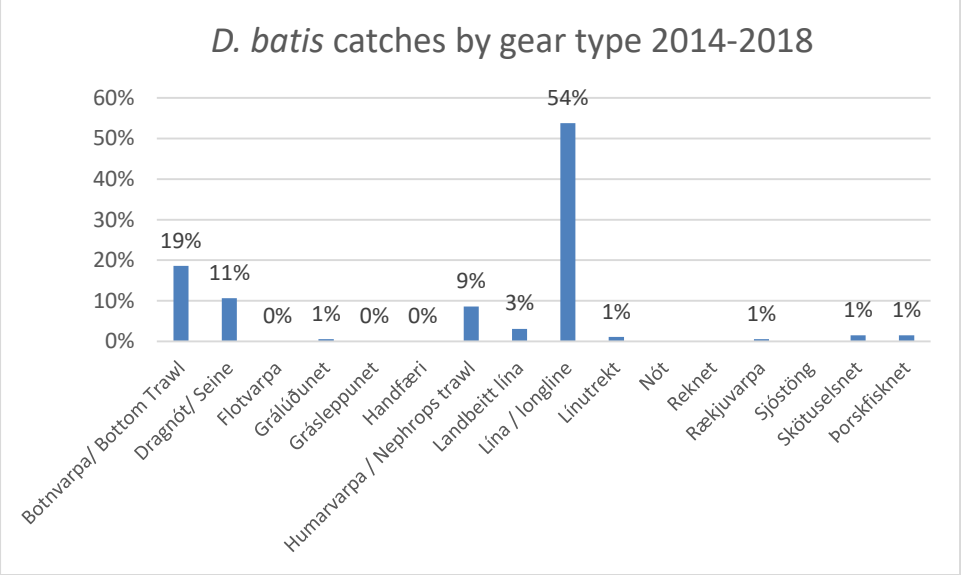



**Figure 46.** *D. batis* bycatch by gear type, 2014-2018 average.

No assessment is carried out for grey skate and indices of abundance are uncertain as only limited survey data exists. Recent survey trends indicate some increase in the scientific groundfish survey (Figure below).

[261] http://ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/rjb.27.89a.pdf

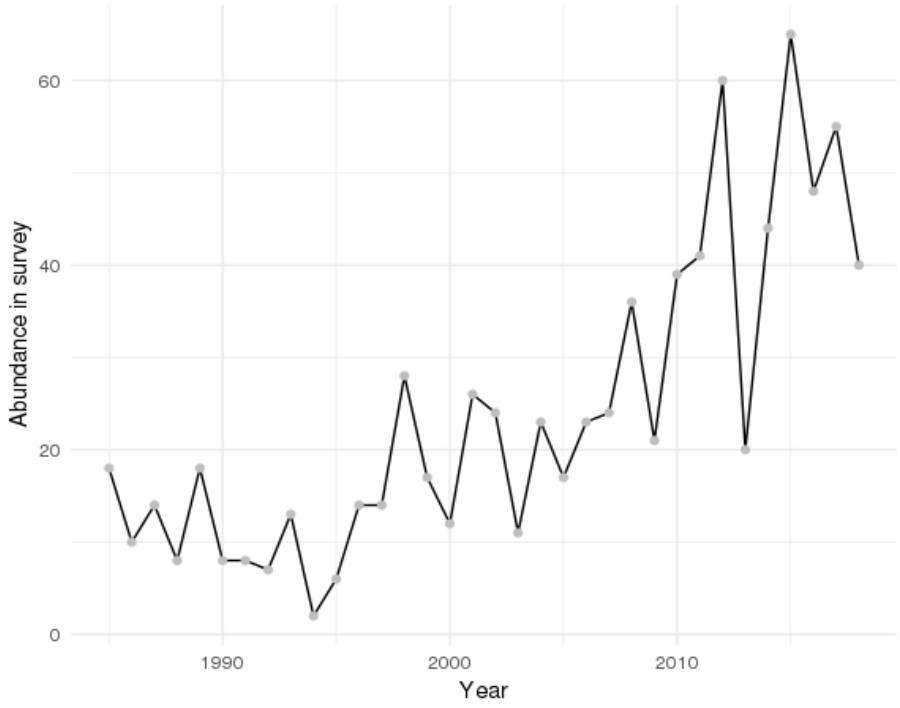



**Figure 47.** Total catch in numbers of Grey skate (*Dipturus flossada/batis*) in MFRI spring survey (1985 – 2018) (Source: MFRI data provided to assessment team during Nov. 2018 site visits).

MFRI will continue to report on incidences of capture and distribution of skate during the spring bottom trawl survey as they have been doing since the survey began in 1985. In addition, catches in commercial fisheries will continue to be collected and the MFRI will monitor whether significant changes either the survey results or the level of landed catches occur. Misidentification of species is an issue and can lead to some moderate errors in landings data.

**Atlantic halibut (*Hippoglossus hippoglossus*)**

Atlantic halibut is classified as Endangered on the IUCN Red list[262]. Around 2000 tonnes of Atlantic halibut were landed annually from Icelandic waters in 1984–1991, but the catch declined to 500–800 tonnes in 1997–2011. Atlantic halibut is now only caught as bycatch in bottom gear all around the island.

Annual landings of Atlantic halibut were 36–119 tonnes in 2012–2017, which are the lowest landings since the beginning of the fishery. The decrease is due to management decisions. The IS-SMB only covers the fishing grounds of juvenile Atlantic halibut, and there is a lack of information on the adult population. The survey indices have been relatively stable between years, and uncertainties around them are low. A committee established in 2010 by the minister of fisheries due to the poor state of the Atlantic halibut stock, concluded that the most effective way to rebuild the stock would be to ban all targeted fishing.

[262] https://www.iucnredlist.org/species/10097/3162182

The Marine Research Institute followed up on these conclusions, by consulting with experienced captains on what would be the best course of action to protect the stock, resulting in advice to ban targeted fishing, and to make it mandatory to release all viable Atlantic halibut caught as bycatch in other fisheries. In 2012, a regulation was issued to ban all targeted fishing for Atlantic halibut[263] and stipulating that all viable halibut in other fisheries must be released. In 2018, MFRI's advice is that these regulations remain in effect[264].

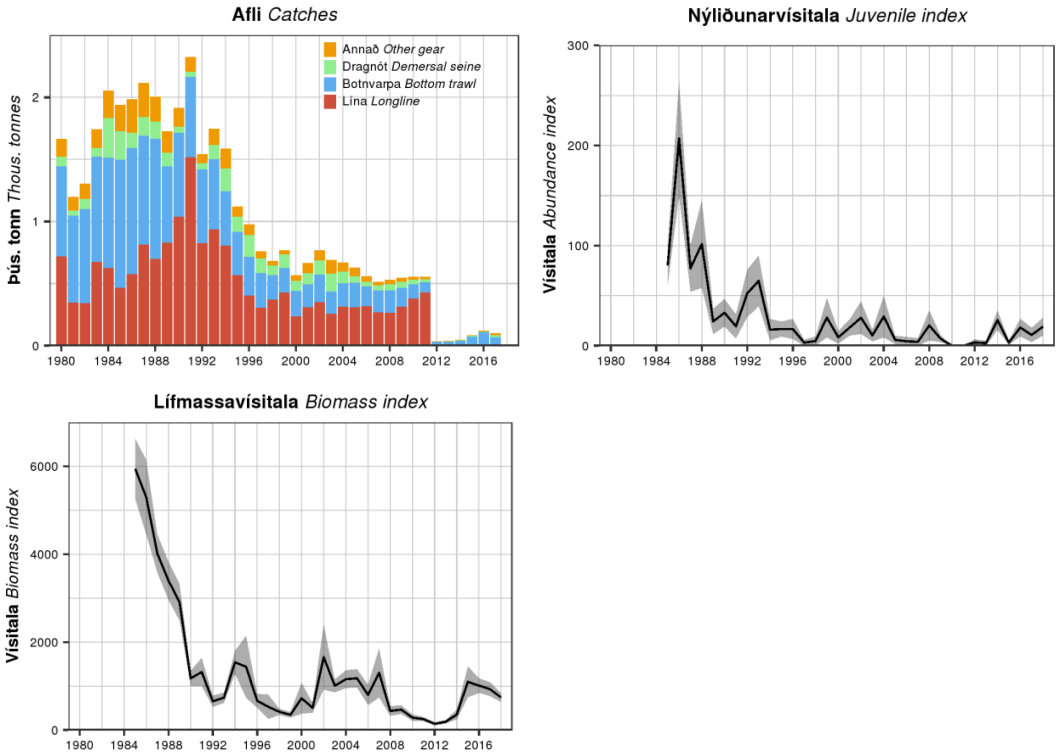



**Figure 48.** Catch by gear type, IS-SMB juvenile (<30 cm) and biomass (≥20 cm) indices.

**Orange roughy (*Hoplostethus islandicus*)**

Recent catches of orange roughy in Iceland have been quite small, ranging 1-56 tonnes. These catches are unlikely to significantly affect the status of the stock. During the November 2018 on site visits, the MFRI stated that there is limited overlap between bottom trawl fisheries and the orange roughy stock because it occurs in deeper water than other species.

| Species | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Orange roughy catches (t) | 0.9 | 3.7 | 0.1 | 1 | 1.5 | 19 | 56 | 13 | 6 | 5.8 | 36.6 | 18.9 |

[263] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/18302

[264] https://www.hafogvatn.is/static/extras/images/luda_2018729535.pdf

**Ban on fishing for spiny dogfish, Porbeagle sharks and Basking shark**

Regulation 456/2017 states that there is a ban on fishing for Porbeagle sharks, Basking shark and spiny dogfish. Any incidental catches of these species are to be landed and sold on an approved auction market for marine products according to the provisions of Act no. 37/1992, on a special fee for illegal fishing, with subsequent amendments. [265] This is the same mechanism adopted (i.e. VS catches) for Atlantic halibut catches, for which directed fishing is banned. During the 2018 November site visits, the Assessment Team visited the Fish Auction in Reykjavik. One Atlantic halibut was in temporary store there. The director of the fish auction confirmed that catches of banned species are sold and 80% of the value goes to a MFRI research fund and only 20% to the fishermen. These VS catches measures are meant to facilitate the landing of every species, discourage potential targeting and avoid discarding.

During the November 2018 site visits, the MFRI also reported that few basking sharks have been reported historically as bycatch in logbooks, so some interactions have been documented in the past. They seem however to be very rare and far between. Leafscale gulper sharks are usually only found in waters deeper than fisheries for cod, haddock, saithe and redfish operate in.

**Spiny dogfish / spurdog (*Squalus acanthias*)**

When foreign fleets operated in Iceland, hundreds of tonnes of spiny dogfishes were fished annually. However, Icelandic catches have always been low, less than 10 tonnes, in recent years. Catches in 2015, 2016, and 2017 were 8, 8 and 2 tonnes, respectively.

| Species | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Spiny dogfish catches (t) | 82 | 43 | 68 | 102 | 62 | 53 | 51 | 6 | 19 | 8 | 8 | 2 |

As spiny dogfish are an aggregating species, landings can be dominated by relatively few large hauls leading to large fluctuations in annual landings and/or survey results. There is no directed fishery for spiny dogfish and current catches are solely bycatch in other fisheries, primarily gillnet fisheries off the southern coast during the summer months. Recent catches of spiny dogfish appear to be unlikely to significantly affect the status of the stock or its rebuilding.

**Porbeagle shark (*Lamna nasus*)**

Recorded catches of Porbeagle shark in Iceland are very small (in the region of 1 tonne or less a year) and unlikely to negatively affect the stock or its recovery.

| Species | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Porbeagle shark catches (t) | 0.4 | 0.4 | 1.1 | 1 | 1.1 | 1 | 0.8 | 0.9 | 0.4 | 0.8 | 1.1 | 1.2 |

[265] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/0456-2017

**Greenland shark (*Somniosus microcephalus)***

Historically, Greenland sharks were fished in Icelandic waters with the fishery reaching its peak in 1867 when 13,100 barrels of shark oil were exported. Later, whale and then fuel oil became more available and commercial fisheries for Greenland shark ceased by about 1910. Greenland sharks are still targeted in small scale artisanal fisheries and is a periodic bycatch in bottom trawl fisheries[266]. National landings in 2017/2018 totalled 18 t with no specific changes or trends apparent in the annual landings[267].

| Species | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Greenland shark catches (t) | 28 | 2 | 35 | 26 | 43 | 18 | 19 | 6 | 97 | 28 | 26 | 18 |

## Vulnerable Whales

**Blue Whale**

The Húsavík Research Centre (HRC) in Húsavík continued their long-term photo-identification and sightings studies of blue whales in Skjálfandi bay. Acoustic tags were deployed on two blue whales in Skjálfandi Bay.

**Northern Right Whale**

No specific monitoring information is available on this species.

No interactions between Blue whales and Northern right whales have been recorded in recent years with Icelandic fisheries. This was confirmed during the November 2018 site visits by the MFRI.

**Opportunistic marine mammal observations during the 2018 IESSNS survey[268]**

During the 2018 IESSNS survey, opportunistic whale observations were done by M/V "Kings Bay" and M/V "Vendla" from Norway in addition to R/V "Árni Friðriksson" from Iceland in 2018 (see figure below). Overall, more than 600 marine mammals of nine different species were observed, which was a small reduction from last year 700+ observed individuals. This could partly be explained by reduced observation effort on the Icelandic R/V "Árni Friðriksson" as in 2017 dedicated whale observers were onboard which was not the case in 2018. The two Norwegian vessels had practically flat sea and excellent visibility during the entire survey period while the Arni Fridriksson had occasional periods with fog in north of Iceland. Observed species included; fin whales (*Balaenoptera physalus*), minke whales (*Balaenoptera acutorostrata*), humpback whales (*Megaptera novaeangliae*), blue whales (*Balaenoptera musculus*), pilot whales (*Globicephala sp.*), killer whales (*Orcinus*

[266] https://seaiceland.is/what/fish/sharks-and-skates/greenland-shark

[267] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGEF/26%20WGEF%20Report%202018_Section%2024%20Greenland%20shark_NEA.pdf

[268] https://www.hafogvatn.is/static/files/skjol/wd05_iessns_survey_report_2018.pdf

*orca*), sperm whales (*Physeter macrocephalus*), white-sided dolphins (*Lagenorhynchus acutus*) and white beaked dolphins (*Lagenorhynchus albirostris*). Marine mammal observations were north and south of Iceland, at the entrance to the Barents Sea, along the Norwegian coast and in the western outskirts of the Norwegian Sea. The observations were a mix of the species with no single species dominating. There were very few observations of marine mammals in the central Norwegian Sea and east of Iceland, and the spatial overlap between the pelagic fish and marine mammals seem to be low.

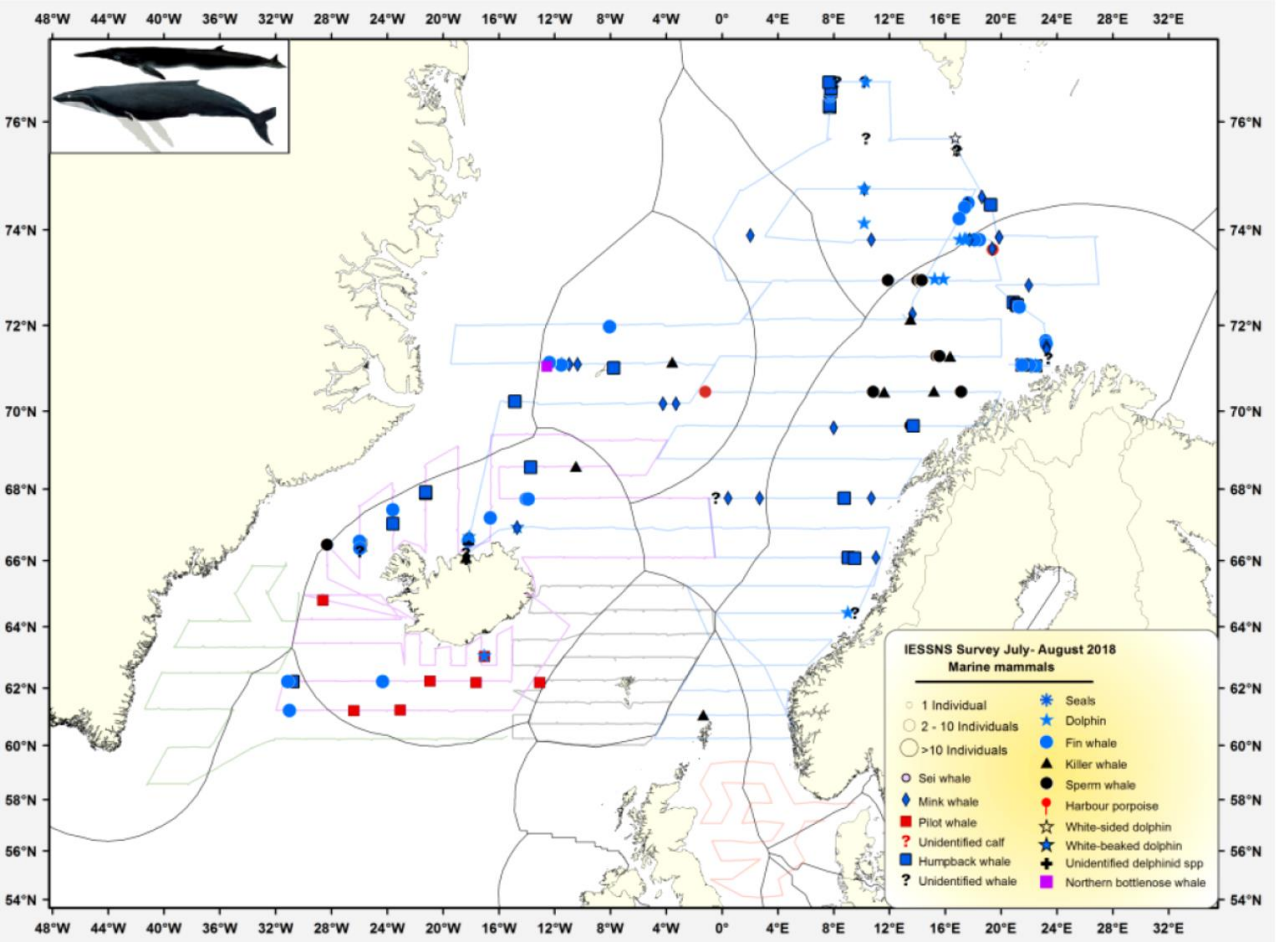



**Figure 49.** Marine mammal observations during the 2018 IESSNS surveys.

**E-logbook seabird and marine mammals recording**

The electronic logbook system designed by TrackWell allows for marine mammal and seabirds to be recorded along with normal catch. In total there are 171 marine mammal and seabird species pre-programmed into the e-log system that are selectable by fishers. Recording of all marine mammals and seabirds in E-logbooks (by species and numbers) interactions/catches is a legal requirement (Reg. 126/2014)[269].

[269] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967

**E-logbook app modifications**

A smartphone app is in development by the Directorate of Fisheries, to make both reporting and identification of bycatch easier for operators in the fishery. During the 2018 site visits the Directorate reported that this app prioritises the need for recording marine mammals and seabirds interactions/bycatch before fish catches are submitted, to enable more consistent and reliable reporting. The app appears to be ready for implementation but there is a need to change current legislation to ensure it can be nested within legal requirements. The Assessment Team will review on this development in the next audit.

**Quality of marine mammals and seabird interaction data collected by Directorate inspectors**

In relation to the quality of by-catch data, it is important to note that the Directorate's inspector coverage of all gear types is limited, and that the sampling is not focused on documenting seabird and marine mammal by-catch (see coverage information below). The Directorate has placed extra effort in monitoring gillnet fisheries for lumpfish and for cod in 2017/2018 due to bycatch issues. All trips are unannounced.

**Table 21.** Unannounced inspector days on fishing vessels in the past 3 years.

| Season | Fishery type: Bottom Trawl | Fishery type: Longline | Fishery type: Gillnet (include lumpfish and cod) |
|---|---|---|---|
| 2015/16 season days | 553 | NA (likely but not reported) | 81 (60 days cod, 21 days lumpsucker)[270] |
| 2016/17 season days | 780 | 230 | 117 (60 days cod, 57 lumpsucker)[271] |
| 2017/2018 season days | 570 | 202 | 152 |
| 2017/2018 season coverage | 1.93% | 0.64% | 3.64% |

As mentioned above, most attention is given to seabird and marine mammal by-catch in the gillnet fisheries, where most of the by-catch is assumed to occur. Less information is available from other fishing gears. It is also important to note that even where observers are present they are not always in a position to document any bycatch. For instance, in the pelagic pair trawl fishery, observers are below deck to monitor the catch, and not in a position to see if a seabird or marine mammal is caught[272]. Since 2014, this has improved with stricter guidelines regarding marine mammal by-catch and supervision of the observers. Prior to this the observer data on marine mammal by-catch is not considered reliable.

[270] http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2017/WGBYC/wgbyc_2017.pdf

[271] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGBYC/wgbyc_2018.pdf

[272] Report of the NAMMCO Scientific Committee Working Group on By-catch, 2 - 4 May 2017, Faroes Representation Copenhagen, Denmark. https://nammco.no/wp-content/uploads/2018/01/08-nammco-26-scientific-committee-report.pdf

The next section provides sources of data post 2014, when the requirement for recording seabird and marine mammal bycatch went into force, showing available observed and raised (i.e. calculated at fleet level) bycatch data for both marine mammals and seabirds in various fisheries before providing a status evaluation for affected species.

**2015 data on marine mammals and seabirds from various fisheries (gillnet, demersal trawl)[273]**

Monitoring in Icelandic waters during 2015 from Directorate inspectors included 81 days spent on gillnet vessels, as well as 553 days on demersal trawl vessels fishing within the Icelandic EEZ. Target species in the gillnet fisheries were cod (60 days observed) and lumpsucker (*Cyclopterus lumpus*; 21 days observed), while demersal fish (gadoids, redfish and flatfish species) were the target species in the demersal trawl fishery.

Observed marine mammal bycatch in Icelandic fisheries was 20 harbour porpoises, 20 harbour seals, 17 grey seals, six harp seals, two ringed seals and one hooded seal.

Observed seabird bycatch in the fisheries was 92 eider ducks, 43 common guillemots, 40 northern fulmars, 12 black guillemot, 13 cormorants, nine northern gannets, two Atlantic puffins, and two Brünnich's guillemots. The majority of the bycaught animals were taken in gillnets, although one harbour seal and one northern gannet were observed in demersal trawls.

Total estimated bycatch of marine mammals for 2015 in observed Icelandic gillnet and demersal trawl fisheries was approximately 1400 harbour seals, 1200 grey seals, 800 harbour porpoises, 140 ringed seals and 50 hooded seals.

Total estimated bycatch of seabirds for 2015 was approximately 6600 eider ducks, 1900 guillemots, 1700 fulmars, 900 black guillemots, 400 northern gannets, 100 puffins and 80 Brünnich's guillemots (thick-billed murre). These estimates are likely to be biased high, as observed effort was low and the coefficient of variance around those estimates is very high (40–100%).

**2016 data on seabirds from various fisheries (longline, gillnets)**

Monitoring of Icelandic waters was conducted by the Marine and Freshwater Research Institute (MFRI) in 2016. The primary purpose of the monitoring was to have bycatch estimates of seabirds and marine mammals available for fishery certification purposes. This included[274]:

- 57 trips/days on lumpsucker gillnet vessels,
- 60 trips/days on cod gillnet vessels,
- 61 trips/780 days on demersal trawl vessels,

[273] http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2017/WGBYC/wgbyc_2017.pdf

[274] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGBYC/wgbyc_2018.pdf

- 72 trips/230 days on longline vessels, and three trips/days in monkfish gillnets, fishing within the Icelandic EEZ.

As part of Iceland becoming part of the ICES Working Group on Bycatch of Protected Species (WGBYC) in 2017, the following information on seabird and marine mammal bycatch for 2016 was submitted to the bycatch working group. This information offers some additional detail in regards to bycatch rate of individuals per days at sea.[275]

**Table 22.** Total number of bycatch specimens (all fisheries) or *number of incidents reported and bycatch rates (number of specimens/days at-sea or *number of incidents per days at-sea) derived from the ICES WGBYC 2016 data call. Bycatch numbers and rates are grouped by ecoregion, taxa, métier and species.

| Ecoregion | Taxa | ICES Subarea | Métier3 | Species | Total Observed Effort (Days at-sea) | Fishing Effort (Days at-sea) | Total No. Incidents | Total No of Specimens *Incident reported but not No of specimen | Bycatch Rate No of specimen per day at-sea observed *No of incidents per days at-sea | Reported Bycatch Estimate by MS |
|---|---|---|---|---|---|---|---|---|---|---|
| Iceland Sea | Bird | 27.5.a | Longlines | *Fulmarus glacialis* | 230 | NA | 11 | 11 | 0.05 | NA |
| Iceland Sea | Bird | 27.5.a | Nets | *Cepphus grylle* | 120 | NA | 6 | 16 | 0.13 | NA |
| Iceland Sea | Bird | 27.5.a | Nets | *Clangula hyemalis* | 120 | NA | 1 | 1 | 0.01 | NA |
| Iceland Sea | Bird | 27.5.a | Nets | *Fratercula arctica* | 120 | NA | 1 | 1 | 0.01 | NA |
| Iceland Sea | Bird | 27.5.a | Nets | *Fulmarus glacialis* | 120 | NA | 9 | 17 | 0.14 | NA |
| Iceland Sea | Bird | 27.5.a | Nets | *Gavia immer* | 120 | NA | 2 | 3 | 0.03 | NA |
| Iceland Sea | Bird | 27.5.a | Nets | *Phalacrocorax* spp. | 120 | NA | 1 | 1 | 0.01 | NA |
| Iceland Sea | Bird | 27.5.a | Nets | *Somateria mollissima* | 120 | NA | 11 | 34 | 0.28 | NA |
| Iceland Sea | Bird | 27.5.a | Nets | *Uria aalge* | 120 | NA | 4 | 13 | 0.11 | NA |
| Iceland Sea | Bird | 27.5.a | Nets | *Uria lomvia* | 120 | NA | 1 | 1 | 0.01 | NA |
| Iceland Sea | Marine mammal | 27.5.a | Bottom trawls | *Halichoerus grypus* | 780 | 33 | 1 | 1 | 0.001 | NA |
| Iceland Sea | Marine mammal | 27.5.a | Nets | *Erignathus barbatus* | 120 | NA | 2 | 2 | 0.02 | NA |
| Iceland Sea | Marine mammal | 27.5.a | Nets | *Halichoerus grypus* | 120 | NA | 4 | 46 | 0.38 | NA |
| Iceland Sea | Marine mammal | 27.5.a | Nets | *Pagophilus groenlandicus* | 120 | NA | 4 | 4 | 0.03 | NA |
| Iceland Sea | Marine mammal | 27.5.a | Nets | *Phoca vitulina* | 120 | NA | 7 | 11 | 0.09 | NA |
| Iceland Sea | Marine mammal | 27.5.a | Nets | *Phocoena phocoena* | 120 | NA | 33 | 44 | 0.37 | NA |

**Interactions with Seabirds and Marine Mammals**

Bycatch of seabirds, small cetaceans, and seals is known to occur in bottom setnets, particularly in Breidafjordur (western Iceland) and in the north. Harbour porpoise (*Phocoena phocoena)* is the most commonly bycaught marine mammal, but seals are also caught, especially in the lumpsucker *Cyclopterus lumpus* fishery.

**Harbour porpoises interactions**

Harbour porpoises are classified as Least Concern in the IUCN Red List[276] (population trend unknown). Annual estimates of harbour porpoise by-catch have decreased in recent years as gillnet effort has decreased (see table

275 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGBYC/wgbyc_2018.pdf

276 https://www.iucnredlist.org/species/17027/6734992

below), from a high of 7,300 animals in 2003 to about 1600 animals in 2009–2013[277] and down to about 750 animals in 2014-2015. There was an increase in harbour porpoise by-catch in cod gillnets in 2016. The rate is four times higher compared to 2015 (with the same amount of observer effort), suggesting that harbour porpoise density on the fishing grounds might be changing[278].

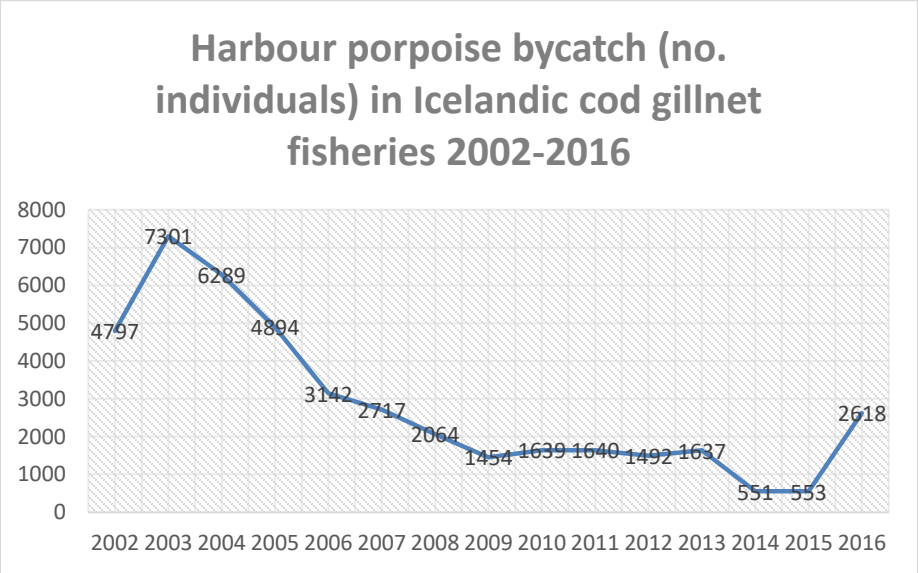



**Figure 50.** Bycatch of harbour porpoise in the Icelandic cod gill net fishery from 2002 to 2016. Data pulled together from Pálsson *et al*. 2015 and the 2017 NAMMCO 24th Scientific Committee Meeting Report. Note that these numbers exclude catches in the lumpsucker fishery (see table below for details of 2014-2016 numbers).

It was suggested that Iceland examine trends in commercial effort in the cod fishery over time, because the change in the by-catch estimate (the 2015 estimate went from 553 to 2,618 in 2016) might be influenced by increases in commercial fishing effort, in addition to higher by-catch rates. However, the cod gillnet effort has been more or less stable since 2008 (see figure below).

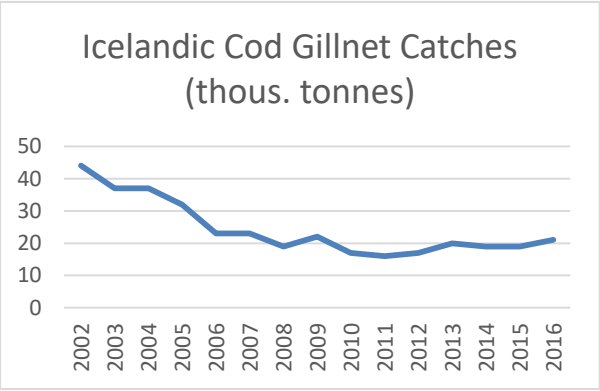



**Figure 51**. Icelandic cod gillnet catches (thous. tonnes) from 2002 to 2016.[279]

[277] Pálsson ÓK, Gunnlaugsson Th, and Ólafsdóttir D. 2015. By-catch of seabirds and marine mammals in Icelandic Fisheries. Marine Research no 178. https://www.hafogvatn.is/static/research/files/fjolrit-178pdf

[278] https://nammco.no/wp-content/uploads/2018/01/08-nammco-26-scientific-committee-report.pdf

[279] https://www.hafogvatn.is/static/extras/images/%C3%BEorskur%20(5)731728.pdf

The estimated harbour porpoise by-catch in 2016 was ~2-9% of the 2007 abundance estimate of 43,179 (43,179 animals, 95% confidence intervals of 31,755-161,899[280]), but it is important to note that the 2007 estimate is considered to be a minimum estimate based on an incomplete aerial survey. The WG noted that large ecosystem changes have been observed in the Icelandic ecosystem between 2015 and 2016, which could have affected the abundance and distribution of harbour porpoises. A new estimate based on next of kin genetic analysis is ongoing.

**Table 23.** Estimated numbers of marine mammal by-catch by species and fishing gear type in Icelandic waters in 2014-2016 from the standard raising methods. Standard deviation of the estimate is shown in the brackets (source: NAMMCO, 2017[281]).

| Species | Cod gill nets | | | Lumpfish nets | | | Other gear | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2014 | 2015 | 2016 | 2014 | 2015 | 2016 | 2014 | 2015 | 2016 | 2014 | 2015 | 2016 |
| Harbour porpoise | 551 (30) | 553 (48) | 2618 (77) | 139 (61) | 215 (75) | 374 (153) | 0 (0) | 0 (0) | 0 (0) | 690 | 768 | 2992 |
| Harbour seal | 0 (0) | 46 (0.7) | 0 (0) | 232 (116) | 1,288 (1335) | 624 (356) | 0 (0) | 86 (3.3) | 0 (0) | 232 | 1,420 | 624 |
| Gray seal | 0 (0) | 0 (0) | 0 (0) | 162 (118) | 1,216 (1824) | 2870 (9820) | 0 (0) | 0 | 0 (0) | 162 | 1,216 | 2,870 |
| Harp seal | 92 (1.5) | 212 (7.7) | 144 (7.0) | 23 (7.5) | 72 (61) | 187 (42) | 0 (0) | 0 (0) | 0 (0) | 115 | 284 | 331 |
| Ringed seal | 38 (1.0) | 0 (0) | 0 (0) | 46 (7.5) | 143 (31) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 84 | 143 | 0 |
| Hooded seal | 0 (0) | 46 (0.7) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 | 46 | 0 |
| Bearded seal | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 124 (23) | 0 (0) | 0 (0) | 0 (0) | 0 | 0 | 124 |
| Total | 681 | 857 | 2,762 | 602 | 2,934 | 4179 | 0 | 86 | 0 | 1,283 | 3,877 | 6,941 |

**Annual anthropogenic induced mortality reference point for harbour porpoise**

ASCOBANS has advised that the maximum annual anthropogenic induced mortality for harbour porpoise should not exceed 1.7% of the total population size so this threshold is likely to have been met or exceeded in 2016[282]. However, Pálsson *et al.*, (2015) suggested that the higher numbers of harbour porpoise occurring in the cod gillnet fishery in recent years could indicate an increase in the porpoise stock as a consequence of reduced fishing effort and perhaps that the replacement potential of the porpoise population may be higher than implied by the precautionary 1.7% reference point.

An alternative explanation may be that, as previously mentioned, the 2007 mean population estimate was a significant under-estimate and the population is bigger than the survey suggested such that it is able to sustain

[280] Gilles *et al.* Harbour porpoise *Phocoena phocoena* summer abundance in Icelandic and Faroese waters, based on aerial surveys in 2007 and 2010. http://www.hafro.is/Bokasafn/Greinar/sc_18-AESP11.pdf

[281] NAMMCO 2017. Report of the 24th Scientific Committee meeting, 14-17 November 2017. https://nammco.no/wp-content/uploads/2018/01/08-nammco-26-scientific-committee-report.pdf

[282] OSPAR, 2009. Background Document for Harbour porpoise Phocoena phocoena. OSPAR Commission. http://www.ascobans.org/en/document/ospar-background-document-harbour-porpoise-phocoena-phocoena

the levels of by-catch observed over the years. It has been suggested that the higher by-catch in 2016 is a result of changing harbour porpoise density on the fishing grounds. The rapid change in by-catch between years does suggest a significant change in distribution (perhaps linked to environmental conditions).

The NAMMCO 2017 Progress report for Iceland[283] highlights that efforts to estimate bycatch of harbour porpoises in fisheries continues at the MFRI.

**Marine mammals bycatch reduction devices trials**

Pingers were tested for the first time in the Icelandic cod gillnet fishery in April of 2017, but their use showed no reduction in porpoise bycatch, as 7 porpoises were caught in nets with pingers, while 5 porpoises were caught in nearby control nets. A more detailed analysis of this experiment is underway and is due to be published. C-PODS [284](i.e. continuous porpoise detectors) were also deployed in Skjálfandi Bay (Northern Iceland) for detections of harbour porpoises.

Collaboration of the MFRI with the University of Potsdam on harbour porpoise genetic research is ongoing (Lah et al. 2016). Among the objectives of this study is estimation of population size based on close kin analysis. For all harbour porpoises, the mitochondrial Control Region and a standard set of 15 nuclear microsatellites is genotyped for population/stock assessment and close-kin-based estimation of population size. Furthermore, multiple nuclear Single Nucleotide Polymorphisms (SNPs) are typed in a representative subset of samples. In 2017 fishermen for the first time received a payment for each harbour porpoise DNA tissue sample that they send in to the MFRI, and this is clearly resulting in an increase in samples and in the recording of by-catch. Efforts to estimate bycatch of harbour porpoises in fisheries continues at the MFRI.

**Harbour seals interactions**

Six pinniped species occur in the Icelandic Waters ecoregion but only two of these breed locally (grey seals and harbour seals). Both species are currently in decline. Harbour seals are classified as Least Concern in the IUCN Red List[285] (population trend is unknown). Bycatch of marine mammals was monitored in all major fisheries in Icelandic waters in 2017, through (limited) logbook submissions, reports from onboard inspectors from the Directorate of Fisheries and in the MFRI annual gillnet survey. A draft report on bycatch in Icelandic fisheries was presented to the NAMMCO Bycatch working group in May 2017.[286]

In 1980, the abundance of harbour seals was estimated at around 33 thous. animals but the population declined rapidly until 1989 to around 15 thous. animals. The latest harbour seal census was conducted in 2016 and the stock was estimated to be 7,652 animals (95% confidence intervals of 4,995–10,310). The current population

[283] https://nammco.no/wp-content/uploads/2018/01/2017-iceland_progress_report_final.pdf
[284] https://nammco.no/wp-content/uploads/2018/07/report_by-catch_wg_may_2017.pdf
[285] https://www.iucnredlist.org/species/17013/45229114
[286] https://nammco.no/wp-content/uploads/2018/01/2017-iceland_progress_report_final.pdf

size is 77% smaller than in the first abundance estimate in 1980 and the population is 36% under the management objective of 12 thous. animals[287].

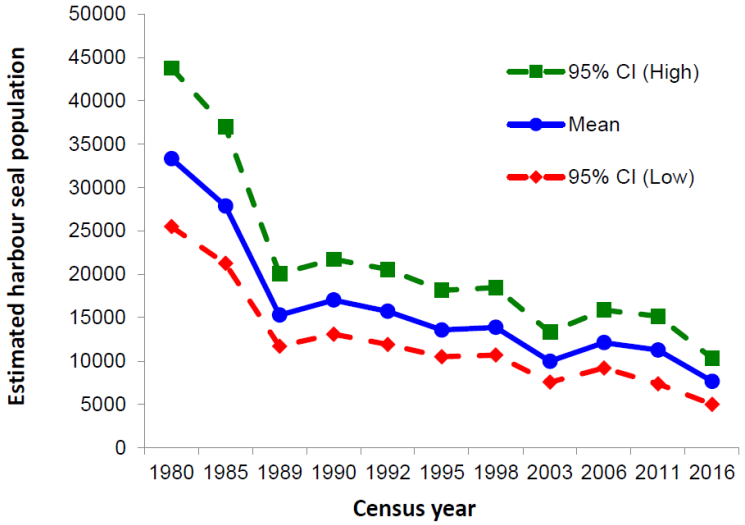



**Figure 52.** Trends in the Icelandic harbour seal population from 1980 to 2016. The mean values (blue) and 95% confidence intervals are shown.

Traditional sealing using nets has decreased in recent decades, but culling around river mouths to reduce the effect that seals are thought to have on salmon fisheries is still common. Seal bycatch in gillnets is high. In 2013, the number of by-caught harbour seals in Icelandic waters was estimated to be 705 animals in total for all fishing gear (Pálsson et al. 2015). Limited data are available on seal bycatch but data collected by on-board inspectors/observers of the Directorate of Fisheries, and in the MFRI gillnet survey, indicate that 1066 (CV = 1.20) harbour seals were by-caught in lumpfish fishery in 2015 and 160 (CV = 1.80) in 2014. Further, 46 (CV = 0.62) harbour seals were estimated as by-caught in cod gillnet fisheries in 2015, but none in 2014.

- Of the total 2,190 harbour seals estimated to have been caught in the gillnet fisheries for cod and lumpsucker in 2014, 2015 and 2016, the cod gillnet fishery is estimated to have caught just over 2%, while almost 98% of the bycatch was from the lumpsucker fishery.
- Moreover, 86 harbour seals were estimated to have been caught in bottom trawls in 2015.

Although the error margins for the by-catch estimates are very high due to limited observer coverage, and should be interpreted with caution, these total numbers correspond to 2-14.5% of the current harbour seal population size and are largely dependent upon lumpsucker fishery effort[288]. MFRI advised that direct hunt should be prevented and that actions must be taken to reduce bycatch of seals in commercial fisheries. MFRI also advices that a hunting management system should be initiated, and that reporting of all seal hunt should be mandatory[289].

[287] https://www.hafogvatn.is/static/extras/images/Landselur277.pdf
[288] https://www.hafogvatn.is/static/research/files/hv2017-009pdf
[289] https://www.hafogvatn.is/static/files/Veidiradgjof/tac-taflan_aukatillogur_jun17.pdf

**Grey seals interactions**

The Icelandic grey seal (*Halichoerus grypus*) population has decreased from an estimated 9000 animals in 1982 to 4200 animals in 2012. They are classified as Least Concern (population increasing) on the IUCN Red List[290]. To estimate the current status of the Icelandic grey seal population, a census was conducted during the pupping period in 2017 and analysis is currently ongoing. A project was initiated in October 2016 where five grey seal pups were tagged with satellite tags to map habitat use and the analysis is also ongoing. MFRI will release advice based on the management objectives set for grey seals in Iceland only after the grey seal population estimate has been finalized in 2018[291]. Zero gray seals were estimated to have been bycaught by the cod gillnet fishery between 2014 and 2016 (see table 1 of 2017 NAMMCO report[292], therefore the recent effects of this fishery on this species are considered negligible).

The NAMMCO working group on by-catch noted that grey seal estimates in the lumpsucker fishery are extremely high, arising from 3 observed events were 17, 16 and 12 grey seals were caught. Outside of those three events only one grey seal was observed among 57 observed hauls. Based on the latest population estimate of grey seals in Iceland, the estimated by-catch amount represents over 60% of the total population. The working group noted that the estimate is therefore considered inaccurate and requires further analysis. MFRI has undertaken some recent work to compare by-catch estimates in the lumpsucker gillnet fishery made using the existing method with alternative estimates stratified by management area, depth and month[293].

**Harp Seals interactions**

The harp seal (*Pagophilus groenlandicus*) population is found in three separate populations, each of which uses a specific breeding site. The western North Atlantic stock, which is the largest, is located off eastern Canada. A second stock breeds on the "West Ice" off eastern Greenland, which contributes to Icelandic individuals. The cod gillnet fleet appears to have some interactions with harp seals. 92 seals were caught in 2014, 212 in 2015 and 144 in 2016. There does not appear to be much information available specific to Iceland but the species is considered Least Concern in the IUCN Red List with increasing population, based on a 2015 assessment[294].

**Ringed and hooded seals**

The interaction between cod gillnet fisheries and ringed seals and hooded seals appear to be quite limited. 38 ringed seals (*Pusa hispida*) were caught in 2014 (none in 2015 and 2016), while 47 hooded seals (*Cystophora cristata*) where caught in 2015 (none in 2014 and 2016). Ringed seals are considered Least Concern[295] in the

[290] https://www.iucnredlist.org/species/9660/45226042
[291] https://nammco.no/wp-content/uploads/2018/01/2017-iceland_progress_report_final.pdf
[292] https://nammco.no/wp-content/uploads/2018/01/08-nammco-26-scientific-committee-report.pdf
[293] MRFI (2018b). By-catch of seabirds and marine mammals in lumpsucker gillnets 2014-2017. https://www.hafogvatn.is/static/files/skjol/techreport-bycatch-of-birds-and-marine-mammals-lumpsucker-en-final-draft.pdf
[294] https://www.iucnredlist.org/species/41671/45231087#conservation-actions
[295] https://www.iucnredlist.org/species/61382318/61382321

IUCN Red List (as well as being marked as non resident or breeding in Iceland), while hooded seals are considered Vulnerable in the IUCN Red List[296]. Hooded seal are native and resident to Canada, Greenland and Iceland, their current estimated population is 340,000 individuals and their population trend is unknown.

**Comparison to nearby fisheries - 2014-2017 marine mammal bycatch in the lumpsucker gillnet fishery**

Extrapolated estimates are available from MFRI monitoring for the lumpsucker fishery based on observations from 2014–2017[297]. These estimates are per year and are stratified by management area.

Estimated raised marine mammal bycatch in the lumpsucker fishery was 3102 (2016– 4188) animals (all mammal species), consisting of 1255 (728–1782) harbour seals, 1091 (502–1680) grey seals, 549 (264–834) harbour porpoises, 132 (15–249) harp seals, 33 (1– 65) ringed seals and 42 (12–72) bearded seals.

Given that most of the bycatch issues highlighted above are caused in gillnet fisheries, it is unlikely that the Icelandic (demersal trawl) golden redfish fishery is causing significant negative impacts on any of the species listed above.

**Seabirds bycatch**

The 2017 ICES Ecosystem Overview on the Icelandic Ecoregion reports that the main bycaught seabird species are northern fulmar *Fulmarus glacialis*, common murre *Uria aalge*, northern gannet *Sula bassana*, black guillemot *Cepphus grylle*, and common eider *Somateria mollissima*, all caught in bottom setnets. Bycatches in gillnets targeting cod have decreased, associated with a large decrease in effort[298]. Pallson et al. 2015[299] reported that among seabirds the estimated by-catch of the smallest stocks, black guillemot and cormorants, was of concern. They also highlighted that these estimates are based on limited data that needs to be increased and improved with a functioning reporting system for the fishery and better follow up.

Pálsson *et al*. (2015) used data from the annual MFRI cod gill net survey, which mimics fleet effort and represents approximately 2% of the total effort in the fishery, to assess by-catches of seabirds in gillnets (excluding the lumpsucker fishery). The study found that seabird by-catch in gillnets was made up of 13 species (see table below).

**Table 24.** Recorded numbers of sea birds in gill nets. a) MFRI cod gill net survey (SMN), sea birds 2009-2014 (Source: Pálsson *et al.*, 2015)

[296] https://www.iucnredlist.org/species/6204/45225150

[297] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGBYC/wgbyc_2018.pdf

[298] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Ecosystem_overview-Icelandic_Waters_ecoregion.pdf

[299] https://www.hafogvatn.is/static/research/files/fjolrit-178pdf

| Sjófuglar *Sea birds* | | a) Netarall *Gill net survey* | |
|---|---|---|---|
| Tegund *Species* | Vísindaheiti *Scientific name* | Fjöldi *Numbers* | % |
| Langvía *Common guillemot* | *Uria aalge* | 554 | 72,1 |
| Stuttnefja *Brunnich's guillemot* | *Uria lomvia* | 11 | 1,4 |
| Svartfugl ógr. *Guillemots* | *Alcidae* | 17 | 2,2 |
| Lundi *Puffin* | *Fratercula arctica* | 1 | 0,1 |
| Álka *Alk* | *Alca torda* | 4 | 0,5 |
| Teista *Black guillemot* | *Cepphus grylle* | 1 | 0,1 |
| Fýll *Fulmar* | *Fulmarus glacialis* | 144 | 18,8 |
| Súla *Northern gannet* | *Morus bassanus* | 24 | 3,1 |
| Æðarfugl *Eider* | *Somateria mollissima* | 8 | 1,0 |
| Himbrimi *Great northern diver* | *Gavia immer* | 0 | 0,0 |
| Lómur *Loom* | *Gavia stellata* | 1 | 0,1 |
| Skarfur ógr. *Cormorants* | *Phalacrocoracidae* | 0 | 0,0 |
| Hávella *Long-tailed duck* | *Clangula hyemalis* | 3 | 0,4 |
| Samtals | *Total* | 768 | 100,0 |

Pálsson *et al.*, (2015) did not record any observations of seabirds in the bottom or pelagic trawl fisheries.

**Comparison to nearby fisheries - 2014-2017 seabird bycatch in the lumpsucker fishery**

Extrapolated estimates are available from MFRI monitoring for the lumpsucker fishery based on observations from 2014–2017[300]. These estimates are per year and are stratified by management area.
Estimated raised seabird bycatch in the lumpsucker fishery was 7207 (4180–10 234) birds, consisting of 3232 (1616–4848) eider ducks, 1510 (695–2325) black guillemots, 1376 (372–2380) common guillemots, 813 (244–1382) cormorants/shags. 61 (1–122) long-tailed ducks, 59 (1–118) razorbills, and less than 50 Atlantic puffins, Black-legged Kittiwakes (*Rissa tridactyla*), Gannets and Common loons.

**Seabird status**

Based on Pallson et al. (2015), Common Guillemot (72% of encounters) and Northern diver (19% of encounters) were the species most frequently caught in the cod gillnet MFRI survey and likely to occur in those fisheries too. If the catch rate observed in the cod gill net survey was multiplied to total fleet effort this would represent about 0.66% and 0.03% of their respective populations. Information on these two species as well as others minor bycatch species listed is provided below.

**Northern fulmar**

The species is covered by the EU Birds Directive as a migratory species. In Europe it occurs within 29 marine Important Bird Areas, including in the Faroe Islands, France, Germany, Iceland, Svalbard (Norway) and the United Kingdom. Within the EU it is listed within 46 Special Protection Areas. Under the EU Marine Strategy Framework Directive it will be monitored for plastic ingestion. Mitigation measures have been developed to

300 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGBYC/wgbyc_2018.pdf

reduce bycatch of the species (Løkkeborg and Robertson 2002). Based on a 2018 BirdLife International assessment Northern Fulmar is categorised as Least Concern in the IUCN red list, with 7 million mature individuals and an increasing population trend[301].

**Common Guillemot and common Eider duck**

The 2018 report on marine mammal and seabird bycatch in the lumpsucker fishery from 2014-2017 [302] highlights that "the population estimates of eider and common guillemots suggest that the populations are large and stable (Skarphéðinsson et al. 2016), and bycatch is therefore unlikely to have any effect on the total populations".

Common Guillemot (*Uria aalge*) is found on Annex I of the EU Birds Directive. With the implementation of bird protection laws, a slow recovery occurred over much of the Atlantic breeding range up to the early 1970s except in north Norway, the Faeroes and probably Iceland (Nettleship et al. 2018). At major colonies, detailed monitoring is needed, particularly in Iceland, which suffered a large decline post-2005 (Nettleship et al. 2018). In 2018, this species is categorised as Least Concern in the IUCN Red List with increasing population. The European population is estimated at 2,350,000-3,060,000 mature individuals (BirdLife International 2015). [303]

Common Eider (*Somateria mollissima*) is listed in the EU Birds Directive Annex II and III. CMS Appendix II. Changes to hunting regulations in Greenland in 2001 shortened the length of the hunting season which is thought to have led to a rapid increase in population size (Burnham et al. 2012). However the hunting regulations have recently changed and the effect on the population is not yet known. Restrictions were also introduced in Denmark in 2004/2005 and 2011/2012 with the aim of reducing the proportion of female birds killed and increasing the population growth rate (Christensen and Hounisen 2014). In 2018, this species is categorised as Near Threatened in the IUCN Red List with an unknown population trend[304].

**Northern Gannet**

Northern Gannet (*Morus bassanus*) is listed on the African Eurasian Waterbird Agreement. It is covered by the EU Birds Directive as a regularly occurring migratory species. In Europe it is currently listed within 34 marine Important Bird Areas. Within the EU, it is currently listed within nine Special Protection Areas. In 2018, this species is categorised as Least Concern in the IUCN Red List with an increasing population trend ranging between 1.5 and 1.8 million mature individuals[305].

**Thick-billed Murre (also called Brunnich's Guillemot)**

[301] https://www.iucnredlist.org/species/22697866/132609419#conservation-actions
[302] https://www.hafogvatn.is/static/files/skjol/techreport-bycatch-of-birds-and-marine-mammals-lumpsucker-en-final-draft.pdf
[303] https://www.iucnredlist.org/species/22694841/132577296#conservation-actions
[304] https://www.iucnredlist.org/species/22680405/132525971#conservation-actions
[305] https://www.iucnredlist.org/species/22696657/132587285#conservation-actions

There are no known current conservation measures for the thick-billed murre (*Uria lomvia*) within its European range. Enhanced monitoring of major colonies is needed, particularly in Iceland, Spitsbergen and the Russian Arctic, where population size and status are inadequately known. Detailed assessment of impacts of overfishing by commercial fisheries is required, particularly of capelin, cod, herring and sand eels in the Barents Sea and Iceland. In 2018, this species is categorised as Least Concern in the IUCN Red List with an increasing population trend. The European population is estimated at 1,920,000-2,840,000 mature individuals (BirdLife International 2015)[306].

**Atlantic Puffin**

Atlantic puffin (*Fratercula arctica)* is listed under the African Eurasian Waterbird Agreement. It is included in the Action Plan for Seabirds in Western-Nordic Areas (TemaNord 2010). There are 76 marine Important Bird Areas identified across the European region. Within the EU there are 40 Special Protection Areas which list this species as occurring within its boundaries. In 2018, this species is categorised as Vulnerable in the IUCN Red List with a decreasing population trend. The European population is estimated to be 4,770,000-5,780,000 pairs, which equates to 9,550,000-11,600,000 mature individuals (BirdLife International 2015)[307].

**Common loon or great northern diver**

The great northern diver (Gavia immer) is listed under Appendix II of the Convention on Migratory Species and under the African Eurasian Waterbird Agreement. It is listed in Article I under the EU Birds Directive. In Europe, it occurs in 20 Important Bird and Biodiversity Areas (IBAs), including in Iceland, Norway (Svalbard and mainland Norway), Ireland, the United Kingdom and in Spain. It is a listed species in 83 Special Protection Areas in the EU Natura 2000 network. In 2018, this species is categorised as Least Concern in the IUCN Red List with a stable population trend. Wetlands International (2016) estimated the population at 612,000-640,000 individuals. In Europe the breeding population is estimated at 700-1,300 pairs, which equates to 1,400-2,600 mature individuals (BirdLife International 2015).[308]

**Razorbill**

Razorbill (*Alca torda*) is listed on the African-Eurasian Waterbird Agreement. There are 91 Important Bird Areas across the region for this species. Within the EU there are 91 Special Protected Areas for this species, recognised as a regularly occurring migratory species. The species is considered in the Nordic Action Plan for seabirds in Western-Nordic areas (TemaNord 2010). In 2018, this species is categorised as Near Threathened in the IUCN Red List with a decreasing population trend. The European population is estimated at 979,000-1,020,000 mature individuals (BirdLife International 2015). Although a number of populations are increasing within Europe, a recent sharp decline was observed in Iceland (where more than 60% of the European population is found) since 2005 (BirdLife International 2015). Two comprehensive surveys of the species in Iceland suggest

[306] https://www.iucnredlist.org/species/22694847/132066134
[307] https://www.iucnredlist.org/species/22694927/132581443#conservation-actions
[308] https://www.iucnredlist.org/species/22697842/132607418#conservation-actions

that the population declined by 18% between 1983-1986 (Gardarsson 1995) and 2005-2009 (Gardarsson et al. in press) from 378,000 pairs to 313,000 pairs. However, more frequent monitoring of a subset of colonies (every five years) between 1985 and 2005 suggests the population decline only started in 2005 and prior to this the population was stable, demonstrating that the decline has been much more rapid. Evidence of a very rapid decline in the Icelandic population is supported by data from the largest colony of this species in the world, Látrabjarg, which declined by 45% in only three years (160,000 pairs in 2006 to 89,000 pairs in 2009) (G. Gudmundsson in litt. 2015). The 2005 decline occurred around the same time that sandeel stocks crashed around Iceland, suggesting that a lack of food may have influenced the decline (Gardarsson et al. in press). As a result of the reported decline in Iceland, the estimated and projected rate of decline of the European population size over the period 2005-2046 (three generations) is 25-29%[309].

**Great Cormorants**

Great Cormorant (*Phalacrocorax carbo*) is listed under the African Eurasian Waterbird Agreement. Within its European range the species occurs in 242 Important Bird Areas. Within the EU it is listed in 245 Special Protection Areas. In 2018 it was categorised as Least Concern in the IUCN Red List with an increasing population trend. The European population is estimated at 401,000-512,000 pairs, which equates to 803,000-1,020,000 mature individuals (BirdLife International 2015)[310].

**Black guillemots**

The 2018 lumpsucker bycatch report reported that "population of black guillemots (*Cepphus grille)* has been declining since the 1980s, and the population is currently estimated at around 20-30.000 birds (Skarphéðinsson et al. 2016)." Hunting of the species was banned in 2017 due to poor population status, and further research needs into whether bycatch in the lumpsucker gillnets could be affecting the population was highlighted.

The species is listed within the African Eurasian Waterbird Agreement. There are 91 marine Important Bird Areas which include this species in Europe. Within the EU, the species is listed within 29 Special Protection Areas. It is listed as Near Threatened by the HELCOM Convention. In 2018, this species is categorised as Least Concern in the IUCN Red List with an unknown population trend and a mature individuals range between 400 thousand and 1.5 million[311].

**Black legged kittiwake**

The black legged kittiwake (*Rissa tridactyla*) species is listed under the African-Eurasian Waterbird Agreement, but is not listed on the Bern Convention, the Convention of Migratory Species or on the EU Birds Directive Annexes. Population monitoring occurs across much of its breeding range, including Greenland, Norway (Anker-Nilssen et al. 2007), Iceland (Garðarsson 2006) France and the U.K. The species is considered within the Nordic Action Plan for Seabirds and is classified as Vulnerable (population trend decreasing) in the IUCN Redlist. The

[309] https://www.iucnredlist.org/species/22694852/131932615#population
[310] https://www.iucnredlist.org/species/22696792/132592923#population
[311] https://www.iucnredlist.org/species/22694861/132577878#conservation-actions

European population is estimated at 1,730,000-2,200,000 pairs, which equates to 3,460,000-4,410,000 mature individuals (BirdLife International 2015)[312].

**Long tailed duck**

Long-tailed duck (*Clangula hyemalis*) is listed under the CMS Appendix II and the EU Birds Directive Annex II. Some of the species' habitat is protected. Efforts are on-going to monitor populations of this species in many parts of its range. The AEWA Action Plan adopted in 2015. Working group to oversee implementation is in process of being established. New coordinated survey of Baltic areas was conducted in January 2016 (results expected in 2017), plus development of other surveys, demographic monitoring and migration studies. Some new restrictions on hunting have been introduced recently. Actions to reduce bycatch are ongoing in several countries. Various protected areas have been implemented recently, especially marine SPAs for wintering birds. In 2018 it was categorised as Vulnerable in the IUCN Red List with a decreasing population trend. The global population is estimated to number 3,200,000 to 3,750,000 individuals (Wetlands International 2017). Surveys of the wintering population in the Baltic sea indicate that the species has undergone a precipitous decline there, from c.4,272,000 individuals in 1992-1993 to c.1,486,000 individuals in 2007-2009 (Skov et al. 2011). There is considerable uncertainty over the trends of smaller populations in Europe outside the Baltic sea, in Greenland and Iceland and East Siberia and North America, rendering the estimation of its global trend very difficult. The European wintering population is estimated to be declining by 30-49% (BirdLife International 2015). However, the overall rate of decline is likely to approach 50% over three generations (27 years), from 1993 until 2020[313].

A similar analysis to that done on lumpsucker fishery bycatch in 2014-17 is in the works for the cod gillnets fishery and should be published in 2019 (MFRI, personal communication during site visits).

Given that most of the bycatch issues highlighted above are caused in gillnet fisheries, it is unlikely that the Icelandic (demersal trawl) golden redfish fishery is causing significant negative impacts on any of the species listed above.

**Bycatch data from the lumpsucker fishery and applicability to other fisheries**

Of relevance to the fishery under assessment, the 2018 report on marine mammal and seabird bycatch in the lumpsucker fishery during 2014-2017 highlights that although reported bycatch in E-logbooks by the fleet has increased (suggesting better compliance with reporting requirements) the overall bycatch rates are still much lower than observed in the trips by inspectors. Overall, the marine mammal and seabird bycatch rate during inspector trips was around four times higher than reported by the fleet in 2017, which showed the need to use other data in addition to the log books. This difference also warrants an investigation into why fishermen do no report bycatch, and how reporting can be made easier. It is not clear how representative this compliance rate is of other Icelandic fisheries such as cod, haddock, saithe and redfish.

[312] https://www.iucnredlist.org/species/22694497/132556442#conservation-actions
[313] https://www.iucnredlist.org/species/22680427/132528200#population

The North Atlantic Marine Mammal Commission (NAMMCO) Scientific Committee Working Group on By-catch noted, in relation to by-catch data from the Iceland lumpsucker gillnet fishery, that logbooks do not provide a reliable source of data to use for estimating by-catch and strongly recommended that logbooks are not used for calculating/assuming by-catch rates, but only used as indicators for raising concerns when by-catch reporting is increasing[314].

A smartphone app is in development by the Directorate of Fisheries, which hopefully will make both reporting and identification of bycatch easier for operators in the fishery.

Overall, bycatch of seabirds and marine mammals in the major gear used to target golden redfish (i.e. bottom trawls) and the effect of this fishery on these animals is not considered to be significant.

**Icelandic Committee for Consultation on Responsible Management of Living Marine Resources**

The Icelandic ministry of Industry and Innovation has recently created (i.e. November 2018) a Committee for Consultation on Responsible Management of Living Marine Resources to address matters concerning bycatches in the gillnet fisheries for lumpfish and cod. The document is shown below.

[314] NAMMCO (2018). Report of the NAMMCO Scientific Working Group on By-catch https://nammco.no/wp-content/uploads/2018/05/report-nammco-sc-bycwg-04042018.pdf

Samstarfsnefnd um bætta umgengni um auðlindir sjávar
Kristján Þórarinsson, formaður

Borgartúni 35
105 Reykjavík

ATVINNUVEGA- OG NÝSKÖPUNARRÁÐUNEYTIÐ

*Ministry of Industries and Innovation*

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

Reykjavík November 27, 2018
Reference: ANR18030330/11.02.09

Subject: Chariman of the Committee for Consultation on Responsible Management of Living Marine Resources

The Minister of Fisheries has appointed Dr. Kristján Thorarinsson as the chairman of The Committee for Consultation on Responsible Management of Living Marine Resources.

The committee comprises of individuals from main stakeholder organizations in the fishing industry as well as The Marine and Freshwater Institute, The Directorate of Fisheries and The Ministry of Fisheries.

The committee has been tasked by the Minister of Fisheries to address matters concerning bycatches of seabirds and marine mammals in gillnet fisheries in Iceland (lumpfish and codfish).
It has the task of addressing data recording, data availability and reliability as well as possible management measures to reduce bycatch of these species.

On behalf of the Minister of Fisheries and Agriculture

Jóhann Guðmundsson
Director General Department of Fisheries and Aquaculture

**Discards**

Since 1996, discarding in Icelandic fisheries is prohibited and subject to penalty[315] (ISK 400,000 to 8,000,000 or about EUR 3,000 to 60,000). In a practical sense, if vessels do not have sufficient quota to cover the species they have caught they are required to attain quota through the quota transfer system. Consequently if vessels do not have sufficient catch quotas for their probable catches they must suspend all fishing activities; this means that under the ITQ system, the discard policy primarily affects the composition of landings and not the aggregate volume. Redfish discards are assumed to be negligible (MFRI, site visit meeting on the 27th November 2018, personal communication). Discards are not accounted for in the stock assessment process.

**VS catches to allow flexibility in discard ban measures**

One feature of the discard ban is the inbuilt flexibility, as any 5% of demersal catches from a fishing trip (called VS catch), irrespective of fish species or size, may be excluded from quota restriction (which means that VS catches are additional to the TAC).

Article 9 Regulation no. 698/2012 on fishing for commercial fishing year 2012/2013 states that:
"The master may decide that part of the catch is not calculated on the vessel's catch quota. This authorization is limited to 0.5% of pelagic catch and 5% of other catches by the relevant vessels during the fishing year and is subject to the following conditions:
a. The catch is kept separately from the other catch of the ship and it is weighed and registered separately.
b. The catch is sold at auction in an approved auction market for seafood, and its proceeds flow to the Fisheries Fund, cf. law no. 37/1992, with subsequent amendments.
c. The license is divided into four three-month periods during the fishing year. Unused sources may not be transferred between the periods[316].

On sale of VS catches in public fish markets, 20% of the revenue generated is paid to the vessel with the remaining 80% going to a designated research and development fund (the VS fund, under the auspices of the Ministry). A maximum of 20% return on VS catches means that there are limited incentives for fishermen to land such catches. However, having the VS catch provisions within the fisheries management system allows the flexibility for vessels to land small catches which are outside their specific quota, and preventing discard. VS catches of golden redfish in 2017/2018 totalled 36 t[317].

[315] Act concerning the Treatment of Commercial Marine Stocks No. 57-1996: https://www.althingi.is/altext/pdf/131/s/0982.pdf

[316] http://www.fiskistofa.is/veidar/aflastada/vs-afli/vsafli.jsp
[317] http://www.fiskistofa.is/veidar/aflastada/vs-afli/vsafli.jsp

**Fisheries effects on the habitat (by bottom gears)**

The Icelandic groundfish fishery is multispecies in nature with vessels simultaneously targeting numerous species; as such the effects of bottom contact fishing gears are not separable by species and thus are generally attributed to the fishery as a whole rather than to any species in particular. Interactions between fishing gears and the seabed are highly dependent on gear type with towed bottom gears such as demersal trawls and dredges having a greater impact than static gear such as longlines, set nets or pots. Of the total catch of golden redfish by the Icelandic fleet in recent years, the following gear types were responsible for:

| Golden redfish catches | | Bottom Trawl | Longline | Nephrops trawl | Other Gear |
|---|---|---|---|---|---|
| 2017[318] | 56,101 t | 92% | 2% | 4% | 2% |
| 2016[319] | 59,698 t | 93.1% | 2.4% | 3% | 1.5% |
| 2015[320] | 51,700 t | 91.5% | 3.1% | 3.5% | 1.9% |
| | **Average** | **92.2%** | **2.5%** | **3.5%** | **1.8%** |

The remainder of the catches (i.e. other gear) was taken by gillnets (also reported in the 2018 NWWG report as a gear responsible for some redfish bycatch, together with longline and Nephrops trawl), as well as Danish seines, pelagic trawls, handlines, and shrimp trawls.

Potential habitat effects of the Golden redfish fishery can therefore be attributed to bottom trawling first and to Nephrops trawling to a lesser degree.

**Trawling distribution and effort[321]**

**Main habitat type in the Icelandic marine ecosystem**

Different oceanic conditions north and south of Iceland have a major impact on the distribution patterns of marine habitats, and the Greenland-Scotland Ridge acts as a barrier to the spread of species. The main substrates around Iceland are clay, sand, gravel and lava. These are shown in the figure below.

[318] https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf
[319] https://www.hafogvatn.is/static/extras/images/Gullkarfi265.pdf
[320] http://www.hafro.is/Astand/2016/gullkarfi_2016.pdf
[321] https://www.hafogvatn.is/static/files/Veidiradgjof/2018/vistkerfi_2018.pdf

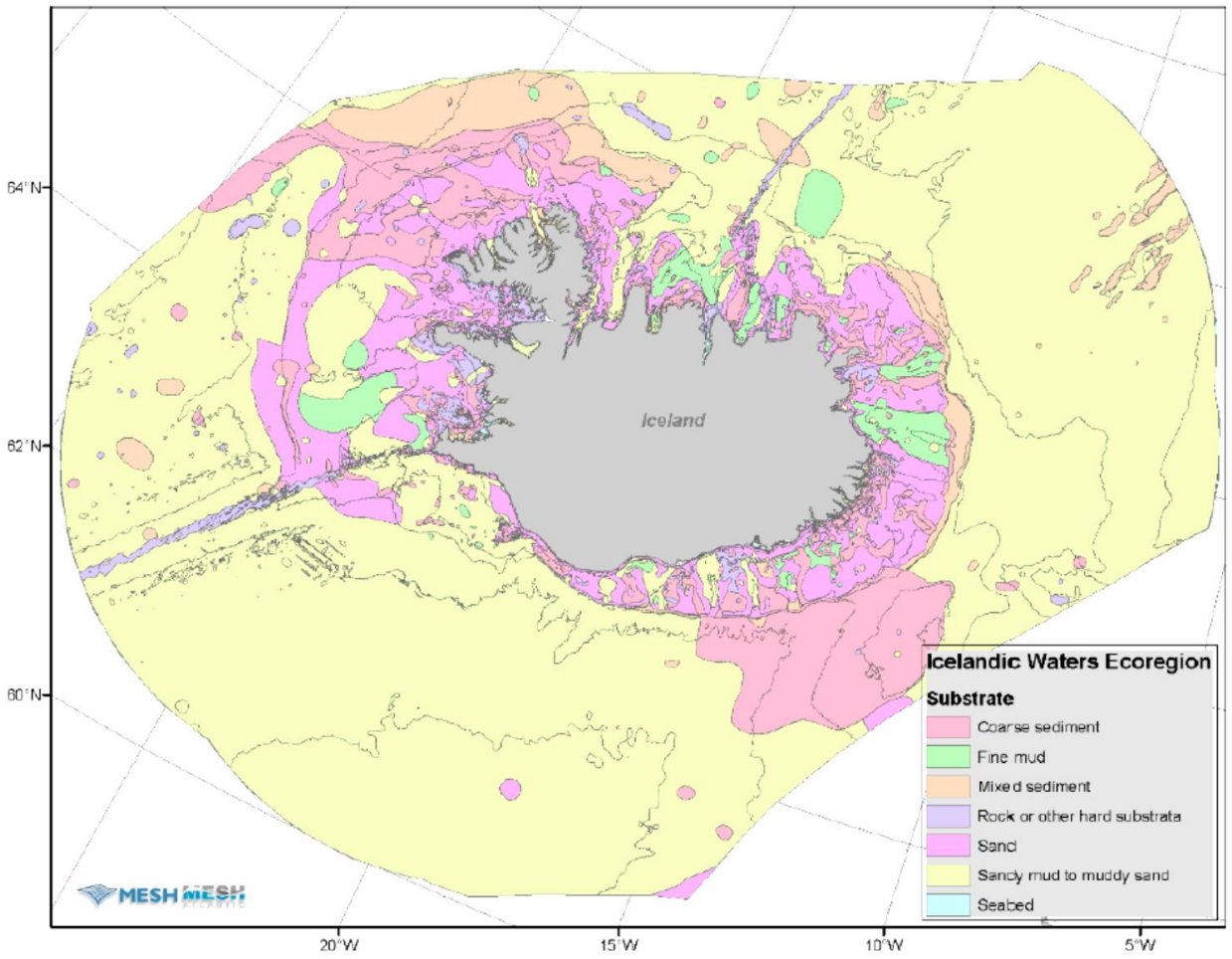
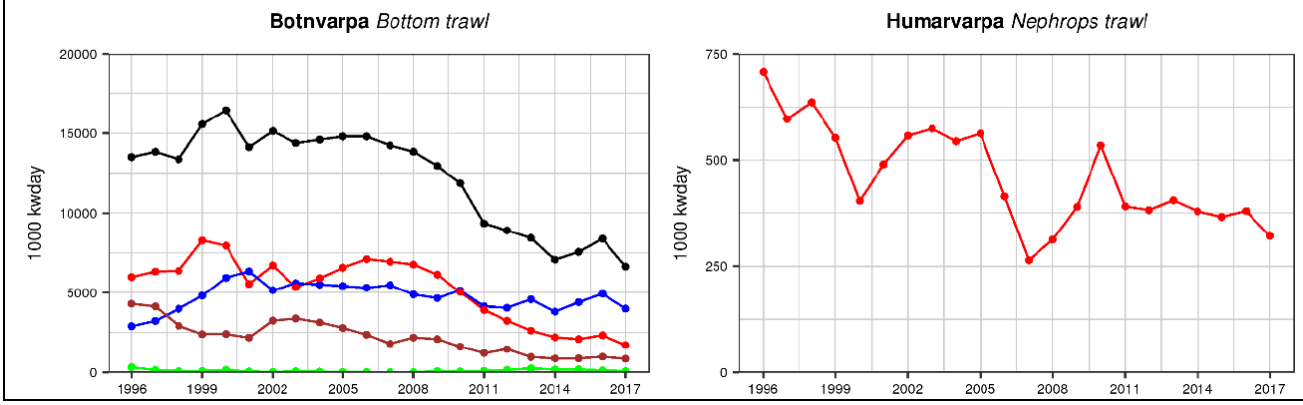



**Figure 53.** Major substrates in the Icelandic Waters ecoregion (compiled by EMODnet Seabed Habitats; www.emodnet-seabedhabitats.eu).

**Trawl Spatial Distribution and Effort in Icelandic waters by gear type and region (i.e. North/South, Shelf/Deep)**



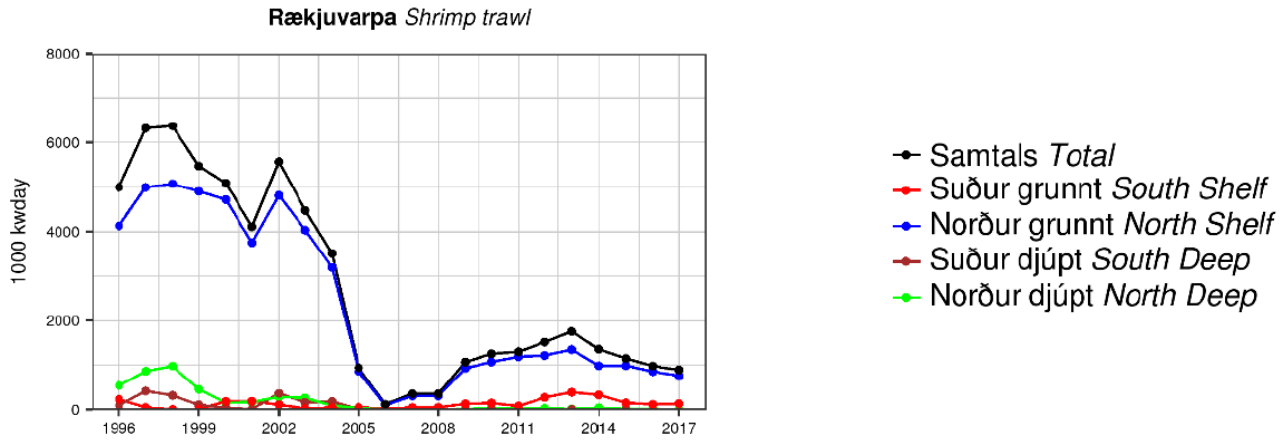



**Figure 54.** Annual total bottom-trawl fishing effort (1000 kW days) based on logbooks from trawl fisheries targeting a) demersal fish, b) Norway lobster and c) shrimp in the Icelandic ecoregion from 1996 to 2017. Bottom trawl effort in 2017 is about 50% of what it was in 2007.

**Bottom Trawl footprint in Iceland**

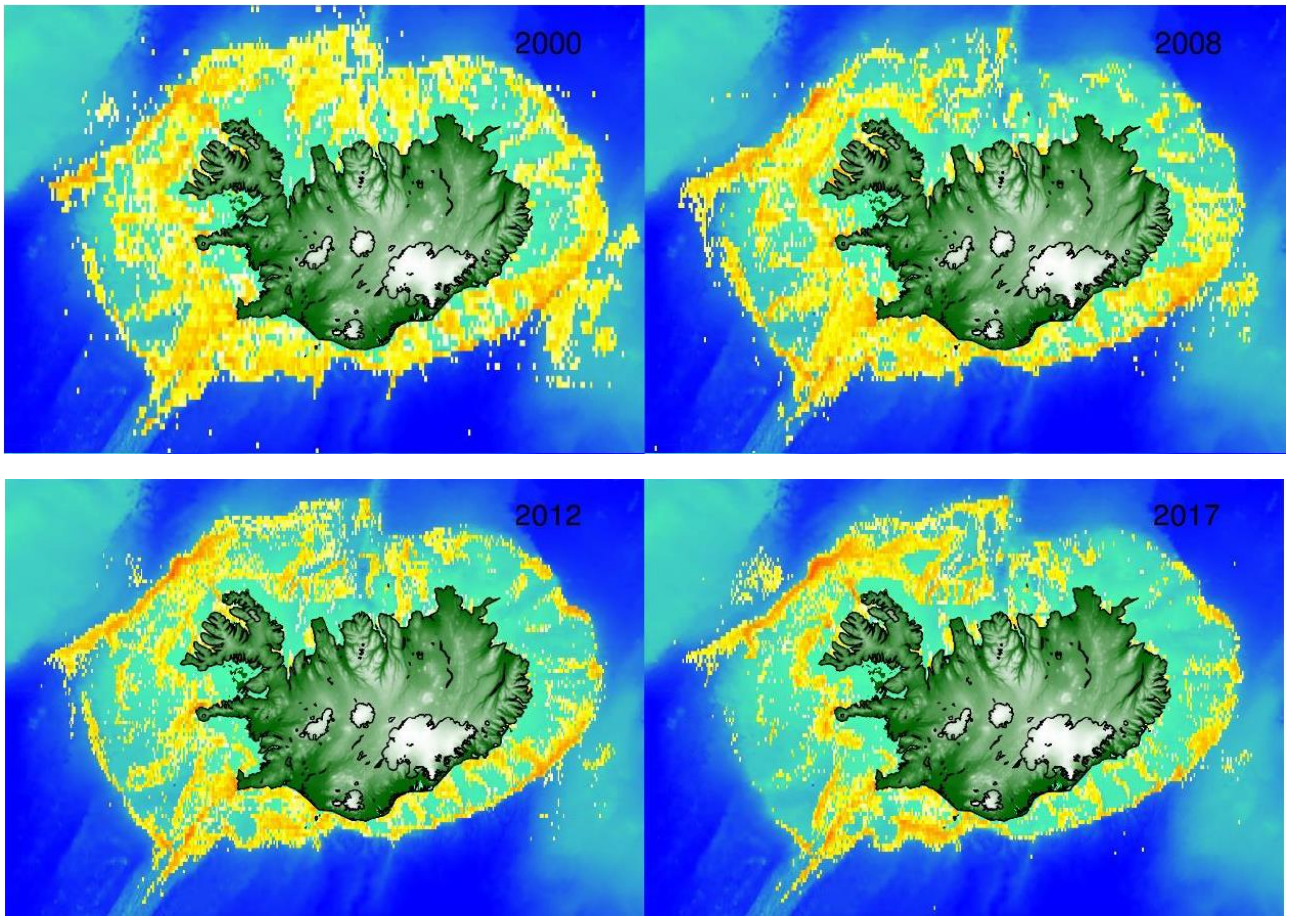



**Figure 55.** Spatial distribution of bottom-trawl effort (1000 kW) days based on logbooks from trawl fisheries in 2000, 2008, 2012 and 2017, targeting demersal fish, shrimp and Norway lobster.

**Effects of bottom trawling**

The main abrasive pressure in the Icelandic Waters ecoregion is caused by mobile bottom-fishing gears targeting demersal fish, shrimp, and Norway lobster *Nephrops norvegicus*.

The 2017 ICES Report on the Icelandic Ecoregion Ecosystem[322] highlights that based on analysis of electronic logbook data a total area of about 79 000 $km^2$ was fished with towed bottom-fishing gears in 2013 in Iceland, composing 10% of the ecoregion. The total fishing effort by bottom trawls targeting fish and shrimp has decreased by around 40% in 2000–2014; in the same period the *Nephrops* trawling effort remained at the same level, although limited. The decrease in fishing effort varied locally, with decreases mainly being noted on the southern shelf and at typical shrimp trawling grounds on the northern shelf.

Within the ecoregion, abrasion caused by bottom trawls has been shown to impact fragile three-dimensional biogenic habitats in particular (e.g. sponge aggregations, coral gardens, and coral reefs), with impacts happening mainly in deeper waters ( > 200 m). Effects of bottom trawling on soft substrates in shallow waters have been shown to be minor. Other impacts involve overturning boulders, scouring the seabed, and direct removal of and/or damage to epifaunal organisms. Effects on large emergent epifauna are more significant than on smaller encrusting organisms with areas subject to regular hydrodynamic disturbance, such as winter storms in shallower areas also being more naturally resilient to fishing disturbance.

Based on recent data from the MFRI Ecosystem Overview report[323] it is possible to see that bottom trawl effort has decreased from 2013 (just above 150 thous. hours) to 2017 (to about 125 thous. hours) by about 17%. Although bottom trawl effort does not necessarily equate to trawled area it is possible that an area less than 10% of the Iceland ecoregion was disturbed by bottom trawls in 2017.

During the Nov. 2018 site visits HB Grandi stated that all of their trawlers (4 wetfish and 2 freezer trawlers), as well other trawlers in the industry[324], use pelagic flying doors because they do not drag on the seafloor and more importantly, because they save on fuel costs and decrease gear damage. Common use of “T90 bottom trawls” (30% lesser net) with pelagic doors (not dragged on the bottom) in Iceland[325], has resulted in considerable fuel savings without sacrificing fishing efficiency. Bottom trawlers in Iceland are also reported to use rock hoppers.

**Protection of Vulnerable Marine Ecosystems (VMEs)**

It is the policy of the Icelandic government to protect vulnerable marine ecosystems (VMEs; sponge communities, coldwater corals and hydrothermal vents), from significant adverse impact from bottom contacting gear. Large areas within the Icelandic EEZ are closed, either temporarily or permanently, to fishing

[322] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Ecosystem_overview-Icelandic_Waters_ecoregion.pdf
[323] https://www.hafogvatn.is/static/files/Veidiradgjof/vistkerfi.pdf
[324] http://www.hampidjan.is/news/news-article/clear-advantages-of-flying-doors
[325] https://www.government.is/topics/business-and-industry/fisheries-in-iceland/fisheries-management/

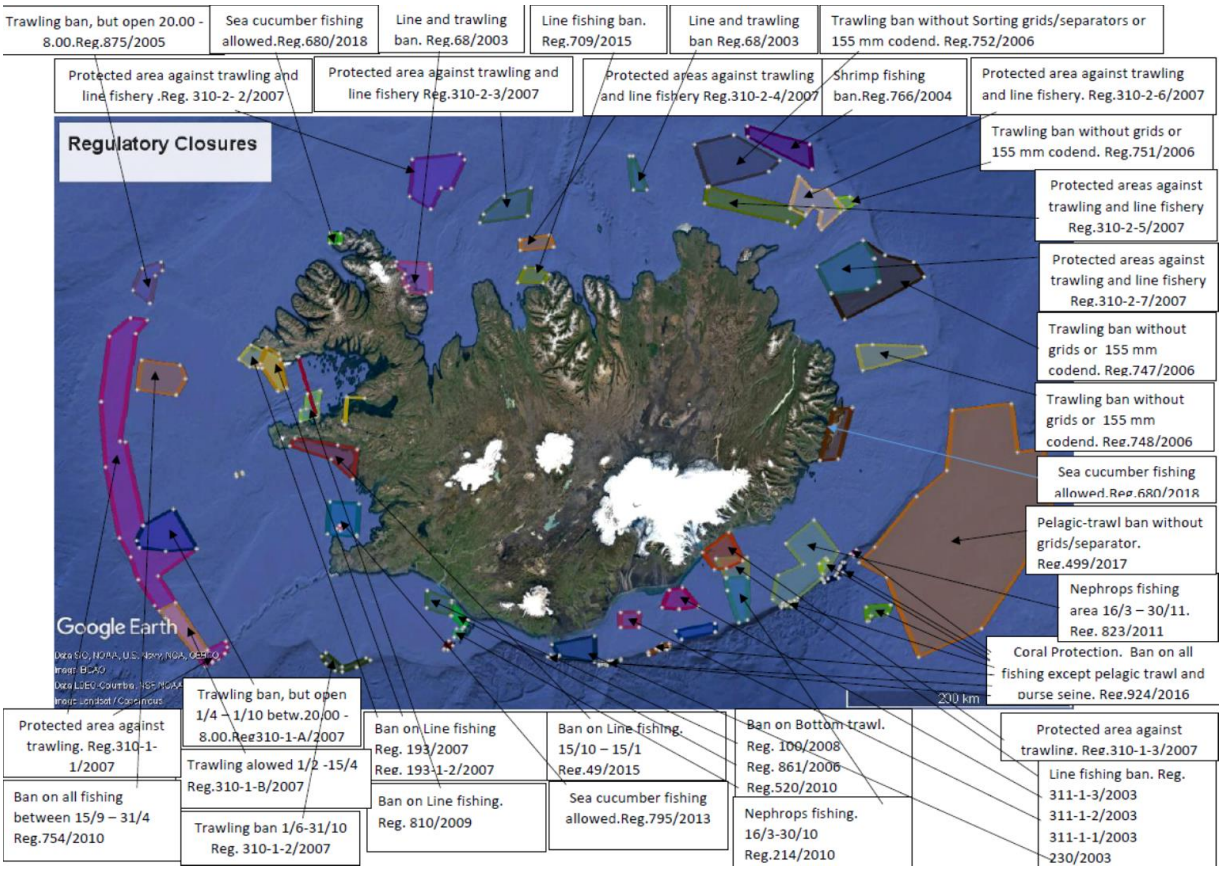
  

for a variety of reasons; these include the protection of juveniles, spawning fish and VMEs. Cumulatively, a large portion of Icelandic shelf area within which fishing activities occur is closed to bottom trawling. Furthermore, not all the fishable shelf areas outside closed areas are trawlable, as some parts of the seabed are unsuitable for trawl gear.

**Closures**

The use of bottom trawl and pelagic trawl is not permitted inside a 12-mile limit measured from low-water line along the northern coast of Iceland. Similar restrictions are implemented elsewhere based on engine size and size of vessels[326]. Off Northwest and North coast of Iceland, fishing by bottom trawl, midwater trawl and Danish seine is not allowed within 12 miles from a line drawn across the mouth of fjords and bays. Off the East, South and West coast, bottom trawling is permitted according to vessel size and engine power, with larger vessels (over 42 m) not having access within 12 miles, but the smaller vessels (less than 29 m) in some areas up to 4 miles. These openings are both area - and time based[327]. The ships are divided into 3 groups depending on their length and power.

These closures, in particular those of a permanent nature, provide wider ecological benefits over and above their intended fisheries management objective by offering *de facto* protection from fishing activity to other elements of the marine environment. Please see the map below indicating most of the current closures in Icelandic waters.




[326] https://www.government.is/news/article/?newsid=e747dac7-fb88-11e7-9423-005056bc4d74

[327] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/domsmalaraduneyti/nr/1154

**Figure 56.** Regulatory Closures in Icelandic waters as of November 2018. The long purple trawl closures in the South West of Iceland were originally designed to protect golden redfish juveniles, and were originally set up in the early 1990s[328]

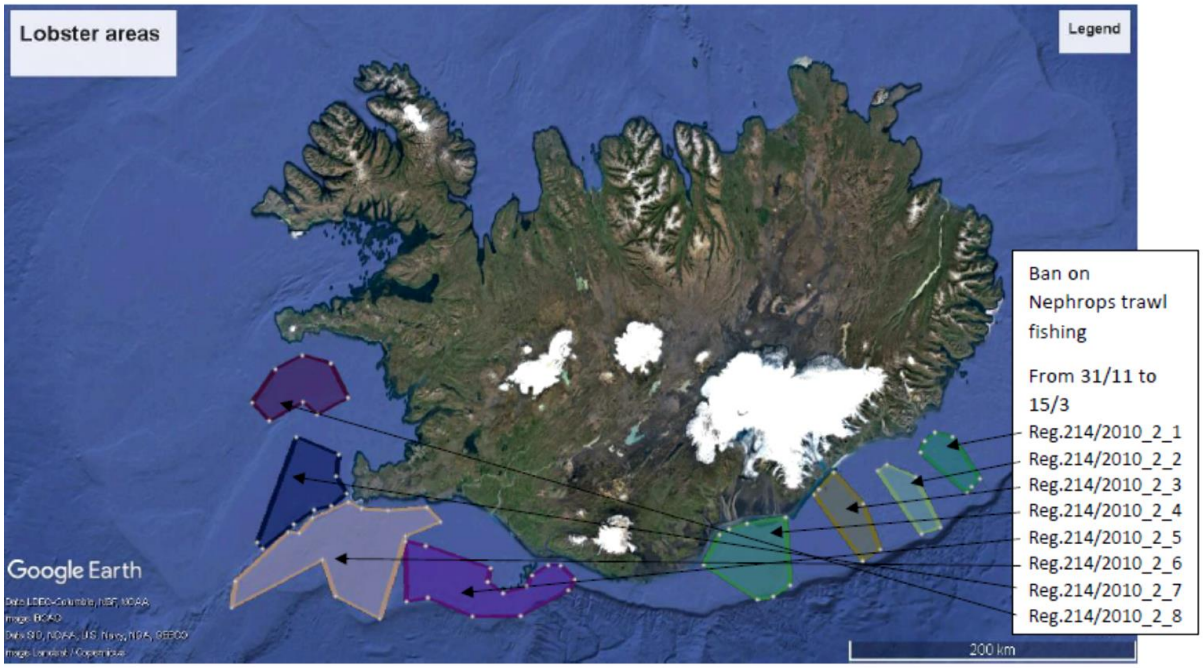



**Figure 57.** Temporary Nephrops fishing Closures in Icelandic waters as of November 2018.

**Benthic organisms**

The database of the BIOICE programme provides information on the spatial distribution of benthic organisms within the Icelandic territorial waters based on samples collected from 579 locations, including horny corals (*Gorgonacea)* and seapens (*Pennatulacea*) that are considered sensitive to fishing[329].

**Seabed Mapping**

In a long-term mapping project, albeit opportunistic in nature, the MFRI collects data to describe habitat types and ecosystems of the sea-floor around Iceland, including VME's. The data is collected with underwater cameras with high spatial accuracy. Benthic fauna and sediment are also recorded. Vulnerable habitats according to FAO, OSPAR and ICES, are identified when observed (MFRI, site visits Nov. 2018, pers. comm).

[328] https://www.hafogvatn.is/static/research/files/fjolrit-133pdf

[329] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Sec%2007%20Overview%20on%20Ecosystem,%20fisheries%20and%20their%20management%20in%20Icelandic%20waters.pdf

Seabed mapping is a key aspect of this policy and is the remit of the MFRI. During the summer of 2017 a 9 day habitat mapping cruise was conducted including a total 61 dives in four areas[330]. The combination of data relating to the distribution of sensitive habitats and fishing effort is important in order to predict species and habitats at risk from fishing activity. MFRI is currently participating in the Norwegian Institute of Marine Research-led NovasArc project, together with the Faroe Marine Research Institute[331]. The three year project running from 2016-2018 aims to map the distribution of VMEs in Arctic and Sub-Arctic waters including those around Iceland. It also aims to map the distribution of commercial fisheries and other human activities and identify possible conflict areas. The most recent meeting was in Tórshavn, Faroes on November 20-24, 2017. The key task for the workshop was to develop and test the analysis chain for the VME/impact analysis including:

- Making a habitat suitability model for one or two VMEs based on observations of occurrence and available abiotic setting e.g. temperature, substratum, current, topography. An example of the model output is shown in the figure below**Error! Reference source not found.**.
- Produce a VME distribution map for the larger study area based on the habitat suitability model and environmental settings.
- Produce fishing pressure map based on trawling data for the larger area.
- Making impact estimates based on GIS analysis of overlap between the VME distribution and fishing intensity.

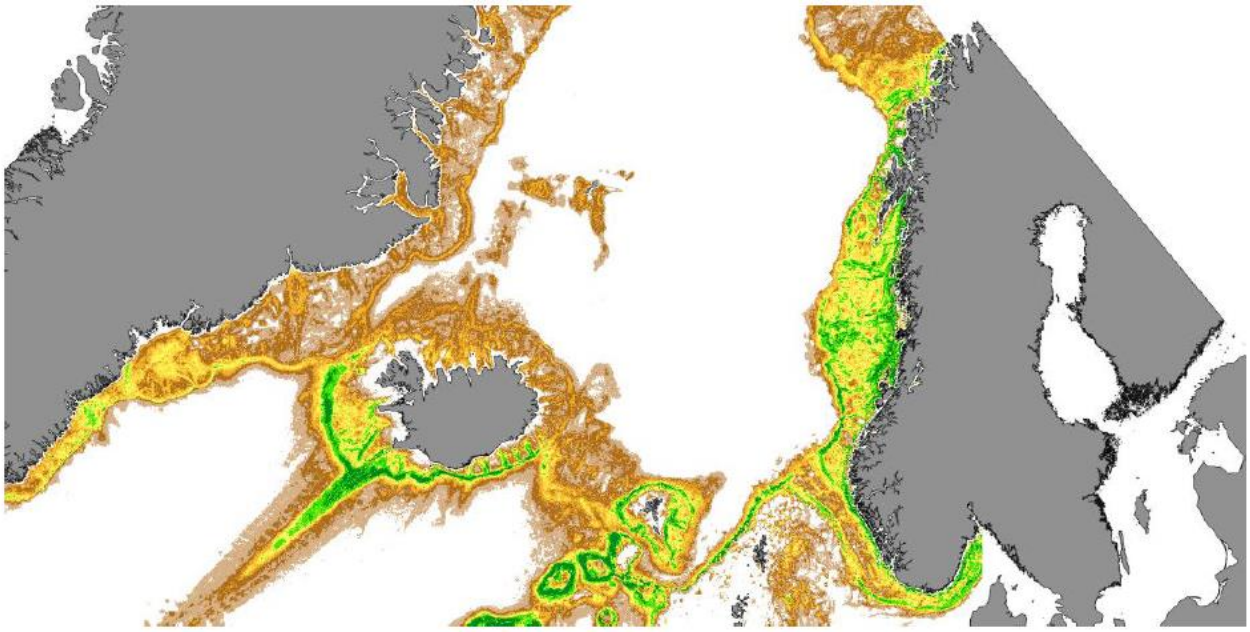


**Figure 58.** Distribution of the VME shallow sea pen based on first test run of the habitat suitability model. Green is 1 and white is zero probability of occurrence (Source: Report of NovasArc workshop, Tórshavn, Faroes, November 20-24, 2017[332]).

[330] https://hafsbotninn.wordpress.com
[331] http://novasarc.hafogvatn.is/
[332] http://novasarc.hafogvatn.is/docs/NovasArc_report_workshop_4.pdf

**Benthos recording in annual MFRI Survey**

Benthos (e.g. sponges, starfish, jellyfish, crabs, tunicates, bivalves, etc..) bycatch is recorded in the annual MFRI ground fish survey by identifying the species, measuring weight to track biodiversity and biomass over time. Further information on VMEs management is provided below.

**Sponge communities**

Aggregation of large sponges (ostur or sponge grounds) is known to occur off Iceland (Klittgard and Tendal 2004). North of Iceland, particularly in the Denmark Strait, ostur was found at several locations at depths of 300-750 m, which some are classified as sponge grounds. Significant ostur and sponge grounds occur off south Iceland, especially around the Reykjanes Ridge[333].

Bycatch of sponges are recorded during annual groundfish surveys allowing managers to estimate the distribution of mass sponge occurrences. Deep-sea sponges fall within the VME habitat category. Suggestions for conservation of deep-sea sponge aggregations by the MFRI will be based on research measurements. Likely areas will be mapped and evaluated prior to conservation suggestions (MFRI, Nov. 2018 site visits, pers. comm.).

Currently, there are no strategic conservation plans in place for sponges; however, there are a number of different closures which while not designed specifically for the protection of sponge communities, provide *de facto* protection for benthic organisms including sponges. These include:

1. Closure of coastal areas within 4 – 12 nm to bottom trawls.
2. Several permanent regulatory fisheries closures outside of 12nm in which otter trawls, and in most cases long-lines, are banned.
3. Cold water coral protection areas, some of which have considerable abundance of sponges.

**Sea-pen fields**

In some locations with soft sediments sea pens can be found in high densities. Norway lobster *Nephrops norvegicus*, squat lobster *Munida sarsi* and sea cucumber *Stichopus tremulus* are commonly associated with them. Like sponges there are no strategic conservation plans in place for sea-pen communities; however, they derive de facto protection from other closures[334].

**Cold water coral communities**

The coral water coral closures protect *Lophelia pertusa,* a species of cold-water coral which is extremely slow growing, associated with diverse communities and may be harmed by destructive fishing practices. In 2004 a research project mapped coral areas off Iceland and as a result 10 areas in to the southeast of Iceland were permanently closed to fishing.

[333] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2005/may/Iceland%20and%20East%20Greenland.pdf
[334] http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2017/WGDEC/wgdec_2017.pdf

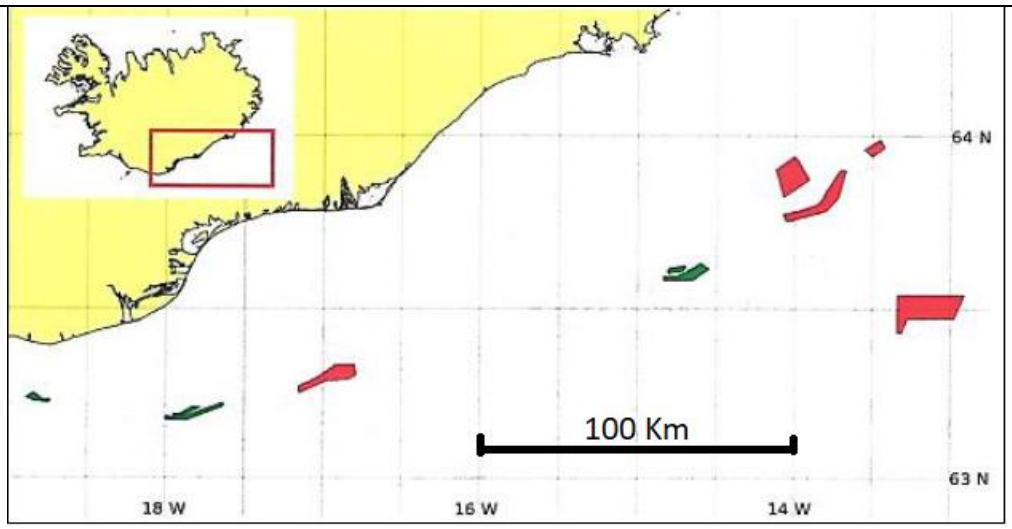



**Figure 59.** 10 coral closures in South East Iceland, current as of November 2018. Maps can be viewed by downloading Google Earth and clicking on the following kml file produced by the Directorate of Fisheries http://uv.fiskistofa.is/uv.kml

**Hydrothermal vent areas**

There are two known hydrothermal vent areas with series of chimneys and fissures on the Icelandic continental shelf. Both are inside Eyafjörður to the north of the island (see map below) and are fully protected by environmental law nr 249/2001 and 510/2007[335]. There are additional known hydrothermal vents in deeper waters to north, south and southwest of Iceland. These are in more remote areas and have less surface structure and are not been considered threatened by fishing activities.

[335] https://www.ust.is/library/Skrar/Einstaklingar/Fridlyst-svaedi/Auglysingar/hverastrytur_eyjafirdi_249_2001.pdf


**Figure 60.** Coordinates and location of protected natural resources (i.e. hydrothermal vent) at Arnarnesstrýtur in Eyjafjörður north of the Arnarnes river[336].

**Consistency of management of the fishery's ecosystem impacts with the precautionary approach.**

As outlined above the most probable adverse impacts of the Icelandic golden redfish fishery are considered and those impacts likely to have serious consequences (e.g. bycatch, ETP species interaction, habitats effects, and wider ecosystem interactions) are addressed either by an immediate management response or further analysis of the identified risk. Consideration of the adverse impacts of the fishery on the ecosystem and resulting management actions are demonstrably consistent with the precautionary approach.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[336] https://www.ust.is/library/Skrar/Einstaklingar/Fridlyst-svaedi/Auglysingar/Hverastrytur_Arnarnesnofum_kort.pdf

### 9.3.1.2. Clause 3.1.2.

Those impacts that are likely to have serious consequences shall be addressed. This may take the form of an immediate management response or further analysis of the identified risk.[337]

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Ecosystem impacts that are likely to have serious consequence include bycatch issues, ETP species interactions and habitat effects of the fishery. Resulting management actions or further analysis of identified risks are demonstrably consistent with the precautionary approach.**

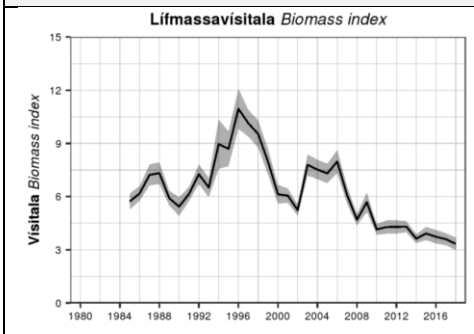
**Evidence:**

Based on the information and analysis provided in Clause 3.1.1, above, ecosystem impacts that are likely to have serious consequence include bycatch issues, ETP species interactions and habitat effects of the fishery. Key issues and management responses to those are summarised below.

**Bycatch issues**

There are a number of species at potential risk of bycatch from the golden redfish fishery for which immediate management responses or further analysis of the identified risk are being carried out. These are summarised below.

**HLÝRI – SPOTTED WOLFFISH (*Anarhichas minor*)[338]**




Spotted wolffish in Icelandic waters is caught as bycatch in the bottom trawl and longline fisheries. MFRI advises that when the precautionary approach is applied, catches in the fishing year 2018/2019 should be no more than 1001 tonnes. Biomass and juvenile indices are at their lowest levels in the time series. Fproxy has been high since 2000. This advice follows the ICES framework for stocks where reliable stock biomass indices are available, but analytical age-length based assessments is not possible (Category 3 stocks; ICES, 2012). IS-SMB biomass index of spotted wolffish, along with catch, is used to calculate Fproxy (catch/survey biomass). The target Fproxy was defined as 70% of the mean Fproxy from the reference period of 2001–2015 based on simulation studies. The catch advice is based on multiplying the most recent index value with the target Fproxy value. The advice is constrained by an uncertainty cap of 20%

[337] 2005/2009 FAO Guidelines for Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries.

[338] https://www.hafogvatn.is/static/extras/images/Hlyri_2018729533.pdf

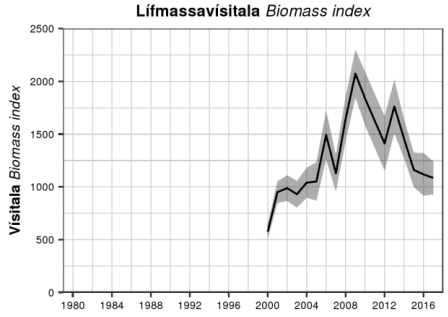
  

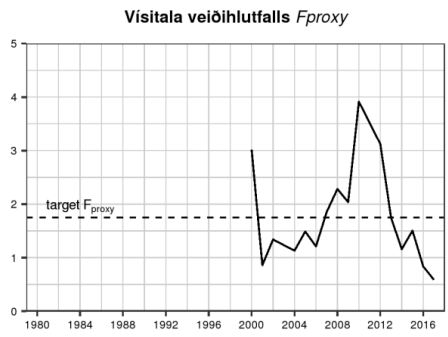

***Spotted wolffish.*** *Recommended TAC, national TAC, and catches (tonnes).*

| Fiskveiðiár *Fishing year* | Tillaga *Recommended TAC* | Aflamark *National TAC* | Afli *Catches* |
|---|---|---|---|
| 2012/13 | 900 | - | 2042 |
| 2013/14 | 900 | - | 2250 |
| 2014/15 | 900 | - | 1655 |
| 2015/16 | 900 | - | 1913 |
| 2016/17 | 1128 | - | 1587 |
| 2017/18 | 1080 | - | |
| 2018/19 | 1001 | | |

compared to the previous advice. Between the 2012/13 and the 2016/17 season catches of this species have been above the recommended TAC levels. During the site visits the Audit Team queried about the sustainability and risks to this stock. During the November 2018 site visits, the MFRI stated that "recommended TAC" is not a binding National TAC and as such, a well monitored official TAC. However, recognising the issue the MFRI notes that this species was formally introduced into the quota system for the 2018/2019 fishing year to maintain catches within TAC limits. This species is classified as Near Threatened under the IUCN Red List[339]. **The status of this stock will be verified again by next year's assessment team to ensure an official TAC has been set and implemented.**

## BLÁLANGA – BLUE LING (*Molva dipterygia*)[340]




In 2008–2011 the proportion of blue ling catches taken by longlines increased and amounted to 70% of total catches in 2011. Since then the proportion of longlines has decreased and was 27% in 2017. Blue ling is increasingly caught as bycatch in the redfish and Greenland halibut fisheries NW of Iceland. This change in distribution is also observed in the survey. The biomass index peaked in 2009 but has declined since then. Fproxy has been below the target value for the last four years indicating a relatively low harvest pressure. The juvenile index was at low levels in 2010–2016, but increased in 2017. MFRI and ICES advise that when the precautionary approach is applied, catches in the fishing year 2018/2019 should be no more than 1520 tonnes. Catches in the 2015/16, 2016/17 and 2017/18 fishing years where well within the national TAC. Additionally, the MFRI advises that spawning areas south of Vestmannaeyjar and Franshóll be closed to all fishing activities during spawning season (15 February to 30 April). Although biomass for this stock has been declining, National TACs have been adhered to, fishing effort has decreased below the target $F_{proxy}$ since 2013, spawning closures have been recommended and juvenile abundance is increasing since 2016. **Fishing mortality and**

[339] https://www.iucnredlist.org/species/18263655/44739959#population
[340] https://www.hafogvatn.is/static/extras/images/Blalanga_2018729178.pdf

| | |
|---|---|
| | **catches are within set reference points (i.e. below $F_{proxy}$) and TAC limits.** |

**ETP species issues**

There are a number of ETP species at potential risk of interaction from the redfish fishery for which immediate management responses or further analysis of the identified risk are being carried out. These are summarised below.

**Common skate (Grey skate)**

Recent studies have shown that the common skate in the Northeast Atlantic may actually be one of two nominal species; the smaller blue skate or grey skate (*Dipturus flossada*) and the large flapper skate (*Dipturus intermedia*); together they are more commonly referred to as the *D. batis* (listed as Critically Endangered under the IUCN Red list[341]) species-complex (Iglésias, 2009)[342]. Investigation of skates in Icelandic waters have shown that the skate currently found in Icelandic waters, and caught as bycatch in Icelandic fisheries, is the smaller grey skate (*D. flossada*) (Jonbjorn Pálsson, unpublished material) with the larger sister species, the flapper skate (*D. intermedia*), believed to be almost extinct in the Atlantic.

A taxonomic revision of these species has concluded that the smaller-bodied blue skate should retain the scientific name *Dipturus batis* and the larger-bodied flapper skate is now referred to as *Dipturus intermedius* (Last et al., 2016). FAO have accepted the latter name, assigning it the ASFIS code DRJ. Flapper skate is reported predominantly from the northern North Sea and north-west Scotland and is occasionally found in the Celtic Sea. Blue skate is reported predominantly in the Celtic Sea, and its distribution extends northwards to Iceland. The southern limits of both species are uncertain[343].

No TAC is available for this species because there is no directed fishery for it. It is caught as bycatch in mainly longline, bottom trawl and Danish seine gear. No assessment is carried out for grey skate and indices of abundance are uncertain as only limited survey data exists. Recent survey trends indicate some increase in the scientific groundfish survey. MFRI will continue to report on incidences of capture and distribution of skate during the spring bottom trawl survey as they have been doing since the survey began in 1985. In addition, catches in commercial fisheries will continue to be collected and the MFRI will monitor whether significant changes in either the survey results or the level of landed catches occur.

**Atlantic halibut**

Atlantic halibut (*Hippoglossus hippoglossus*) is classified as Endangered on the IUCN Red list[344]. A committee established in 2010 by the minister of fisheries due to the poor state of the Atlantic halibut stock in Iceland,

[341] https://www.iucnredlist.org/species/39397/10198950#assessment-information
[342] https://onlinelibrary.wiley.com/doi/abs/10.1002/aqc.1083
[343] http://ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/rjb.27.89a.pdf
[344] https://www.iucnredlist.org/species/10097/3162182

concluded that the most effective way to rebuild the stock would be to ban all targeted fishing. In 2012, a regulation was issued to ban all targeted fishing for Atlantic halibut[345] and stipulating that all viable halibut in other fisheries must be released. In 2018, MFRI's advice is that these regulations remain in effect[346].

Annual landings of Atlantic halibut were 36–119 tonnes in 2012–2017, which are the lowest landings since the beginning of the fishery. The decrease is due to management decisions.

**Ban on fishing for spiny dogfish, Porbeagle sharks and Basking shark.**

Regulation 456/2017 states that there is a ban on fishing for Porbeagle sharks, Basking shark and spiny dogfish. Any incidental catches of these species are to be landed and sold on an approved auction market for marine products according to the provisions of Act no. 37/1992, on a special fee for illegal fishing, with subsequent amendments. [347]

Catches of spiny dogfish and porbeagle sharks have been very low in recent years. Catches of Greenland sharks have been 18 t in 2017.

**Issues with recording of marine mammal and seabird bycatch and relative management actions**

**E-logbook app modifications**

A smartphone app is in development by the Directorate of Fisheries, to make reporting and identification of marine mammal and seabird bycatch easier for operators in the fishery. During the 2018 site visits the Directorate reported that this app prioritises the need for recording marine mammals and seabirds interactions/bycatch before fish catches are submitted, to enable more consistent and reliable reporting. The app appears to be ready for implementation but there is a need to change current legislation to ensure it can be nested within legal requirements.

**Marine mammal bycatch**

**Harbour porpoises**

ASCOBANS has advised that the maximum annual anthropogenic induced mortality for harbour porpoise should not exceed 1.7% of the total population size so this threshold is likely to have been met or exceeded in 2016[348]. However, Pálsson *et al*., (2015) suggested that the higher numbers of harbour porpoise occurring in the cod gillnet fishery in recent years could indicate an increase in the porpoise stock as a consequence

[345] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/18302

[346] https://www.hafogvatn.is/static/extras/images/luda_2018729535.pdf

[347] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/0456-2017

[348] OSPAR, 2009. Background Document for Harbour porpoise Phocoena phocoena. OSPAR Commission. http://www.ascobans.org/en/document/ospar-background-document-harbour-porpoise-phocoena-phocoena

of reduced fishing effort and perhaps that the replacement potential of the porpoise population may be higher than implied by the precautionary 1.7% reference point. An alternative explanation may be that, as previously mentioned, the 2007 mean population estimate was a significant under-estimate and the population is bigger than the survey suggested such that it is able to sustain the levels of by-catch observed over the years.

The NAMMCO 2017 Progress report for Iceland[349] highlights that efforts to estimate bycatch of harbour porpoises in fisheries continues at the MFRI.

Pingers were tested for the first time in the Icelandic cod gillnet fishery in April of 2017, but their use showed no reduction in porpoise bycatch, as 7 porpoises were caught in nets with pingers, while 5 porpoises were caught in nearby control nets. A more detailed analysis of this experiment is underway and is due to be published. C-PODS [350](i.e. continuous porpoise detectors) were also deployed in Skjálfandi Bay (Northern Iceland) for detections of harbour porpoises.

Collaboration of the MFRI with the University of Potsdam on harbour porpoise genetic research is ongoing (Lah et al. 2016). Among the objectives of this study is estimation of population size based on close kin analysis.

**Harbour seals**

In 1980, the abundance of harbour seals was estimated at around 33 thous. animals but the population declined rapidly until 1989 to around 15 thous. animals. The latest harbour seal census was conducted in 2016 and the stock was estimated to be 7,652 animals (95% confidence intervals of 4,995–10,310). The current population size is 77% smaller than in the first abundance estimate in 1980 and the population is 36% under the management objective of 12 thous. animals[351]. Of the total 2,190 harbour seals estimated to have been caught in the gillnet fisheries for cod and lumpsucker in 2014, 2015 and 2016, the cod gillnet fishery is estimated to have caught just over 2%, while almost 98% of the bycatch was from the lumpsucker fishery.

MFRI advised that direct hunt should be prevented and that actions must be taken to reduce bycatch of seals in commercial fisheries. MFRI also advices that a hunting management system should be initiated, and that reporting of all seal hunt should be mandatory[352].

**Grey seals**

The Icelandic grey seal (*Halichoerus grypus*) population has decreased from an estimated 9000 animals in 1982 to 4200 animals in 2012. They are classified as Least Concern (population increasing) on the IUCN Red

[349] https://nammco.no/wp-content/uploads/2018/01/2017-iceland_progress_report_final.pdf
[350] https://nammco.no/wp-content/uploads/2018/07/report_by-catch_wg_may_2017.pdf
[351] https://www.hafogvatn.is/static/extras/images/Landselur277.pdf
[352] https://www.hafogvatn.is/static/files/Veidiradgjof/tac-taflan_aukatillogur_jun17.pdf

List[353]. To estimate the current status of the Icelandic grey seal population, a census was conducted during the pupping period in 2017 and analysis is currently ongoing. A project was initiated in October 2016 where five grey seal pups were tagged with satellite tags to map habitat use and the analysis is also ongoing. MFRI will release advice based on the management objectives set for grey seals in Iceland only after the grey seal population estimate has been finalized in 2018[354].

**Icelandic Committee for Consultation on Responsible Management of Living Marine Resources**

In response to the recently recognized issue of seabird and marine mammal bycatch in cod and lumpfish gillnet fisheries the Icelandic ministry of Industry and Innovation has recently created (i.e. November 2018) a Committee for Consultation on Responsible Management of Living Marine Resources to address these matters. The Committee's recommendation to the Ministry include:

- Improvement of information collection and monitoring activities to gather reliable seabird and marine mammal bycatch information from vessel e-logbooks through technology development (e.g. mobile app in development by the Directorate), a species identification training program for fishermen and observers, and a general improvement in the quality of bycatch data (i.e. narrower confidence limits) and depth of information recorded (e.g. catch information on area, time, depth etc.) to help design mitigation measures that will result in appropriate industry acceptance and buy in;
- Measures to reduce bycatch (e.g. potential spatial/temporal closures at sensitive times such as around seal pupping or bird breeding season); and
- US Marine Mammal Protection Act importing requirements collectively dealt with through improvements in the previous two points (i.e. information gathering and management measures).

**Habitat effects and related improvement measures**

The main abrasive pressure in the Icelandic Waters ecoregion is caused by mobile bottom-fishing gears targeting demersal fish, shrimp, and Norway lobster *Nephrops norvegicus*.

The 2017 ICES Report on the Icelandic Ecoregion Ecosystem[355] highlights that based on analysis of electronic logbook data a total area of about 79 000 $km^2$ was fished with towed bottom-fishing gears in 2013 in Iceland, composing 10% of the ecoregion. The total fishing effort by bottom trawls targeting fish and shrimp has decreased by around 40% in 2000–2014; in the same period the *Nephrops* trawling effort remained at the same level, although limited. The decrease in fishing effort varied locally, with decreases mainly being noted on the southern shelf and at typical shrimp trawling grounds on the northern shelf. Based on recent data from the MFRI Ecosystem Overview report[356] it is possible to see that bottom trawl effort has decreased

[353] https://www.iucnredlist.org/species/9660/45226042
[354] https://nammco.no/wp-content/uploads/2018/01/2017-iceland_progress_report_final.pdf
[355] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Ecosystem_overview-Icelandic_Waters_ecoregion.pdf
[356] https://www.hafogvatn.is/static/files/Veidiradgjof/vistkerfi.pdf

from 2013 (just above 150 thous. hours) to 2017 (to about 125 thous. hours) by about 17%. Although bottom trawl effort does not necessarily equate to trawled area it is possible that an area less than 10% of the Iceland ecoregion was disturbed by bottom trawls in 2017.

During the Nov. 2018 site visits HB Grandi stated that all of their trawlers (4 wetfish and 2 freezer trawlers), as well other trawlers in the industry[357], use pelagic flying doors because they do not drag on the seafloor saving on fuel costs and decrease gear damage. Bottom trawlers in Iceland are also reported to use rock hoppers, as well as flying doors.

**Protection of Vulnerable Marine Ecosystems (VMEs)**

It is the policy of the Icelandic government to protect vulnerable marine ecosystems (VMEs; sponge communities, coldwater corals and hydrothermal vents), from significant adverse impact from bottom contacting gear. Large areas within the Icelandic EEZ are closed, either temporarily or permanently, to fishing for a variety of reasons; these include the protection of juveniles, spawning fish and VMEs. Cumulatively, a large portion of Icelandic shelf area within which fishing activities occur is closed to bottom trawling (please refer to clause 3.1.1).

Specific to VMEs, there are specific closures in place for cold water coral (i.e. 10 closures) and hydrothermal vents (1 closure) in Icelandic waters.

MFRI is currently participating in the Norwegian Institute of Marine Research-led NovasArc project, together with the Faroe Marine Research Institute[358] to map VMEs in Nordic waters. The three year project running from 2016-2018 aims to map the distribution of VMEs in Arctic and Sub-Arctic waters including those around Iceland. It also aims to map the distribution of commercial fisheries and other human activities and identify possible conflict areas.

In a long-term mapping project, albeit opportunistic in nature, the MFRI also collects data to describe habitat types and ecosystems of the sea-floor around Iceland, including VME's. The data is collected with underwater cameras with high spatial accuracy. Benthos (e.g. sponges, starfish, jellyfish, crabs, tunicates, bivalves, etc..) bycatch is recorded in the annual MFRI ground fish survey by identifying the species, measuring weight to track biodiversity and biomass over time. Deep-sea sponges fall within the VME habitat category. Suggestions for conservation of deep-sea sponge aggregations by the MFRI will be based on research measurements. Likely areas will be mapped and evaluated prior to conservation suggestions (MFRI, Nov. 2018 site visits, pers. comm.).

| | |
|---|---|
| **References:** | See footnote. |
| **Non-Conformance Number (if relevant)** | **NA** |

[357] http://www.hampidjan.is/news/news-article/clear-advantages-of-flying-doors
[358] http://novasarc.hafogvatn.is/

### 9.3.2. Clause 3.2. Specific Criteria

#### 9.3.2.1. Clause 3.2.1. Information gathering and advice

##### 9.3.2.1.1. Clause 3.2.1.1.

Information shall be available on fishing gear used in the fishery, including the fishing gears' selectivity and its potential impact on the ecosystem. Stocks of non-target species commonly caught in the fisheries for the stock under consideration may be monitored and their state assessed, as appropriate.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Information is available on the legal specification of fishing gear in the Icelandic groundfish fishery. The primary aim of fishing gear regulations is size selectivity with a secondary aim being species selectivity. Gears are regulated in several ways to regulate both size and species selectivity. The MFRI provide advice for 40 fish stocks in Iceland as well as advice for harvest of marine mammal species (e.g. fin whale and common minke whale). Their most recent advice, which include routine monitoring and assessment efforts is available online.**

**Evidence:**

Information is available on the legal specification of fishing gear in the Icelandic groundfish fishery. The primary aim of fishing gear regulations is size selectivity with a secondary aim being species selectivity. Gears are regulated in several ways to regulate both size and species selectivity.

**Fish size regulations**

The minimum reference size for Golden redfish is 33 cm. As discarding is prohibited it is mandatory to land all specimens below these lengths. The minimum reference lengths are used to trigger area closures when catches comprise of 20% or greater of fish below the reference size. Where an area closure has been triggered, it remains closed for a minimum of two weeks and is subject to periodic monitoring. No such closures have triggered for redfish in recent years.

**Mesh size regulations.**

The mesh size in the codend in the Icelandic trawl fishery was increased from 120 mm to 155 mm in 1977. Since 1998 the minimum codend mesh size allowed is 135 mm[359] [360], provided that a so-called Polish cover (a net protecting the belly of the fishing net) is not used. In the Nephrops fishery, the use of two large (200 mm) mesh escape panels is mandatory (*Reg. 543/2002 on mesh sizes and trawls for fishing of demersal species, shrimp and nephrops)*[361].

[359] https://www.reglugerd.is/reglugerdir/allar/nr/543-2002

[360] https://www.icefish.is/news101/better-redfish-selectivity-with-four-panel-codend

[361] https://www.reglugerd.is/reglugerdir/allar/nr/543-2002

Mesh size and gear restrictions are mandated to protect both juvenile stocks (trawl mesh size 135 mm with separator panel) and spawners (gill net mesh size 8 inches/203 mm)[362]. Shrimp (Pandalus) fisheries are associated with by-catches of juvenile finfish species. To minimise such by-catch, the use of sorting grids is mandatory.

Additionally, longliners in Iceland use protective devices to shield baited hooks as gears are shot in order to prevent encounters with seabirds. Fishermen tend to use automatic gas guns and night settings (i.e. haul gear at night minimizing seabird interactions). Night setting of longlines is generally done in the winter period but to a lesser degree in the summer when sunlight can be present all day and night in certain areas of Iceland. The requirement follows Regulation 456 issued in 1994[363].

The MRI routinely conducts selectivity experiments to assess the performance of the main fishing gears and to assess ways in which selectivity might be improved.

**T90 trawl net configuration**

A study was conducted in the summer of 2017 on the selectivity of redfish, by a team from the Marine Research Institute and the Marine Institute of Memorial University of Newfoundland, joined by skipper Heimir Guðbjörnsson and HB Grandi's fresher trawler *Helga María* to assess the selectivity of a T90 codend on redfish catches. T90 is a regular net that has been turned 90° and along with lines on the codend ensures that the mesh stays open during trawling. The conclusion was that this codend showed a 7.3cm better effectiveness in separating golden redfish than the conventional redfish codend in 135mm diamond mesh. The study also showed that although more small redfish were released from the T90 codend, it was also shown to retain more of the over 33cm reference size redfish. More research was warranted in regards to other fish catches in that specific net configuration[364]. The T90 net is being used by HB Grandi trawl vessels, and apparently by other trawl vessels in Iceland (Ingimundur Ingim, Fleet Manager, HB Grandi, per. comm.). Furthermore, common use of "T90 bottom trawls" (30% lesser net) with pelagic doors (not dragged on the bottom) in Icelandic vessels, has resulted in considerable fuel savings without sacrificing fishing efficiency[365].

**Longline gear capture efficiency**

A study by the Institute of Marine Research, Norway and the MFRI, on the effects of hook and bait sizes on size selectivity and capture efficiency in Icelandic longline fisheries was also published in 2017[366]. The authors looked at the main species caught by longliners in Iceland, (*Gadus morhua*), haddock (*Melanogrammus aeglefinus*), tusk (*Brosme brosme*), ling (*Molva molva*) and wolffish (*Anarhichas lupus*). The study showed that increasing hook size lowered capture efficiency for all species, but had only a minor

362 http://www.ices.dk/sites/pub/publication%20reports/forms/marine.aspx?rootfolder=/sites/pub/publication+reports/expert+group+report/acom/2011/nwwg&folderctid=0x0120005daf18eb10daa049bbb066544d790785&view=%7B5c7a53f9-446e-486e-93af-841fc20c1773%7D

363 https://www.stjornartidindi.is/Advert.aspx?RecordID=8bd54700-a433-413f-83ed-48cd60438a4b

364 https://www.icefish.is/news101/better-redfish-selectivity-with-four-panel-codend

365 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/fisheries-management/

366 https://www.sciencedirect.com/science/article/abs/pii/S0165783617300541

effect on size selectivity. It also demonstrated that hook size and bait size affect the profitability of longline fisheries, in that smaller hooks improve capture efficiency, while larger baits increase catches of large fish and reduce those of undersized fish.

**Stocks of non-target species commonly caught in the Golden redfish fisheries are monitored and their state assessed as appropriate.**

A comprehensive list of species is assessed as associated species catch, bycatch and ETP species interacting with the fishery under assessment (including marine mammals and seabirds) in Clause 3.1. *Please refer to the previous clause for an assessment on their status.*

The MFRI provide advice for 40 fish stocks in Iceland[367] as well as advice for harvest of marine mammal species (e.g. fin whale and common minke whale). Their most recent advice, which include routine monitoring and assessment efforts, is summarised below.

| Type | Advice | Tech report | Tables | Pub.date | Archive |
|---|---|---|---|---|---|
| Norwegian Spring-Spawning Herring | Advice | Tech report | | 22. October 2018 | Archive |
| Capelin | Advice | Tech report | | 17. October 2018 | Archive |
| Mackerel | Advice | Tech report | | 28. September 2018 | Archive |
| Blue Whiting | Advice | Tech report | | 28. September 2018 | Archive |
| Northern Shrimp | Advice | Tech report | | 3. August 2018 | Archive |
| Northern Shrimp - Eldey | Advice | Tech report | | 3. August 2018 | Archive |
| Cod | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Haddock | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Saithe | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Golden Redfish | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Demersal Beaked Redfish | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Norway Redfish | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Greenland Halibut | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Atlantic Halibut | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Plaice | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Dab | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Long Rough Dab | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Witch | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Lemon Sole | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Megrim | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Atlantic Wolffish | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Spotted Wolffish | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Blue Ling | Advice | Tech report | Tables | 13. June 2018 | Archive |

[367] https://www.hafogvatn.is/en/harvesting-advice

| | | | | | |
|---|---|---|---|---|---|
| Ling | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Tusk | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Whiting | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Anglerfish | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Herring | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Greater Silver Smelt | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Starry Ray | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Icelandic Scallop | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Ocean Quahog | Advice | | Tables | 13. June 2018 | Archive |
| Common Whelk | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Sea Cucumber | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Sea Urchin | Advice | Tech report | Tables | 13. June 2018 | Archive |
| Northern Shrimp - Snæfellsnes | Advice | Tech report | Tables | 25. April 2018 | Archive |
| Common Minke Whale | Advice | Tech report | Tables | 12. April 2018 | |
| Lumpfish | Advice | Tech report | Tables | 4. April 2018 | Archive |
| Northern Shrimp in Ísafjarðardjúp | Advice | Tech report | Tables | 8. March 2018 | Archive |
| Rockweed | Advice | Tech report | Tables | 29. January 2018 | |
| Northern Shrimp in Arnarfjörður | Advice | Tech report | Tables | 16. November 2017 | |
| Norway Lobster | Advice | Tech report | Tables | 13. June 2017 | |
| Fin Whale | Advice | Tech report | Tables | 13. June 2017 | |
| Harbour Seal | Advice | Tech report | Tables | 13. June 2017 | |

**Additional species/stocks monitored by the Directorate of Fisheries**

The Directorate of Fisheries monitors catches of a larger suite of species (many of them non-target species) including starry ray/thorny skate, common skate, dogfish, Greenland shark, Porbeagle shark, Atlantic halibut, orange roughy, shagreen ray, etc… Records for 65 species can be retrieved on their website.[368]

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[368] http://www.fiskistofa.is/english/quotas-and-catches/catches-in-individual-species/

### 9.3.2.1.2. Clause 3.2.1.2.

Information shall be available on the potential effect of fishing on endangered, threatened and protected species[369], as appropriate and relevant in the context of the unit of certification.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**According to the OSPAR Convention, as reported in the 2017 ICES Ecosystem report of the Icelandic Ecoregion, there are vulnerable and /or ETP species occurring in Icelandic waters. Accordingly, there appears to be enough information to assess effects on ETP species in Icelandic waters.**

**Evidence:**

According to the Convention for the Protection of the Marine Environment of the North-East Atlantic or OSPAR Convention, as reported in the 2017 ICES Ecosystem report of the Icelandic Ecoregion[370], there are vulnerable and /or ETP species occurring in Icelandic waters

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| SEABIRDS | |
| *Rissa tridactyla* | Black-legged kittiwake |
| *Uria lomvia* | Thick-billed murre (or Brünnich's guillemot) |
| FISH | |
| *Anguilla anguilla* | European eel |
| *Centrophorus squamosus* | Leafscale gulper shark |
| *Cetorhinus maximus* | Basking shark |
| *Dipturus batis* | Common skate |
| *Hoplosthethus atlanticus* | Orange roughy |
| *Lamna nasus* | Porbeagle |
| *Petromyzon marinus* | Sea lamprey |
| *Salmo salar* | Salmon |
| *Squalus acanthias* | [Northeast Atlantic] spurdog |
| MARINE MAMMALS | |
| *Balaenoptera musculus* | Blue whale |
| *Eubalaena glacialis* | Northern right whale |

OSPAR Contracting Parties are Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Luxembourg, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom, together with the European Union.

[369] Species recognised by Icelandic legislation and/or binding international agreements to which the Icelandic authorities are party. Binding international agreements as applicable in Icelandic jurisdiction.
[370] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Ecosystem_overview-Icelandic_Waters_ecoregion.pdf

| | |
|---|---|
| There is enough information to assess the effects on ETP species in Icelandic waters. A comprehensive list of ETP species interacting with the fishery under assessment (including marine mammals and seabirds) has been assessed in Clause 3.1.1. *Please refer to it for further information.* | |
| **References:** | See footnote. |
| **Non-Conformance Number (if relevant)** | **NA** |

#### 9.3.2.2. Clause 3.2.2. By-catch and discards

##### 9.3.2.2.1. Clause 3.2.2.1.

Discarding, including discarding of catches from non-target commercial stocks, is prohibited.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**According to section 2 of Act no. 57/1996, concerning the treatment of commercial marine stocks, discard of catches (although with minor exceptions) is prohibited. Discarding violations are subject to penalty ranging from ISK 400K to 8M.**

**Evidence:**

Since 1996, discarding in Icelandic fisheries is prohibited and subject to penalty[371] (400K to 8M ISK).

- According to section 2 of Act no. 57/1996, concerning the treatment of commercial marine stocks, discard of catches is prohibited
- Minor exceptions:
  - (1) Non-value catches (e.g starfish, jellyfish etc..)
  - (2) Heads and other refuse from working or processing

In a practical sense, if vessels do not have sufficient quota to cover the species they have caught they are required to attain quota through the quota transfer system. Consequently, if vessels do not have sufficient catch quotas for their probable catches they must suspend all fishing activities; this means that under the ITQ system, the discard policy primarily affects the composition of landings and not the aggregate volume[372].

One feature of this ban is that it has some inbuilt flexibility, as any 5% of demersal catches from a fishing trip (called VS catch), irrespective of fish species or size, may be excluded from quota restriction (which means that VS catches are additional to the TAC).

Article 9 Regulation no. 698/2012 on fishing for commercial fishing year 2012/2013 states that:
"The master may decide that part of the catch is not calculated on the vessel's catch quota. This authorization is limited to 0.5% of pelagic catch and 5% of other catches by the relevant vessels during the fishing year and is subject to the following conditions:
a. The catch is kept separately from the other catch of the ship and it is weighed and registered separately.

[371] Act concerning the Treatment of Commercial Marine Stocks No. 57-1996: https://www.althingi.is/altext/pdf/131/s/0982.pdf

[372] http://www.nwwac.org/_fileupload/Image/Iceland%20fisheries%20directorate%202007%20presentation%20re%20discards%20to%20EU%20delegation.ppt

| | |
|---|---|
| b. The catch is sold at auction in an approved auction market for seafood, and its proceeds flow to the Fisheries Fund, cf. law no. 37/1992, with subsequent amendments.<br>c. The license is divided into four three-month periods during the fishing year. Unused sources may not be transferred between the periods[373].<br><br>On sale of VS catches in public fish markets 20% of the revenue generated is paid to the vessel with the remaining 80% going to a designated research and development fund (the VS fund, under the auspices of the Ministry). A maximum of 20% return on VS catches means that there are limited incentives for fishermen to land such catches. However, having the VS catch provisions within the fisheries management system allows the flexibility for vessels to land small catches which are outside their specific quota, and preventing discard. VS catches of golden redfish in 2017/2018 totalled 36 t[374]. | |
| **References:** | Refer to footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

[373] http://www.fiskistofa.is/veidar/aflastada/vs-afli/vsafli.jsp
[374] http://www.fiskistofa.is/veidar/aflastada/vs-afli/vsafli.jsp

#### 9.3.2.2.2. Clause 3.2.2.2.

Where relevant, appropriate steps shall be taken to avoid, minimize or mitigate encounters with seabirds and marine mammals.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Key bycatch risks relate to seabird bycatch in longline gear and marine mammal bycatch in gillnets. For the golden redfish fishery only longlines catch a small percentage of redfish. There are technical measures/mechanisms in place in Icelandic longliners to mitigate adverse impacts on seabirds. These include the use of acoustic cannons, balloons towed at the end of the vessel to scare-off of diving birds, and night settings to minimise interactions with seabirds.**

**Evidence:**

**Bycatch reporting**

The electronic logbook system used in Icelandic fisheries as designed by TrackWell, allows for marine mammal and seabirds to be recorded along with normal catches (and including bycatch amounts of non-target fish species, all of which are landed). In total there are 171 marine mammal and seabird species pre-programmed into the e-log system that are selectable by fishers. Recording of all marine mammals and seabirds in E-logbooks (by species and numbers) interactions/catches is a legal requirement since 2014 (Reg. 126/2014)[375].

Key bycatch risks relate to seabird bycatch in longline gear and marine mammal bycatch in gillnets. For the golden redfish fishery only longlines catch a small percentage (i.e. 2% in 2017) of redfish. Efforts to minimise seabird interactions with longline gear are summarised below.

**Minimising seabirds interactions and bycatch in longline gear**

The Directorate of Fisheries require longliners to take all reasonable measures to avoid seabirds taking bait or catch because it is an offence in Iceland to catch a seabird with hooks (Reg. 456, 1994).

There are technical measures/mechanisms in place in Icelandic longliners to mitigate adverse impacts on seabirds. These include the use of acoustic cannons, balloons towed at the end of the vessel to scare-off of diving birds, and night settings to minimise interactions with seabirds. Setting longlines at night (between the end of nautical twilight and before nautical dawn) is effective at reducing incidental mortality of seabirds because the majority of vulnerable seabirds are diurnal foragers. The Directorate also highlighted that laser lights are being used widely as a deterrent.

[375] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967

However, during the winter months, some measures are rarely necessary as the lines are shot and hauled in the dark (when it's dark at night and through most of/all of the day) and when few if any diving birds are active.[376] This, however, being an advantage in winter, becomes a challenge In the summer when daylight hours exceed hours of darkness.

Visir HF, a specialised longline fishing company in Iceland (with about 5% of the cod and 6% of the haddock quota in 2018) stated during site visits meetings in Nov. 2018 that it is in the interest of skippers to avoid catching seabirds because when seabirds get hooked, they float and pull up the longlines, decreasing the effectiveness of the gear from catching demersal fish. Furthermore, they reported that every hook in a longline (average 40,000 hooks per longline) has an iron sink to help the longline sink fast to the bottom, further decreasing the risk of diving birds catching on to hooks. Visir HF has reported that similar gear modifications and practices are in use across Iceland (i.e. night setting, bird scaring balloons, acoustic cannons, weighted longlines).

Information from Birdlife International communications point to available advice for demersal longline, pelagic longline and trawl fisheries - ACAP (the Agreement on the Conservation of Albatrosses and Petrels), which has established best practice mitigation advice for reducing seabird bycatch, reviewed every 18-24 months by experts. It is based on published literature and it is the key resource for assessing the efficacy of bycatch mitigation measures[377] [378].

Based on ACAP advice, the key technical bycatch reduction measures for longlines are: line weighting, bird-scaring lines and night-setting. In comparison, Iceland uses night settings, trailing balloons instead of bird scaring lines (at least to some degree), and some form of weighted lines.

While night settings and acoustic cannons seem to be widely used in Iceland, it is not clear if weighted longlines are set up in the same way consistent with 2017 ACAP Advice, and if/to what degree tori lines are used across the industry. However, variants of scare lines, i.e. trailing balloons and laser lights have been reported to be in use in Icelandic fisheries (Directorate, Visir HF, pers. comm, Nov. 2019).

All of these measures are implemented voluntarily by industry. Currently, there are no regulations in Iceland that direct on the use of explicit bycatch reduction devices/methods within longline fisheries.

| **References:** | See footnotes. |
|---|---|
| **Non-Conformance Number (if relevant)** | **NA** |

[376] https://abcbirds.org/wp-content/uploads/2015/05/ABC_Analysis_of_MSC_Certification_on_Seabird_Bycatch_Pt_2_Fishery_Analyses.pdf

[377] https://acap.aq/en/bycatch-mitigation/mitigation-advice/3242-acap-2017-review-and-best-practice-advice-for-reducing-the-impact-of-pelagic-longline-fisheries-on-seabirds/file

[378] https://www.iattc.org/Meetings/Meetings2018/SAC-09/BYC-08/PDFs/Docs/_Spanish/BYC-08-INF-J(b)-ENO_ACAP-Review-and-best-practice-advice-for-reducing-the-impact-of-pelagic-longline-fisheries-on-seabirds.pdf

### 9.3.2.2.3. Clause 3.2.2.3.

Non-target catches, including discards, of stocks other than the "stock under consideration" should not threaten these non-target stocks with serious risk of extinction; if serious risks of extinction arise, effective remedial action should be taken.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Non-target catches, including discards, of stocks associated to the Golden redfish fishery, caught with bottom trawl, longline, Nephrops trawl gear, and gillnets do not threaten these non-target stocks with serious risk of extinction or comparable irreversible risks. Most of these stocks are actively managed by the MFRI.**

**Evidence:**

98% of the golden redfish catches in 2017 have been caught in these proportions and with the following gears.

| Afli 2017 (tonn)<br>*Catches 2017 (tonnes)* | Botnvarpa<br>*Bottom trawl* | Lína<br>*Longline* | Humarvarpa<br>*Nephrops trawl* | Annað<br>*Other gear* |
|---|---|---|---|---|
| 56101 | 92% | 2% | 4% | 2% |

The remainder 2% was taken by gillnets (also reported in the 2018 NWWG report as a gear responsible for some redfish bycatch, together with longline and nephrops trawl), Danish seines, pelagic trawls, handlines, and shrimp trawls.

Retained species accounting for > 0.5% of the cumulative total for each of these three main gear types are presented below. Information in the following tables were downloaded from the Directorate's website at http://www.fiskistofa.is/veidar/aflaupplysingar/bradabirgdatolur/.

**Table 25.** Golden redfish bycatch and associated species catch above the 0.5% threshold of total catches for each of the three key gear types that targeted and caught redfish: bottom trawl, Nephrops trawl and longline, as averaged in the last 3 seasons. Gillnet is also added in the list because considered a minor gear responsible for its bycatch, although catches of redfish in the past 3 seasons where below the 0.5% threshold.

| Gear | Species | Last 3 years average catches % |
|---|---|---|
| **Bottom Trawl** | Þorskur /cod | 46.96% |
| | Ufsi /saithe | 16.51% |
| | Karfi / Gullkarfi / Golden redfish | 17.28% |
| | Ýsa /haddock | 7.28% |
| | Djúpkarfi / beaked redfish | 3.44% |
| | Grálúða / Greenland halibut | 3.27% |
| | Gulllax / greater silver smelt | 1.69% |
| | Skarkoli / plaice | 0.75% |
| | Steinbítur / Atlantic wolffish | 0.61% |
| | Langa / ling | 0.60% |
| **Gear** | **Species** | **Last 3 years average catches %** |
| **Nephrops trawl** | Þorskur /cod | 30.18% |

| | | |
|---|---|---|
| | Karfi / Gullkarfi / Golden redfish | 26.07% |
| | Humar / Norway Lobster | 15.35% |
| | Langa / ling | 7.53% |
| | Ufsi /saithe | 5.28% |
| | Langlúra / witch | 4.46% |
| | Skötuselur / anglerfish | 3.03% |
| | Stórkjafta / Öfugkjafta / Megrim | 3.02% |
| | Ýsa /haddock | 1.58% |
| | Steinbítur / Atlantic wolffish | 1.00% |
| | Lýsa / whiting | 0.76% |
| | Blálanga / blue ling | 0.67% |
| | Þykkvalúra / Sólkoli / lemon sole | 0.58% |
| **Gear** | **Species** | **Last 3 years average catches %** |
| **Longline** | Þorskur /cod | 71.60% |
| | Ýsa /haddock | 13.10% |
| | Steinbítur / Atlantic wolffish | 4.67% |
| | Langa / ling | 4.41% |
| | Keila / tusk | 2% |
| | Karfi / Gullkarfi / Golden redfish | 1.17% |
| | Hlýri / spotted wolffish | 0.86% |
| | Ufsi /saithe | 0.66% |
| | Tindaskata / starry ray | 0.74% |
| **Gear** | **Species** | **Last 3 years average catches %** |
| **Gillnet** | Þorskur /cod | 81.65% |
| | Ufsi /saithe | 7.41% |
| | Grálúða / Greenland halibut | 5.51% |
| | Langa / ling | 2.33% |
| | Ýsa /haddock | 1.28% |
| | Skarkoli / plaice | 0.75% |
| | Karfi / Gullkarfi / Golden redfish | 0.46% |

Target and non-target catches, including discards, of stocks other than Golden redfish, as listed in the table above, do not threaten any of these stocks with serious risk of extinction. Please refer to clause 3.1.1 for an assessment of each of these species.

| | |
|---|---|
| **References:** | As referenced. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.3.2.2.4. Clause 3.2.2.4.

Suitable steps shall be considered to avoid, minimize or mitigate encounters with endangered, threatened and protected species, as appropriate and relevant in the context of the unit of certification.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**As appropriate, suitable steps are considered to avoid, minimize or mitigate encounters with endangered, threatened and protected species, as appropriate and relevant in the context of the golden redfish fishery. Most of these steps include ban on direct harvest for these species.**

**Evidence:**

According to the Convention for the Protection of the Marine Environment of the North-East Atlantic or OSPAR Convention, as reported in the 2017 ICES Ecosystem report of the Icelandic Ecoregion[379], there are vulnerable and /or ETP species occurring in Icelandic waters. These are:

| SCIENTIFIC NAME | COMMON NAME |
|---|---|
| SEABIRDS | |
| *Rissa tridactyla* | Black-legged kittiwake |
| *Uria lomvia* | Thick-billed murre (or Brünnich's guillemot) |
| FISH | |
| *Anguilla anguilla* | European eel |
| *Centrophorus squamosus* | Leafscale gulper shark |
| *Cetorhinus maximus* | Basking shark |
| *Dipturus batis* | Common skate |
| *Hoplosthethus atlanticus* | Orange roughy |
| *Lamna nasus* | Porbeagle |
| *Petromyzon marinus* | Sea lamprey |
| *Salmo salar* | Salmon |
| *Squalus acanthias* | [Northeast Atlantic] spurdog |
| MARINE MAMMALS | |
| *Balaenoptera musculus* | Blue whale |
| *Eubalaena glacialis* | Northern right whale |

As appropriate, suitable steps are considered to avoid, minimize or mitigate encounters with endangered, threatened and protected species, as appropriate and relevant in the context of the unit of certification. Most of these steps include the ban on direct harvest. Detailed information has been provided under clause 3.1.1.

A summary is provided below for species that interact with the fishery under assessment, or related ones.

**Black-legged Kittiwakes (*Rissa tridactyla*)**

[379] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Ecosystem_overview-Icelandic_Waters_ecoregion.pdf

Only reported as bycatch in the lumpfish fishery between 2014–2017[380]. No issues have been recorded with the redfish fishery.

**Thick-billed murre (*Uria lomvia*)**

Only reported in very small numbers (11 individuals, 1.4% of total) in the cod gillnet survey 2009-2014 (Source: Pálsson *et al.*, 2015). No issues have been recorded with the redfish fishery.

**Common skate (Grey skate)**

It is caught as bycatch in mainly longline, bottom trawl and Danish seine gear. There is no directed fishery for this species. Catches (as bycatch) have been stable at around 135 tonnes in the past 10 years and catches from the spring bottom trawl survey have been increasing since 2010.

**Ban on fishing for spiny dogfish, Porbeagle sharks and Basking shark**

Regulation 456/2017 states that there is a ban on fishing for Porbeagle sharks, Basking shark and spiny dogfish. Any incidental catches of these species are to be landed and sold on an approved auction market for marine products according to the provisions of Act no. 37/1992, on a special fee for illegal fishing, with subsequent amendments. [381] This is the same mechanism adopted (i.e. VS catches) for Atlantic halibut catches, for which directed fishing is banned.

**Leafscale gulper sharks**

Leafscale gulper sharks are usually only found in waters deeper than fisheries for cod, haddock, saithe and redfish operate in.

**Spiny dogfish / spurdog**

There is no directed fishery for spiny dogfish and current catches are solely bycatch in other fisheries, primarily gillnet fisheries off the southern coast during the summer months.

**Blue Whale**

No issues have been identified with the fishery under assessment. This was confirmed during the November 2018 site visits by the MFRI.

**Northern Right Whale**

No interactions between Blue whales and Northern right whales have been recorded in recent years with Icelandic fisheries. This was confirmed during the November 2018 site visits by the MFRI.

380 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGBYC/wgbyc_2018.pdf

381 https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/0456-2017

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.3.2.2.5. Clause 3.2.2.5.

Appropriate steps shall be taken to avoid the loss of fishing gear and ghost fishing of lost and abandoned gear.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**There are a number of initiatives and regulations in place to avoid the loss of fishing gear and subsequent ghost fishing of lost and abandoned gear. Where Fiskistofa finds and recovers lost or abandoned gear they recover the cost of recovery from the gears' owner. The Directorate confirmed that gear loss (e.g. longlines, gillnets) and ghost fishing is not considered an issue and that reporting lost gear is compulsory. Additionally, the Icelandic ITQ system operates in such a way that gear losses are minimised.**

**Evidence:**

There are a number of initiatives and regulations in place to avoid the loss of fishing gear and subsequent ghost fishing of lost and abandoned gear. Recycling schemes are in place to encourage fishers to bring old gear ashore and it is illegal to dump old gear at sea. Where Fiskistofa finds and recovers lost or abandoned gear they recover the cost of recovery from the gears' owner. For example, in the 2015 lumpfish season the Directorate contracted two vessels to go out and specifically look for and recover lost gear. The Coastguard also reports any buoys it feels might represent lost or abandoned fishing gear to the Directorate. All regulations relating to fishing gear may be found in the various Articles of Fisheries Management 2018 Laws and regulations[382]. During the November 2018 site visits, the Directorate confirmed that gear loss (e.g. longlines, gillnets) and as such ghost fishing is not considered an issue and that reporting lost gear is compulsory.

Another important factor that contributes to low levels of lost fishing gear is the high price of that gear. This means that fishers are careful to avoid losing their gear. In the case of trawls the majority of vessels carry special grapples onboard that allow them to retrieve lost gear even when both towing warps have parted, a quite rare situation.

In the case of gillnets fishers are required to attend their nets at regular intervals and retrieve them before going ashore. According to Article 4 of Act 57/1996, concerning the Treatment of Commercial Marine Stocks (Translated from Icelandic); *"Nets and other gear, which are left in the sea, must be drawn on an appropriate and regular basis as circumstances allow. The Fisheries Directorate may remove, or have removed gears that are not been looked after properly. The same applies to fishing gear remaining in the sea after the end of fishing season, gears that are illegal or gears deployed in areas where their use is prohibited. The Directorate shall demand that the owners of fishing gear, removed from the sea by authority in paragraph 2 pay the costs associated with their removal. If the owner of the fishing gear is not known, the Directorate*

[382] http://vefbirting.oddi.is/raduneyti/fiskveidar2018/108/

| | |
|---|---|
| *may sell the gear with profits going to the MFRI."* This means that gear is not left out in inclement weather conditions that might lead to increased gear loses.<br><br>The Icelandic ITQ system allows for a slower paced fishery than would be expected if there was only an overall TAC with all boats fishing against it. The system allows fishers to target their efforts in optimum weather conditions leading to decreased rates of lost fishing gear. | |
| **References:** | See footnote. |
| **Non-Conformance Number (if relevant)** | **NA** |

#### 9.3.2.3. Clause 3.2.3 – Habitat Considerations

#### 9.3.2.3.1. Clause 3.2.3.1.

If studies show that the spawning or nursery areas or other essential habitats in the fishing area are at risk and highly vulnerable to negative impacts of particular fishing gear, such impacts shall be limited in range relative to the full spatial range of the habitat or else action is taken to avoid, minimise or mitigate such impacts.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**Growth of Golden redfish is very slow and maturity is only reached at age 12-15 when the fish is around 35 cm long. The fry stays near the bottom off East Greenland and at the edge of the Icelandic continental shelf. The main fishing grounds, as well as the main adult grounds, are at the edge of the continental shelf at 200 to 400 m depth south and west of Iceland. Large areas within the Icelandic EEZ are closed for fishing, either temporarily or permanently. These closures are aimed at protecting juveniles and spawning fish and protecting vulnerable marine ecosystems.**

**Evidence:**

**Nursery areas**

Growth of Golden redfish is very slow and maturity is only reached at the age of 12 to 15 when the fish is around 35 cm long. Redfish mate in early winter; the female carries the sperm and eggs, and later larvae that are hatched in April/May in remote areas in the southwest. The fry stays near the bottom off East Greenland and at the edge of the Icelandic continental shelf (see figure below).

The MFRI communicated at the site visits in November 2018 that is it believed that most of the golden redfish juveniles migrate from East Greenland and that there are no “real” spawning areas for this species in Icelandic waters. Golden redfish is found all around Iceland on various bottom types, but off the north coast mainly juveniles are found. It is both found close to the bottom and in the water column (usually at night) and can therefore be classified as benthopelagic.

The main fishing grounds, as well as the main adult grounds, are at the edge of the continental shelf at 200 to 400 m depth south and west of Iceland [383].

383 http://www.ices.dk/sites/pub/publication%20reports/forms/marine.aspx?rootfolder=/sites/pub/publication+reports/expert+group+report/acom/2011/nwwg&folderctid=0x0120005daf18eb10daa049bbb066544d790785&view=%7B5c7a53f9-446e-486e-93af-841fc20c1773%7D

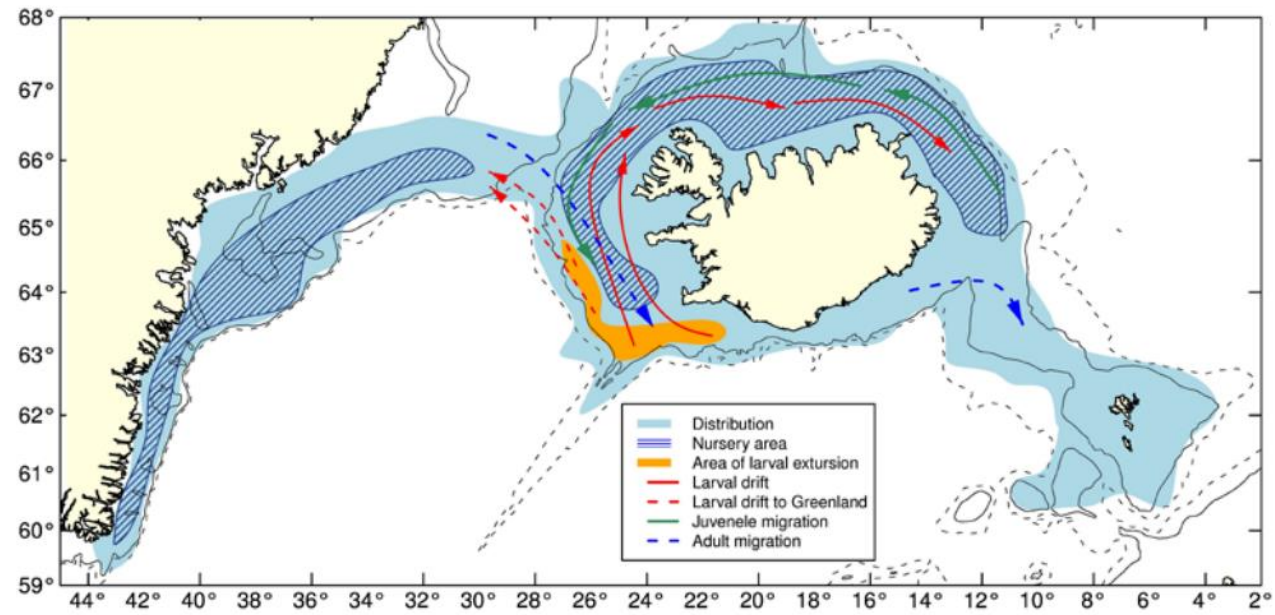



**Figure 61.** Geographical range of golden redfish in East Greenland, Icelandic and Faroese waters, area of larval extrusion, larval drift and possible migrations routes. The solid and dashed lines indicate the 500 m and 1000 m depth contour respectively (source WKRED 2012[384]).

**Closures**

Large areas within the Icelandic EEZ are closed for fishing, either temporarily or permanently. There are many large closures for bottom trawl gear around Iceland (please refer to Clause 3.1.1). Collectively, these closures are aimed at protecting juveniles and spawning fish and protecting vulnerable marine ecosystems from gear interactions. The large, long and narrow trawl closures in the South West of Iceland were originally designed to protect golden redfish juveniles, and were originally set up in the early 1990s[385]

Furthermore, the use of bottom trawl and pelagic trawl is not permitted inside a 12-mile limit measured from low-water line along the northern coast of Iceland. Similar restrictions are implemented elsewhere based on engine size and size of vessels[386].

Off Northwest and North coast of Iceland, fishing by bottom trawl, midwater trawl and Danish seine is not allowed within 12 miles from a line drawn across the mouth of fjords and bays.

Off the East, South and West coast, bottom trawling is permitted according to vessel size and engine power, with larger vessels (over 42 m) not having access within 12 miles, but the smaller vessels (less than 29 m) in

384 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2012/WKRED%202012/wkred_2012.pdf

385 https://www.hafogvatn.is/static/research/files/fjolrit-133pdf

386 https://www.government.is/news/article/?newsid=e747dac7-fb88-11e7-9423-005056bc4d74

some areas up to 4 miles. These openings are both area - and time based[387]. The ships are divided into 3 groups depending on their length and power. Group 1 are the largest ships. The green area represents the temporal allowance for fishing.

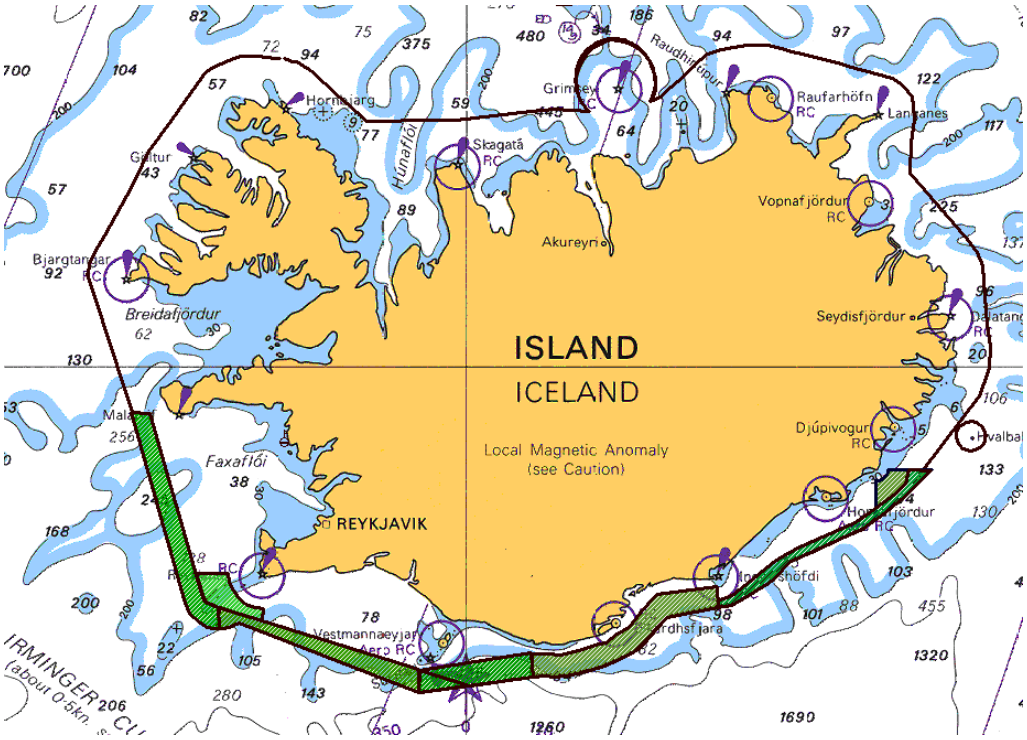



**Figure 62.** Temporary fishing areas for group 1, large-size vessels.

[387] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/domsmalaraduneyti/nr/1154

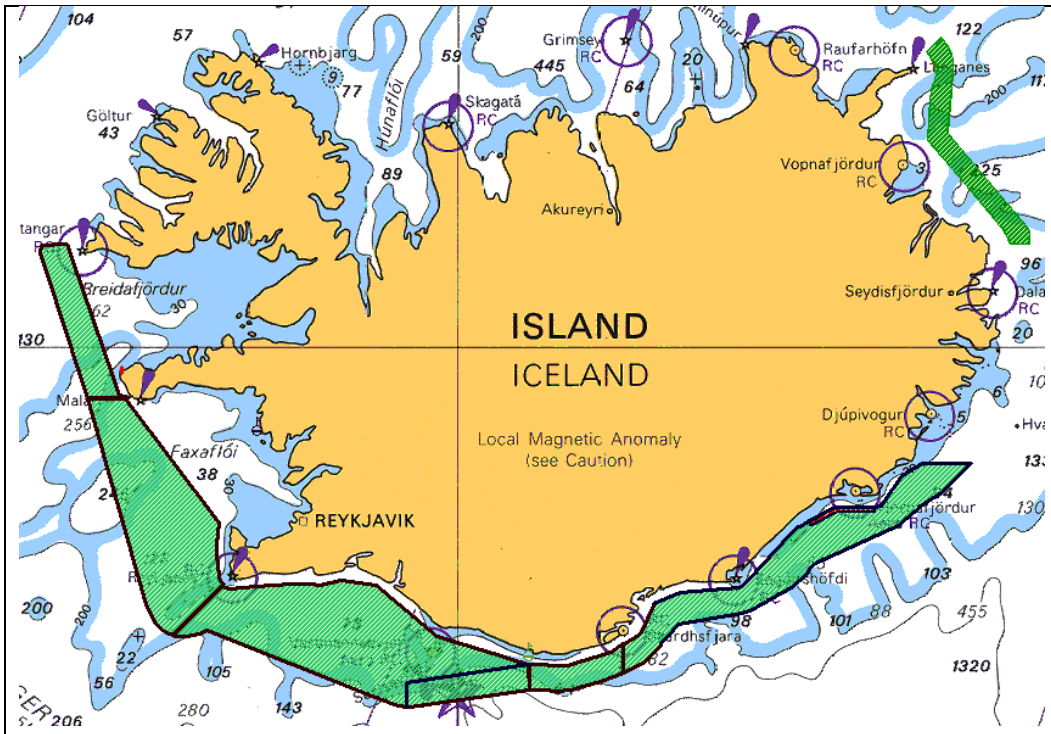



**Figure 63.** Temporary fishing areas for group 2, mid-size vessels.

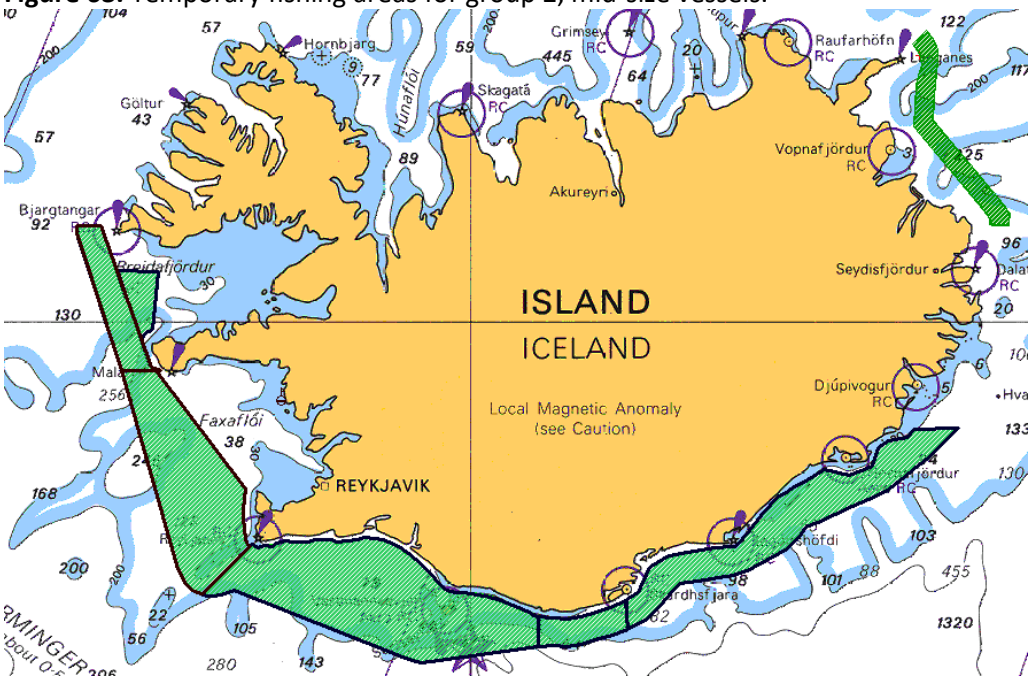



**Figure 64.** Temporary fishing areas for group 3, small-size vessels.

These closures, in particular those of a permanent nature listed under clause 3.1.1, provide wider ecological benefits over and above their intended fisheries management objective by offering *de facto* protection from fishing activity to other elements of the marine environment.

| | |
|---|---|
| We also note that the 2 weeks temporary closures implemented each year to protect undersize fish, particularly cod, haddock and saithe are likely to have a conservation benefits for other species too, including golden redfish.<br><br>Please refer to additional fishery closures listed in Clause 3.1.1. | |
| **References:** | See footnote. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.3.2.3.2. Clause 3.2.3.2.

Management measures must take into account significant continuous stony coral areas, identified through scientific and formal methods.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**The Icelandic government has closed 10 areas in South East Iceland where significant coral cover has been identified through scientific research.**

**Evidence:**
**Cold water coral communities**

The coral water coral closures protect *Lophelia pertusa,* a species of cold-water coral which is extremely slow growing, associated with diverse communities and may be harmed by destructive fishing practices. In 2004 a research project mapped coral areas off Iceland and as a result 10 areas in to the southeast of Iceland were permanently closed to fishing.

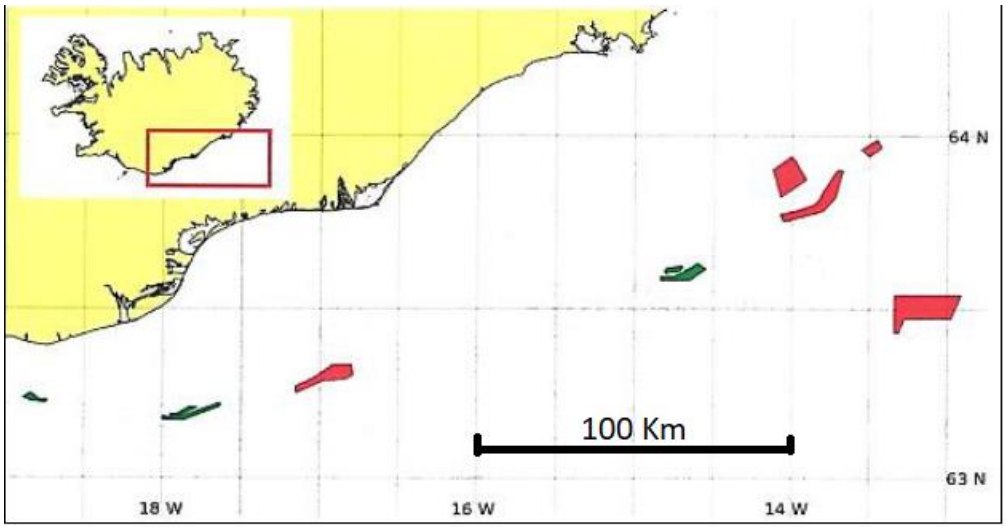



**Figure 65.** Ten coral closures in South East Iceland, current as of November 2018. Maps can be viewed by downloading Google Earth and clicking on the following kml file produced by the Directorate of Fisheries http://uv.fiskistofa.is/uv.kml

| **References:** | As referenced. |
|---|---|
| **Non-Conformance Number (if relevant)** | **NA** |

#### 9.3.2.3.3. Clause 3.2.3.3.

Such areas shall be documented and protected through their closure to fishing, where appropriate, with gear that has significant bottom impact (established through 3.2.4.2).

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**The Icelandic government has closed 10 areas in South East Iceland where significant coral cover has been identified through scientific research.** | | | | |
| **Evidence:**<br>Please see the evidence provided under clause Clause 3.2.3.2. | | | | |
| **References:** | As noted. | | | |
| **Non-Conformance Number (if relevant)** | | | | **NA** |

### 9.3.2.3.4. Clause 3.2.3.4.

Known thermal vents structures shall be protected through area closure to fishing activities with gear that has significant bottom impact during normal operation.

| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
|---|---|---|---|---|
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**
**There are two known hydrothermal vent areas with series of chimneys and fissures on the Icelandic continental shelf. Both are inside Eyafjörður to the north of the island and are fully protected by environmental law no. 249/2001 and 510/2007.**

**Evidence:**

There are two known hydrothermal vent areas with series of chimneys and fissures on the Icelandic continental shelf. Both are inside Eyafjörður to the north of the island (see map below) and are fully protected by environmental law nr 249/2001 and 510/2007[388]. There are additional known hydrothermal vents in deeper waters to north, south and southwest of Iceland. These are in more remote areas and have less surface structure and are not been considered threatened by fishing activities.


**Figure 66.** Coordinates and location of protected natural resources (i.e. hydrothermal vent) at Arnarnesstrýtur in Eyjafjörður north of the Arnarnes river[389].

| **References:** | As referenced. |
|---|---|
| **Non-Conformance Number (if relevant)** | **NA** |

[388] https://www.ust.is/library/Skrar/Einstaklingar/Fridlyst-svaedi/Auglysingar/hverastrytur_eyjafirdi_249_2001.pdf
[389] https://www.ust.is/library/Skrar/Einstaklingar/Fridlyst-svaedi/Auglysingar/Hverastrytur_Arnarnesnofum_kort.pdf

#### 9.3.2.4. Clause 3.2.4. Foodweb Considerations

##### 9.3.2.4.1. Clause 3.2.4.1.

If the stock under consideration is a key prey species in the ecosystem, the harvesting policy and management measures shall be directed to avoid severe adverse impacts on dependent predators.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |

**Summary Evidence:**

**Golden redfish are epibenthic-pelagic and are preyed upon by larger fish including Atlantic cod, Atlantic halibut, harbour seals and whales. Golden redfish appears to be reasonably well connected to other key fish species as both prey and predator but it does not appear to be a key prey species in the Icelandic marine ecosystem so it is not necessary that harvesting policy and management measures are specifically directed to avoid severe adverse impacts on dependent predators.**

**Evidence:**

The MRI has studied redfish and its place/relationship in the ecosystem. Extensive studies on the feeding ecology of a large number of demersal fish species, marine mammals and seabirds have shown that capelin is a key prey species in the Icelandic ecoregion ecosystems.

Fishbase reports[390] that golden redfish feed mostly on euphausiids (i.e. krill) in summer; herrings in autumn and winter; capelins, herrings, euphausiids and ctenophores (e.g. comb jellies) in spring. The diet of the smallest fish was dominated by zooplankton with the relative proportion of fish in the diet increasing with size. There are spatial and temporal variations in the diet of redfish[391]. Golden redfish are epibenthic-pelagic and are preyed upon by larger fish including Atlantic cod, Atlantic halibut, harbour seals and whales.

Their trophic level is 4.0 ±0.68 se; based on food items[392].

A June 2018 publication by Sturludottir *et. al.*[393] described the results of an ecological end-to-end model built using the Atlantic framework for the Icelandic marine ecosystem. Atlantis is a spatially resolved deterministic end-to-end model designed for exploited marine ecosystems.

The modeling framework consists of four sub-models: biophysical, fisheries, management and socio-economic. It has been used to explore major processes and responses in systems and it has been used for management strategy evaluations.

[390] http://www.fishbase.se/summary/Sebastes-norvegicus.html
[391] https://academic.oup.com/icesjms/article/63/9/1682/699283
[392] http://www.fishbase.se/Ecology/FishEcologySummary.php?StockCode=517&GenusName=Sebastes&SpeciesName=norvegicus
[393] https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/HAPISG/2018/01%20WGSAM%20-%20Report%20of%20the%20Working%20Group%20on%20Multispecies%20Assessment%20Methods.pdf

Study results indicated that predators in Icelandic waters were feeding on the correct groups, but they were relying too much on zooplankton and benthic invertebrates in the model than what the stomach data indicated (Figure below). The zooplankton could however be under-represented in the stomach content data because of differences in digestion rates (Hyslop, 1980). Sandeel were not as large a component of the diet of its predators as they should have been.

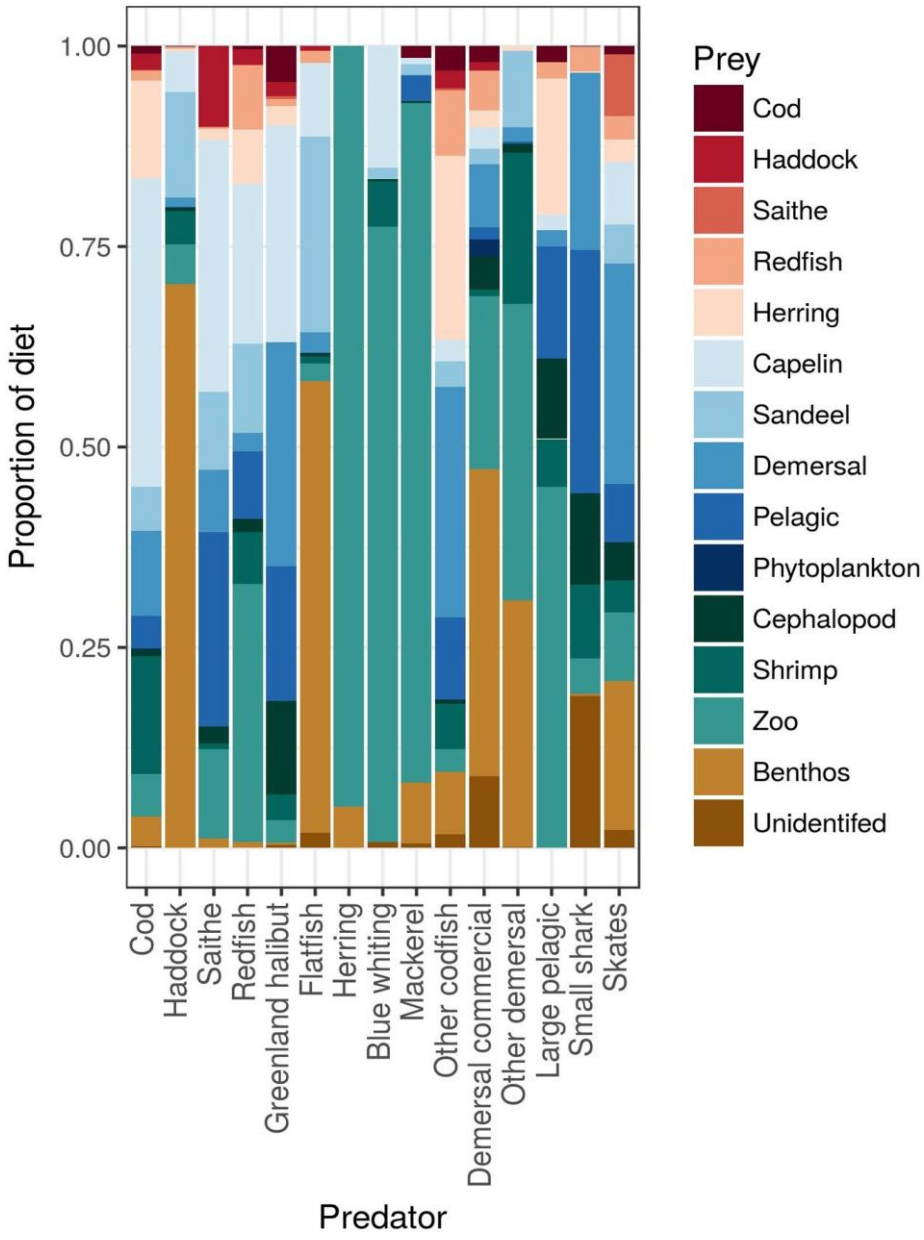



**Figure 67.**Average diet composition from stomach content data that was available for 15 of the 20 fish groups.

Data from the MFRI on stomach content and information from the literature (Gunnarsson et al., 1998; Jónsson and Pálsson, 2013) was used as a guideline when tuning the availability of each prey. The resulting modeled food web in the study was quite complex and presented below.

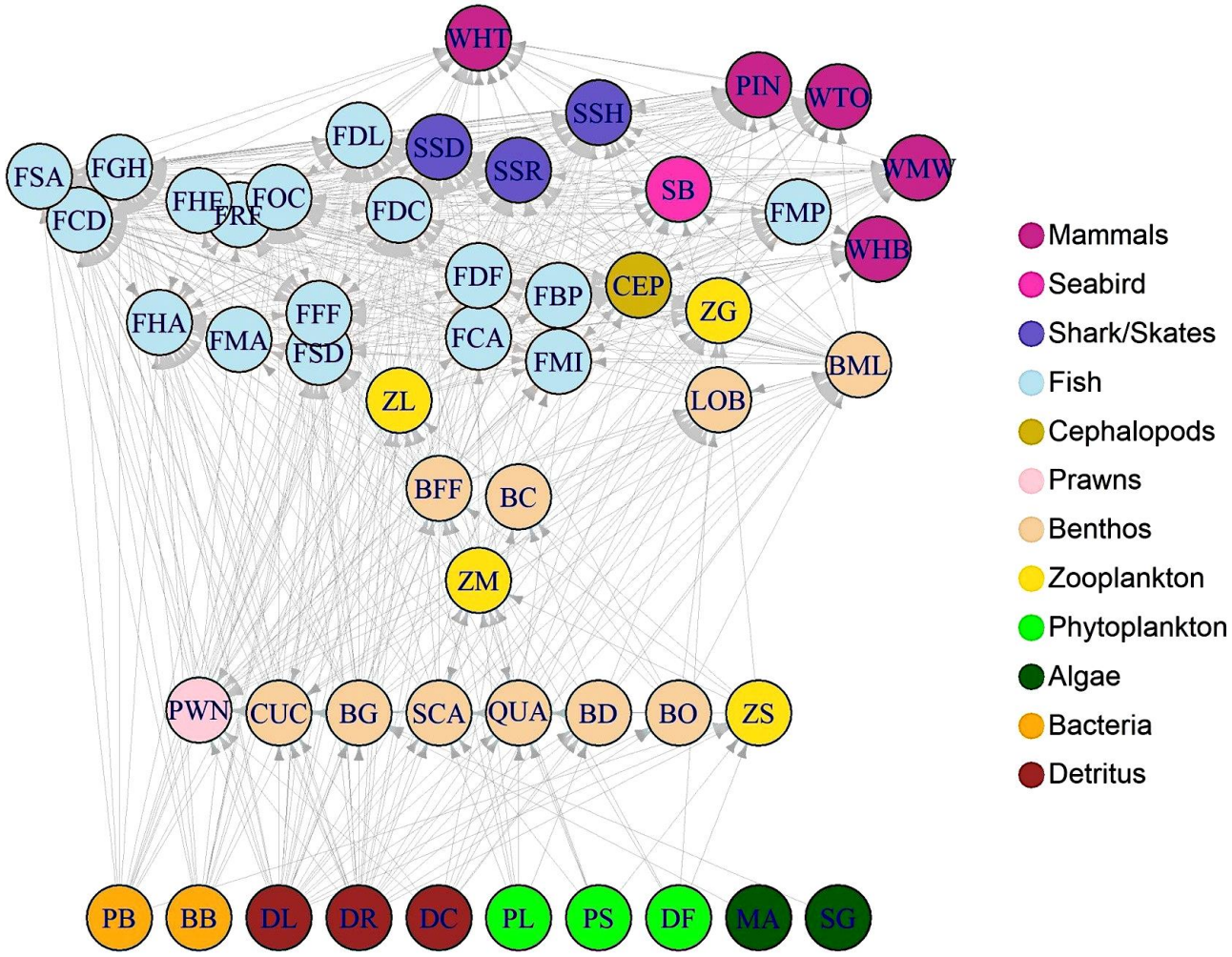



**Figure 68.** Food web connections between the modeled functional groups. Important fish species codes: FCD is Cod (*Gadus morhua*); FHA is Haddock (*Melanogrammus aeglefinus*); FSA is Saithe (*Pollachius virens*), FRF is Redfish (*Sebastes sp*); FGH is Greenland halibut (*Reinhardtius hippoglossoides*), FFF is Flatfish, FHE is Herring (*Clupea harengus*); FCA is Capelin (*Mallotus villosus*), FMI is Blue whiting (*Micromesistius poutassou*), FMA is Mackerel (*Scomber scombrus*).

Golden redfish appears to be reasonably well connected to other key fish species as both prey and predator but it does not appear to be a key prey species in the Icelandic marine ecosystem so it is not necessary that harvesting policy and management measures are specifically directed to avoid severe adverse impacts on dependent predators.

| | |
|---|---|
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

### 9.3.2.5. Clause 3.2.5. Precautionary Considerations

#### 9.3.2.5.1. Clause 3.2.5.1.

Management plans shall be developed and implemented in a timely fashion for avoiding, minimizing or mitigating any ecosystem issues properly identified. These shall be based on risk analysis and scientific advice, consistent with the precautionary approach[394], as being of serious concern in the fishery in question.

| | | | | |
|---|---|---|---|---|
| **Evidence Rating:** | Low ☐ | Medium ☐ | | High ☑ |
| **Non-Conformance:** | Critical ☐ | Major ☐ | Minor ☐ | None ☑ |
| **Summary Evidence:**<br>**Measures to minimize or mitigate ecosystem issues identified include technical measures such as the use of night settings, trailing balloons, scare lines and weighted lines in longline fisheries, the trial of bycatch reduction devices in gillnet fisheries, the use of flying doors and rock hoppers on bottom trawlers, and real time, temporary and permanent areal closures, and, where appropriate, the specific consideration of predation in some stock assessments as is the case in the assessment of capelin which considers the cod-capelin predator-prey relationship.** | | | | |
| **Evidence:**<br>Icelandic government policy aims to protect vulnerable marine ecosystems from significant adverse impact from bottom contacting gear and legislation exists to provide for the prohibition of fishing activities with bottom-contacting gear in areas where vulnerable ecosystems occur. MFRI Advice includes a specific section on the ecosystem impacts of Icelandic fisheries[395]. The document identifies the major regional pressures for the ecoregion (Figure below). | | | | |

[394] In this context refer to 2009 FAO Guidelines for Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries, Article 31: Adverse impacts of the fishery on the ecosystem should be appropriately addressed. Much greater scientific uncertainty is to be expected in assessing possible adverse ecosystem impacts of fisheries than in assessing the state of target stocks. This issue can be addressed by taking a "risk assessment/risk management approach". For the purpose of development of ecolabelling schemes, the most probable adverse impacts should be considered, taking into account available scientific information, and traditional, fisher or community knowledge provided that its validity-can be objectively verified. Those impacts that are likely to have serious consequences should be addressed. This may take the form of an immediate management response or further analysis of the identified risk. ...

[395] https://www.hafogvatn.is/static/files/Veidiradgjof/vistkerfi.pdf

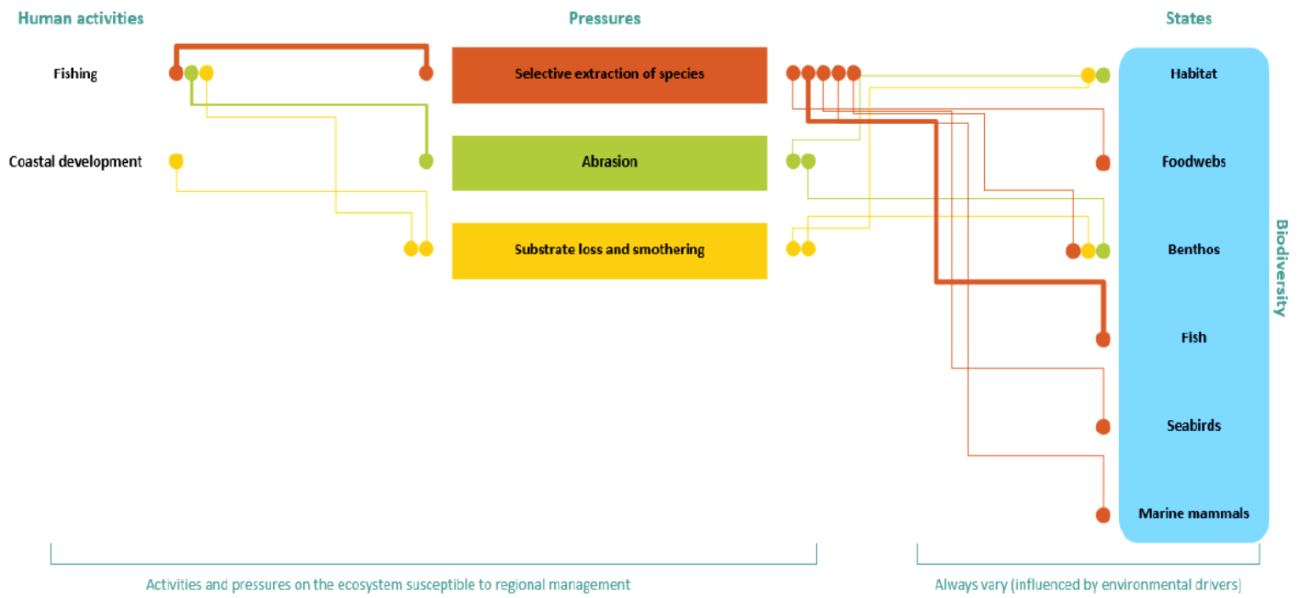



**Figure 69.** Icelandic Waters ecoregion overview with the major regional pressures, human activities, and state of the ecosystem components. The width of lines indicates the relative importance of individual links (the scaled strength of pressures should be understood as a relevant strength between the human activities listed and not as an assessment of the actual pressure on the ecosystem).

Measures to minimize or mitigate ecosystem issues identified include technical measures such as the use of night settings, trailing balloons, scare lines and weighted lines in longline fisheries, the trial of bycatch reduction devices in gillnet fisheries, the use of flying pelagic doors[396] and rock hoppers on bottom trawlers, and real time, temporary and permanent areal closures (see clause 3.2.3.1 for details), and, where appropriate, the specific consideration of predation in some stock assessments as is the case in the assessment of capelin which considers the cod-capelin predator-prey relationship.

In 2014, Iceland has adopted a Fisheries Management Plan for Icelandic golden redfish which summarizes the measure in place relevant to ecosystem effects[397].

The fisheries are managed by a catch quota system. The annual quota is allocated to individual vessels or vessel groups so that the sum of quotas for individual vessels and vessel groups equals the TAC according to the HCR. Within the system there are various measures to make the fisheries economically viable, together with measures to coordinate catch composition and the TAC and to reduce discard, which is prohibited by law. The use of bottom trawl and pelagic trawl is not permitted inside 12 nm along the northern coast of Iceland. Similar restrictions are implemented elsewhere based on engine size and size of vessels. In many areas special rules regarding fishing gear apply such as mandatory use of a sorting grid when fishing for shrimp to avoid juveniles and small fish or bycatch grids when fishing for pelagic species in certain areas. Overall, these management

[396] https://www.government.is/topics/business-and-industry/fisheries-in-iceland/fisheries-management/
[397] https://www.government.is/news/article/?newsid=e747dac7-fb88-11e7-9423-005056bc4d74

| | |
|---|---|
| measures are designed to ensure the Icelandic marine ecosystem remains healthy and productive and to allow for the future conservation and sustainable harvest of fish stocks (see Redfish FMP for further details). | |
| **References:** | See footnotes. |
| **Non-Conformance Number (if relevant)** | **NA** |

# 10. External Peer Review

Three fishery experts have peer reviewed this report.

## 10.1. Peer Reviewer 1

### 10.1.1. General comments – Peer Reviewer 1

| Peer Reviewer Comments | Assessment Team Response |
|---|---|
| **General Comments** | |
| I find this report to be very well-researched and well-written; it is obvious that it builds on extensive previous knowledge about Icelandic fisheries management among the members of the Assessment Team. My own competence lies within management, enforcement and compliance, so this has been my focus in reviewing the report. I have a few specific comments and questions to the Assessment team (see below), but I fully agree with the Team's conclusions.<br>I haven't proofread the report, but the Team should attempt to make the use of names of the management bodies consistent. Fisheries Directorate/Fishing Directorate/Directorate of Fisheries/Fisheries Administration are used in different parts of the report; Coast Guard/Coastguard and MRI/MFRI likewise. Also, the Directorate is sometimes referred to as part of the Ministry and sometimes independent of it. | The Assessment Team has acknowledged the Peer Reviewer's comments and has made revisions to the assessment report accordingly. |

#### 10.1.1.1. Scoring element review – Peer Reviewer 1

| Peer Reviewer Comments | Assessment Team Response |
|---|---|
| **Background Section** | |
| | |

### 10.1.1.2. Section 1 – Fisheries Management

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| **1.1** | **The Fisheries Management System** | |
| **1.1.1** | What exactly is meant by 'Policies incorporate a number of International Agreements'? Does it mean that international agreements are made binding in domestic law? | Comment acknowledged. That means that key Icelandic policies for fisheries management incorporate the key principles of a number of International Agreements, including; UN Convention of the Law of the Sea,[398] Agenda 21 of the Rio Declaration[399], FAO Code of Conduct for Responsible Fisheries and the International Plan of Action to prevent, deter and eliminate Illegal, Unregulated and Unreported Fishing. |
| **1.1.2** | | |
| **1.1.3** | It would be interesting to know what it entails that fisheries regulations are revised and *integrated* in order to *facilitate understanding by fishermen and applicability by the management organisations*. | Comment acknowledged. That refers to a recent effort to integrate and make fishery regulations more user friendly. Details below.<br><br>**2018 Fisheries Regulations Update**<br>The Client group representative highlighted during the 2018 site visits that there is an ongoing effort to revise and integrate Icelandic fisheries regulations to facilitate understanding by fishermen and applicability by the management organisations. The official Icelandic committee report on the revision of Icelandic fisheries regulations is titled (and roughly translated as):<br>*Conclusions of a working group on the comprehensive revision of regulations on the use of fishing gear, fishing areas and protected areas in Icelandic waters – final report to the minister of fisheries and agriculture*[400]. |
| **1.1.4** | | |
| **1.1.5** | | |
| **1.1.6** | | |
| **1.1** | **The Fisheries Management Plan** | |
| **1.1.7** | | |

398 Ratified 1985: https://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm
399 http://www.un.org/documents/ga/conf151/aconf15126-4.htm
400 https://www.stjornarradid.is/lisalib/getfile.aspx?itemid=0b53db18-ba77-11e8-942c-005056bc530c

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| 1.1.8.1 | | |
| 1.1.8.2 | | |
| 1.1.8.3 | | |
| 1.1.8.4 | From where do the Faroese get their quota? Golden redfish is said to be shared between Iceland, Greenland and the Faroe Islands. Yet there is no quota allocation arrangement between all three parties – is that in any way problematic? | Comment acknowledged. Faroese catches have been very limited in the past (about 1.4% of total catches in 2006-2016, and 2.5% in 2017) and hence a formal TAC may have not been required in the past, likely because their management is through effort control, not TAC. To partially address this, 350 tonnes from the total TAC are allocated each year to other areas. The vast majority of the catches are regulated via TACs in Iceland and Greenland. The Assessment Team acknowledges this issue and agrees with the Peer Reviewer comment in so far as placing a new Recommendation directed at the Client group to deal with this point:<br><br>**The Assessment Team recommends that the Faroes catches of golden redfish be taken more formally into account through a formal catch sharing agreement, as it currently exist (i.e. in 2019) between Iceland and Greenland, or equivalent, and evaluated through simulations as part of the next golden redfish benchmark evaluation scheduled for 2020.** |
| 1.1.9.1 | | |
| 1.1.9.2 | | |
| 1.1.9.3 | | |
| 1.1.9.4 | | |
| 1.1.10.1 | | |
| 1.1.10.2 | | |
| 1.1.10.3 | | |
| 1.1.10.4 | | |
| 1.1.10.5 | | |
| 1.1.10.6 | | |
| 1.1.10.7 | | |
| 1.2 | **Research and Assessment** | |
| 1.2.1 | | |
| 1.2.2 | | |
| 1.2.3 | | |
| 1.2.4.1 | | |
| 1.2.4.2 | | |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| 1.2.4.3 | | |
| 1.2.5 | | |
| 1.2.6 | | |
| 1.2.7 | | |
| 1.3 | The Precautionary Approach | |
| 1.3.1.1 | | |
| 1.3.1.2 | | |
| 1.3.1.3 | | |
| 1.3.1.4 | | |
| 1.3.1.5 | | |
| 1.3.1.6 | | |
| 1.3.2 | Management Targets and Limits | |
| 1.3.2.1 | Harvesting rate and fishing mortality | |
| 1.3.2.1.1 | | |
| 1.3.2.1.2 | | |
| 1.3.2.2 | Stock biomass | |
| 1.3.2.2.1 | | |
| 1.3.2.2.2 | | |
| 1.3.2.2.3 | | |
| 1.3.2.2.4 | | |
| 1.3.2.3 | Stock biology and life-cycle (structure and resilience) | |
| 1.3.2.3.1 | | |
| 1.3.2.3.2 | | |
| 1.3.2.3.3 | | |
| 1.4 | External Scientific Review | |
| 1.4.1 | | |
| 1.4.2 | | |
| 1.5 | Advice and Decisions on TAC | |
| 1.5.1 | | |
| 1.5.2 | | |
| 1.5.3 | | |
| 1.5.4 | | |
| 1.5.5 | | |
| 1.5.6 | | |
| 1.5.7 | | |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| 1.5.8 | | |
| 1.5.9 | | |
| 1.5.10 | | |

### 10.1.1.3. Section 2 – Compliance and Monitoring

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| **2.1** | **Implementation, Compliance, Monitoring, Surveillance and Control** | |
| **2.1.1** | The contents of the inspections of the Directorate of Fisheries at sea are specified, but not those of the Coast Guard. Do they differ or overlap?<br>The instances of fees imposed for illegal catches increased tenfold from 2016 to 2017 – any particular reason? | Comment acknowledged.<br><br>Yes there is some small overlap between the Directorate and Coast Guard at sea inspections but the Coast Guard is more concerned with enforcement of fishery regulations (e.g. mesh sizes, logbook records, etc..). while the Directorate staff will accompany different vessels on fishing trips to count and measure fish caught.<br><br>The quota infringement relates to each incidence detected of vessels that have taken longer than the 3 days required by law to balance their quota where they have landed fish in excess of their quota (proceeding to fish without quota is a separate offence) (Pers. com. Fiskistofa). Fees imposed for illegal catches reflect the issue of balancing the transferable quotas later than required by law. |
| **2.1.2** | | |
| **2.2** | **Concordance between actual Catch and allowable Catch** | |
| **2.2.1** | | |
| **2.2.2** | | |
| **2.2.3** | | |
| **2.2.4.1** | | |
| **2.2.4.2** | | |
| **2.2.4.3** | | |
| **2.3** | **Monitoring and Control** | |
| **2.3.1** | **Vessel registration and catch quotas** | |
| **2.3.1.1** | | |
| **2.3.1.2** | | |
| **2.3.1.3** | | |
| **2.3.1.4** | | |
| **2.3.2** | **Fishing vessel monitoring and control systems** | |
| **2.3.2.1** | | |
| **2.3.2.2** | | |
| **2.3.2.3** | | |
| **2.3.2.4** | | |
| **2.3.2.5** | | |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| 2.3.2.6 | The report states that 'catch and catch recording is checked' by the Coast Guard. How does that take place? Is the catch in the holds on board physically checked – measured, counted, calculated into round weight by use of conversion factors? | Comment acknowledged. Yes, the Coast Guard takes fish samples on-board of fishing vessels and verify e-logbook data to ensure that records match with catches. |
| 2.3.2.7 | | |
| 2.3.2.8 | | |
| 2.3.2.9 | It is extremely important that the team recognizes other compliance mechanisms than state enforcement, like self-policing. It would be interested to hear whether the team also thinks that the legitimacy of rules, or of the enforcement bodies, can be considered constituent parts of the overall enforcement regime in Icelandic fisheries. | Comment acknowledged. The assessment team has discussed the element of self-policing with the Coast Guard and the Directorate. Based on this, it is the understanding of the Team that individual fishermen keep an eye for any potential transgressor in their areas and if they witness any fishery violations they report them to either the Directorate or the Coast Guard. In that respect, self-policing can be understood as an important element of the overall compliance mechanism in Iceland. |
| 2.3.2.10 | | |
| 2.3.2.11 | | |
| 2.3.2.12 | | |
| 2.3.2.13 | | |
| 2.3.2.14 | | |
| 2.3.2.15 | | |
| 2.3.2.16 | | |
| 2.3.2.17 | | |
| 2.3.3 | **Catches are subtracted from relevant quotas** | |
| 2.3.3.1 | | |
| 2.3.3.2 | | |
| 2.3.3.3 | | |
| 2.3.3.4 | | |
| 2.3.3.5 | | |
| 2.3.4 | **Rules are enforced** | |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| 2.3.4.1 | | |
| 2.3.5 | Analysis is carried out | |
| 2.3.5.1 | | |
| 2.3.5.2 | | |
| 2.3.5.3 | | |

### 10.1.1.4. Section 3 – Ecosystem Considerations

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| 3.1 | Guiding Principle | |
| 3.1.1 | | |
| 3.1.2 | | |
| 3.2 | Specific Criteria | |
| 3.2.1 | Information gathering and advice | |
| 3.2.1.1 | | |
| 3.2.1.2 | | |
| 3.2.2 | By-catch and discards | |
| 3.2.2.1 | | |
| 3.2.2.2 | | |
| 3.2.2.3 | | |
| 3.2.2.4 | | |
| 3.2.2.5 | | |
| 3.2.3 | Habitat Considerations | |
| 3.2.3.1 | | |
| 3.2.3.2 | | |
| 3.2.3.3 | | |
| 3.2.3.4 | | |
| 3.2.4 | Foodweb Considerations | |
| 3.2.4.1 | | |
| 3.2.5 | Precautionary Considerations | |
| 3.2.5.1 | | |

### 10.1.2. Conclusion – Peer Reviewer 1

The conclusions of the assessment team are appropriate based on the evidence presented in the report.

The non-conformances are appropriate.

I cannot see a Corrective Action Plan from the client, only from the Minister of Fisheries and Aquaculture – I assume this to be satisfactory according to the IRFM Standard. I agree with the Assessment Team that the actions laid out in the letter are a step in the right direction. Milestones and deliverables are not yet specified, but perhaps that's not realistic until further analysis has been done.

The Assessment Team has acknowledged the Peer Reviewer comments. The Corrective Action Plan is from the Ministry of Fisheries and Agriculture, and the effort has been coordinated by the Client Group.

Further to the corrective action letter provided, the client also clarified that the Committee on Consultation on Responsible Management of Living Marine Resources has recommended a number of actionable steps (i.e. improvement of information collection and monitoring activities, and management measure to reduce bycatch of marine mammals and seabirds) to the Ministry of Industries and Innovation. Accordingly, the Ministry is now considering further action with a view to determine what arrangements are realistically achievable and by when, potentially resulting in the following corrective action timelines:

Year 1: Ongoing work to further refine the actions identified above in terms of specific deliverables with their accompanying timeline;
Year 2: Initiate deliverable x, y, z identified in Year 1;
Year 3: Fully implement and report on progress;
Year 4: Continued implementation and reporting.

The Assessment Team understanding is that by the end of Year 1, the Icelandic authorities will have a much clearer understanding of deliverables and timelines from which a more fixed corrective action timeline can be agreed. Notwithstanding, strictly for the scope of this certification the Client Group has agreed that by the 1st surveillance (i.e. Year 1: late 2019 / early 2020) they will provide measurable evidence of corrective action towards the appropriate recording of marine mammal and seabirds catches in fishing logbooks on-board of fishing vessels, as per regulation no.126/2014[401]. This surveillance action has been agreed by the Client Group and the Ministry (see assessment report, Section 11.2: Future Surveillance Actions).

[401] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967

### 10.1.3. Peer Reviewer 2

#### 10.1.3.1. General comments – Peer Reviewer 2

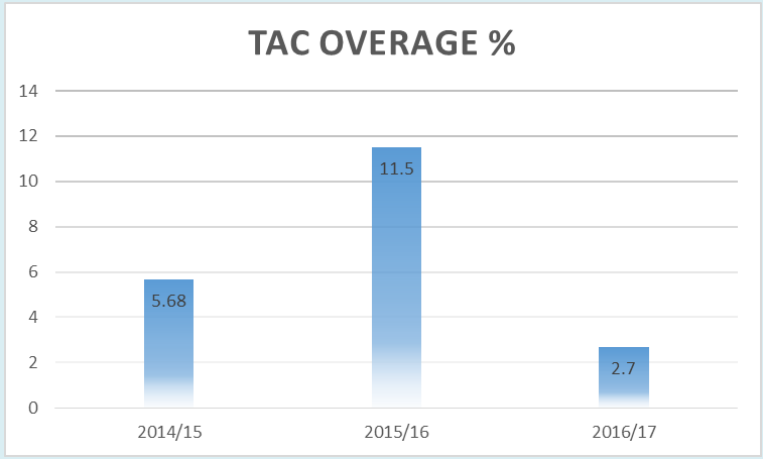
| Peer Reviewer Comments | Assessment Team Response |
|---|---|
| **General Comments** | |
| The report provides generally sufficient information to make a decision in each clause, but there are many clauses where the information provided does not support the conclusion reached, and in many cases it is even contradictory to the conclusion reached. An example is the case where Faroes Island is not part of the golden redfish TAC share agreement between Greenland and Iceland, but all clauses regarding TAC settings and decisions all reach high evidence.<br><br>Another aspect of the report is that there are a few strong statements made that can have significant implications in the conclusions reached, but these are not reflect in that conclusion and not explained or provided a context for. An example is the statement regarding ICES fishing opportunity advice is "changed and expanded" by IMFR, or that TAC decisions follow the HCR except when there are "strong reasons" not to do so. | Comments acknowledged. All of these points have been addressed in detail in the following clauses. A small summary is presented below:<br><br>In regards to the first point about Faroes catches, we note that between 2006 and 2016, Faroes catches of golden redfish have been nominal (about 1.4% of total catches), although a spike occurred in 2017 when they caught 2.5% of total catches. The Assessment Team has acknowledged the issue and drafted a new Recommendation for the Client Group to deal with the potential need for more formal accounting of such catches.<br><br>Regarding the second point on "extension of the TAC" there is been a slight misrepresentation and misunderstanding of the information provided. We note that the Icelandic Ministry and the MFRI have the ultimate say about the TAC set in each fishing year, and as such have legal power to deviate from ICES advice if deemed necessary. However, since the formal implementation of the redfish Fishery Management Plan and Harvest Control Rule in 2015, TAC recommendations have been made according to the HCR and in line with scientific advice from ICES. All in all, although deviation is ultimately possible, available evidence shows compliance with scientific advice. |

#### 10.1.3.2. Scoring element review – Peer Reviewer 2

| Peer Reviewer Comments | Assessment Team Response |
|---|---|
| **Background Section** | |
| The Background section has some of the necessary information and would improve if reference to the documents were included in the text. In opposition, the tables with the clauses justification provide much more information than the background text.<br><br>It is a choice to either provide the information in the background section and then summarised in the clause tables or the opposite. However, when there is only summary information in the background section, as in this report, one tends to either miss information needed for scoring (previous) clauses or the information added is not relevant to the issue being analysed. For example, the issues with the TAC being overshot is only explained in depth in clause 1.5.8, but this information was relevant to previous scoring clauses. | Comments acknowledged. We have added some relevant information in the background section of the report. |

### 10.1.3.3. Section 1 – Fisheries Management

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| **1.1** | **The Fisheries Management System** | |
| **1.1.1** | | |
| **1.1.2** | Are "catches in conformity with amounts allowed by the competent authorities"? TACs are overshot to significant %s (up to 11.5%) thus one cannot conclude that catches are in conformity with amounts allowed by the competent authorities. Furthermore, as the management system allows for that overshoot (either by TAC flexibilities or by the lack of Faroes in the TAC share agreement), one wonders if the system is not too permissive that the objectives of long-term sustainability cannot be put in to jeopardy? Exploitation rates that generates maximum sustainable yield (MSY) have not been achieved since 1979, and likely will not be as along as the TAC continues to be overshoot. | Comment acknowledged.<br>Since the introduction and implementation of the Golden Redfish Fishery Management Plan (FMP) and Harvest Control Rule therein, Icelandic catches have exceeded the overall TAC by an average of 6.6% (2.7 to 11.5%, figure below) due in part to catch transfer flexibility measures (i.e. between species and years) and to facilitate adherence to the discard ban.<br>  <br><br>Total Icelandic landings of golden redfish % over TACs (2014/15-2016/17). [170]<br><br>**Reasons for overshooting TAC**<br>• Transfer of quotas (Law 116/2006, §11),<br>○ Transfer of quotas between years, is legal within bounds. Vessels may transfer up to 15%[402] of catch quotas for each demersal species from one year to the next.<br>○ Transfer of quotas between most species is legal within bounds. It may happen that vessels spend part of the golden redfish quota on other species or uses quotas for other species to cover catches of golden redfish. |

402
Act No. 116/2006 as amended by Act No. 22/2010

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | | • Undersized fish catches shall still be landed and sold (up to 5% of catches per fishing year), but the vessel gets only 20% of the price. The reminder goes to the Fisheries Commission Project Fund or 'VS Fund'[403].<br>• Some of the overall TAC overages are due to catches of golden redfish outside Iceland. In the Faroes (not covered by the TAC sharing agreement between Iceland and Greenland, but Iceland unilaterally subtracts 350 tonnes from the TAC to compensate for such catches.), In the Faroes, the main regulatory tool is effort-quotas but there is no explicit quota for golden redfish, hence any catch there contributes to the overall TAC overage. The Faroese catch spiked in 2017 to 1397 tonnes out of a total of 56101 tonnes (i.e. 2.5% of total), while it was averaging 700 tonnes (about 1.4% in the previous 10 years).<br><br>During the full assessment, the Fisheries Direcorate, communicated to the Audit Team that the main reason for recently overshooting the TAC is that there are considerable golden redfish bycatches in the targeted fisheries for cod/haddock in areas closer to the coast (as opposed to deep sea fisheries). Typically these are the small to medium sized vessels in the fleet with limited catch quota in golden redfish. As a result, they utilize the allowances for transfers between species to accommodate the accidental redfish catches in their quota portfolio. This is a relatively large part of the fishing fleet so small catches handled in this way eventually add up.<br>Fiskistofa also highlighted that an attempt to incorporate these catches into the TAC (e.g. by increasing the catch quota) would mainly increase the catch quotas of the vessels that have high quota shares and are targeting golden redfish but would not help the vessels that are using the transferability option. On the other hand, stronger restrictions on transfer between species for the golden redfish may only increase the temptation for discarding – which at the moment is considered negligible[404].<br>Some of the points illustrated above impacting on TAC overages are shown in the figure below. |

403
http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Sveigjanleiki_i_aflamarkskerfinu
404
https://www.hafogvatn.is/static/extras/images/05-ICES_NWWG_loka731445.pdf

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|

| Species | Cod | Haddock | Saithe | Redfish |
|---|---|---|---|---|
| Alloc. quota | 203,094 | 31,746 | 47,918 | 43,042 |
| Compensations | 2,204 | 664 | 1,695 | 2,277 |
| Trfr. prev. year | 8,289 | 4,312 | 7,016 | 3,322 |
| Allowed catch | 213,587 | 36,722 | 56,629 | 48,641 |
| Catch | 213,007 | 34,460 | 48,815 | 51,430 |
| Balance | 580 | 2,263 | 7,814 | -2,788 |
| Transfers | -13 | 1,041 | -1,553 | 5,031 |
| New balance | 567 | 3,304 | 6,261 | 2,243 |
| Trfr/ next year | 407 | 2,961 | 2,793 | 1,957 |
| Over fished | 2 | 0 | 0 | 0 |
| Net quota status | 162 | 343 | 3,468 | 286 |

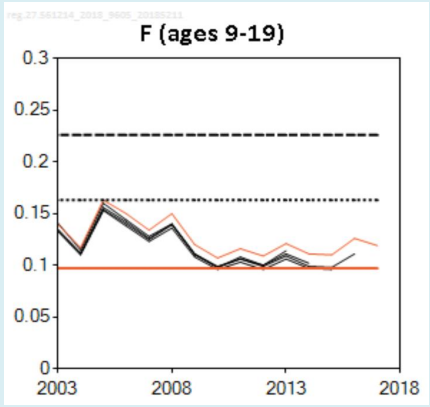
Fishing period Sept 207-Aug 2018, quotas, balances and transfer information for redfish.

In the figure above the 45,319 t TAC can be seen in the two first lines of allocated quota (the Compensations are basically the 5,3% subtracted from the general allocation on the basis of shares). There is a transfer of 3,322 tons from the previous year (a result of the allowed transfer between species that year). There is a catch, 2,788 tons in excess of allowed catch potentially due to legal allowance for juvenile landings as part of the discard ban. Transfer from other species accounts for an extra allowance of 5,031 tons which accommodates the excess catches and creates a transferable quota to next season.
The table above shows that among other factors, the flexibility measures within the Icelandic fishery management system impact the overall catches to some degree. These catches, however, are within the bounds (TAC + flexibility measures) allowed by these regulations.

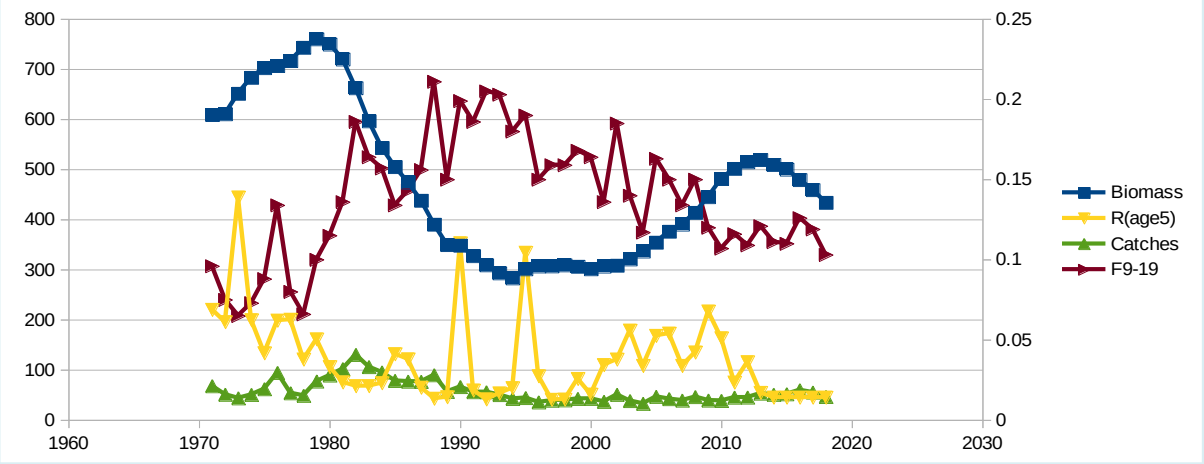
**On the question: Does the current fishing mortality compromize sustainability?** According to the previous annual assessments, the fishing mortality was reduced some years prior to introducing the current harvest rule from the previous level to close to the target value of 0.097, and has remained there. The latest (2018) assessment[405] shows a downwards revision of the stock biomass (about 12%) and an upward revision of all fishing mortalities since 2005. The reason for this revision was technical, previous assessments had not fully converged to an optimum solution. Robustness tests performed indicated that the 2018 assessment has fully converged and the problem was fixed. We note that prior to this error being spotted the fishing mortality estimate was floating since 2010 at or slightly above the target fishing mortality reference point (0.098 and 0.099 in most years), hence the issue was identified more clearly only after this latest revision.

405
https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | | Confidence intervals for F are not provided routinely with the method currently used, but the target F would be well within any sensible confidence limits. The precision of F-estimates in an assessment cannot be expected to be high enough to draw conclusions of differences like those that created concerns by the reviewer here. This does not preclude the use of harvest rules or make such rules non-precautionary, but requires that the rule can function with the assessment uncertainty that must be expected. In the simulations used to evaluate the rule, an assessment error of 20-25% was assumed, and the rule was robust to that.<br><br>The retrospective error is remarkably small which may give an impression of a high precision. However, the NWWG recognises several elements that make the assessment uncertain, which are listed for consideration in the upcoming benchmark process in 2020. Therefore, it would be more appropriate to note the marked reduction in F (which the harvest rule consolidates). In particular, this discrepancy is not likely to put the sustainability in jeopardy. The target is below the current estimate of FMSY and the point estimate now is close to the FMSY estimate. The simulations done when the rule was evaluated indicated a low risk even to the trigger biomass, when quite large uncertainties were taken into account, for example an assessment error of 20-25% with high autocorrelation, among others. This shows that the rule should be robust to far greater uncertainties than the present difference between target F and the point estimate of F.<br>  <br><br>Source. ICES 2018 advice (http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf)<br>The ICES terminology may need some clarification at this point. The F value of 0.097 (red line in the figure) is the target fishing mortality in the management plan. This value was the one evaluated because it was the one proposed by managers and it performed satisfactorily. TACs are derived by applying that to the assessed stock abundance. In some previous assessment with a slightly different method, F=0.097 was the estimate of FMSY. With the present method, where *inter alia* the growth is |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | | modeled differently, FMSY = Fmax = 0.114. However, when the management plan was presented for evaluation by the Iceland government, the target F = 0.097 was proposed since that was the estimate of FMSY at the time. The target F is now on the conservative side of the actual FMSY. ICES still refers to the target value as FMSY.<br><br>**TAC overages and stock sustainability**<br>As noted above, there is a regular overshoot of the TAC averaging 6.6% since FMP implementation in 2015, mostly for reasons that are entirely legal. It may be argued that rather than abandoning that legislation, one should apply a harvest rule that is robust to overfishing of that magnitude.<br>The effect of overshooting the TAC derived from the harvest rule naturally leads to a higher F than if the TAC had been adhered to. The exact effect has not been calculated, but apparently, the Golden redfish stock did not tolerate the fishing mortalities around 0.2 in the 1980s and 1990s, and the catches declined accordingly (Figure below). Towards the end of that period, the biomass stabilized thanks to two strong year classes and a gradual reduction of fishing mortality. The biomass then improved again due to a combination of better recruitment and reduced fishing mortality.<br>  <br><br>Development of biomass, recruitment, catches and fishing mortality since 1970. Source: Table 19.4.1 in 2018 NWWG report[406]. |

406 NWWG 2018: http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%2019_Golden%20redfish%20in%20subareas%205,%206%20and%2014.pdf

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | | Upon enquiry with the MFRI, the Audit Team was told that the overshoot of quotas were not included in the original simulations made when the HCR was decided. Since the risk even to the trigger biomass was very low in the simulations despite considerable assessment error, it is likely that the target F is small enough to tolerate a TAC overshoot of the magnitude observed here. The Audit Team determined this approach to be sufficiently conservative. Furthermore, stock biomass is still well above Btrigger and almost double the Blim threshold.<br>However, this issue should be controlled in the next benchmark evaluation, which is scheduled for 2020. The current methodology should allow for implementation bias, which is routine in many harvest rule evaluations.<br><br>**The Assessment Team acknowledges the TAC overshooting issue and agrees with the Peer Reviewer comment in so far as placing a new Recommendation for the Client Group to deal with this point:**<br><br>**The Assessment Team recommends that the issue of TAC overshooting (due to flexibility measures in Iceland as well as the Faroese catches to a smaller degree) is addressed at the next management plan revision in 2020 and that the harvest control rule is evaluated through simulation where implementation bias in the order of magnitude experienced in recent years is addressed.**<br><br>**Reflecting the additional clarification and recommendation provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.1.3** | Related to the above, are TACs "effectively implemented"? First of all there is the issue of TACs overshoot mentioned before so the TACs are not implemented effectively. Secondly, although discarding is prohibited and it is stated that "*there are virtually no under-sized fish in Icelandic waters since 2009 due to an absence of recruitment*" and that nursery grounds are closed to trawling (which seems to be in contradiction), in a mixed-fisheries with | Comment acknowledged.<br><br>The TAC overshoot issue has been effectively addressed in the assessment team response provided above (see response to comments in clause 1.1.2).<br><br>**Discards.** This issue appears in several comments, and the assessment team response is assembled here.<br>It is hardly realistic to just assume that a discard ban precludes discarding completely. However, the general attitude observed by the Audit Team in consultations with all parties was a broad consensus that discards nowadays is regarded as unacceptable and would not be tolerated. This has developed over the last decades, and may be different from the attitude in regions where discarding still is legal and discard bans are being discussed.<br>Discards in trawl and line fisheries have been estimated regularly since 2003. The method is to compare length distributions at measurements by inspectors (from the Directorate or Coast Guard) at sea with length distributions in landings[407]. The |

407 Ólafur K. Pálsson 2003. A length based analysis of haddock discards in Icelandic fisheries. Fisheries Research 59: 437-446.

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | an ITQ system, that provides a significant incentive for highgrading (discarding of smaller specimens above 33 cm, i.e. not necessarily undersize or juvenile), without monitoring at-sea how can one be sure that the TAC is followed? Discarding can still occur without being detected, as it happens for haddock and cod, an issue already detected by the relevant authorities: "*Coast Guard is currently investigating additional means to enhance detection of discarding*".<br><br>How are TACs set? It is stated that ICES advice "*is taken over by MFRI, modified and extended if necessary and presented as the scientific advice to the Ministry*". What is done in this process? The international peer-reviewed advice, that is reached with the contribution of all research institutes involved, is then taken by a national research institute and is then "*modified and extended*" to provide advice to the Ministry. This seems as an opportunity to bias scientific advice to national interests, while the statement "*very compelling and concrete arguments have been needed in the few instances in latter years when the Ministry has allowed bigger total allowable catches than recommended by the Institute*" makes | measurements concentrated on cod and haddock, but in most years until 2008, golden redfish (and saithe) was also examined. In some years, a discard rate of 0.1% is stated for golden redfish, in the other years, the statement was that the discard rate was not measurable. The sampling should be sufficient, but the difference was too small. In later years, only cod and haddock have been examined in these investigations.<br>Currently, discards in this fishery are considered negligible[408] but recent attempts to quantify discards are lacking for golden redfish. Ongoing work to establish improved ways to detect discarding is of course valuable (See Clause 2.3.2.7), but that should not be taken as a proof that substantial discarding takes place. Further studies of discarding practice with alternative methods should be encouraged, but would probably require methodological innovations that can make the cost-benefit ratio acceptable. There are several measures in place to reduce discarding and remove incentives for discarding.<br><br>• An area on the Western shelf break has been closed permanently for many years to protect concentrations of undersized redfish, which tended to assemble there. In recent years, the concentration of redfish there has been low.<br><br>• Areas where undersized fish (including redfish) appears in the catches will be temporarily closed by the MFRI. Note that this has not happened in recent years due to the lack of undersized redfish.<br><br>• Catches of undersized fish must be landed. The fish is sold (up to 5% of other marine catches per fishing year), but the vessel gets only 20% of the price. The reminder goes to the Fisheries Commission Project Fund or 'VS Fund'[409].<br><br>• Substantial discard of small redfish took place in the deep-water shrimp fishery from 1986 to 1992 when sorting grids became mandatory. Since then the discard has been insignificant both due to the sorting grid and much less abundance of small redfish in the region. Discard of redfish species in the shrimp fishery in ICES Division 14.b is currently considered insignificant.<br><br>**The process of setting the TAC**<br>According to Icelandic legislation, the responsible authority is the Ministry, and the MFRI is the formal advisor (see Clause 1.1.1 and 1.5.1). ICES is consulted and provides useful feedback and support, but the task of setting a TAC is not outsourced to ICES. MFRI knows the stocks very well, takes part in the assessment with methods developed by them, and has a very high scientific standing. Normally, the MFRI agrees with what ICES concludes and provides its advice accordingly, but if ICES makes errors, misunderstandings or unwise decisions, or if the stock develops in a way that was not foreseen, it is the MFRIs responsibility to provide the decision makers with their best advice. Since the implementation of the FMP in 2015, the national TAC has been set in line with scientific advice. |

408 http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf
409 http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Sveigjanleiki_i_aflamarkskerfinu

| # | Peer Reviewer Comments | Assessment Team Response |
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| | the decision making process of setting TACs unclear, un-transparent and likely influenced by short-term objectives.<br><br>For all these questions, the information presented does not support the evidence rating assigned. | Several mechanisms exist for ensuring transparency. Digital tools for publication are used extensively, where results and decisions are published once they are ready. Interested parties participate in decisions processes through regular meetings between industry and management. A special consultation group of the MFRI meets every year and reviews different sources and information regarding the main demersal stocks and fisheries in the Icelandic EEZ, including redfish. The consultation group consists of experts from the MFRI and fleet managers and skippers from many places around the country which conduct fisheries on small and large vessels with different gears. When the advice has been made available the Minister consults with representatives from the main stakeholders before decision is taken and regulation on commercial fisheries is issued.<br>When harvest rules have been established, the Ministry recognizes an obligation to set the TAC according to the rule[410], and it does so in practice.<br>**Reflecting the additional clarification provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.1.4** | | |
| **1.1.5** | "*MFRI advice follows the advice for ICES unless there is good reasons to deviate from it*." The transparency that existed in the international peer-reviewed ICES advice is deleted trough that advice being "*extended and modified*" by MFRI. This process of adapting ICES advice needs to clear and transparent. Also, there are no details on how environmental NGOs and the general public have access to the decisions taken by managers. Therefore the information presented does not support the evidence rating assigned. | Comment acknowledged. This has been addressed under 1.1.3. The statement has been somehow misrepresented. We note that the Icelandic Ministry and the MFRI have the ultimate say about the TAC set in each fishing year, and as such have legal power to deviate from ICES advice if deemed necessary. However, since the formal implementation of the redfish Fishery Management Plan and Harvest Control Rule in 2015, TAC recommendations have been made according to the HCR and in line with scientific advice from ICES. All in all, although deviation is ultimately possible, available evidence shows compliance with scientific advice.<br><br>We also note that the standard does not explicitly require NGOs involvement, but instead requires transparency in the fisheries management and related decision-making process. In terms of transparency, and aside from the consultations described above (response to comments to 1.1.3), available documentation and other relevant information are made available publically for the benefit of and to enable participation of interested stakeholders in decision making processes.<br><br>**Reflecting the additional clarification provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.1.6** | The fact that in the ITQ system, quota is reserved for local fisheries may also be a mechanism to avoid tension and conflict | Comment acknowledged. This additional point is correct and adds to the evidence for the clause. The text in the reported has been added accordingly. Because of this, the original scores is maintained. |

410 https://www.government.is/news/article/2014/04/01/FisheriesManagement-Plan-Golden-Redfish/

  

| # | Peer Reviewer Comments | Assessment Team Response |
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| | between fisheries. This should be referred to. | |
| **1.1** | **The Fisheries Management Plan** | |
| **1.1.7** | | |
| **1.1.8.1** | | |
| **1.1.8.2** | | |
| **1.1.8.3** | The stock distribution includes the Faroes Islands but there is no quota share agreement with the Faroes. Catches are since 2006 very small in 5b (around 1%) but that is not to say they will stay small in the future. In 2017 that have increased to around 1400 tonnes (ICES 2018 advice). However, the management plan does include the Faroes Islands (ICES 2014 special request). More explanation is needed. | Comment acknowledged. Faroese catches have been very limited in the past (about 1.4% of total catches in 2006-2016, and 2.5% in 2017) and hence a formal TAC may have not been required/feasible in the past, partly because golden redfish in the Faroese is regulated through effort control. The vast majority of the catches are regulated via TACs in Iceland and Greenland. In this respect, TAC decisions are taken in the key jurisdictions. **However, the Assessment Team acknowledges this issue and agrees with the Peer Reviewer comment in so far as placing a new Recommendation for the Client Group to deal with this point:**<br><br>**The Assessment Team recommends that the Faroes catches of golden redfish be taken more formally into account through a formal catch sharing agreement as it currently exist (i.e. in 2019) between Iceland and Greenland, and evaluated through simulations as part of the next golden redfish benchmark evaluation scheduled for 2020.**<br><br>**Reflecting the additional clarification and recommendation provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.1.8.4** | | |
| **1.1.9.1** | | |
| **1.1.9.2** | Limit reference points are estimated for the stock and include $B_{loss}$ and $F_{loss}$. The HCR decreases fishing mortality when biomass is below Bpa, and continues to decrease F when biomass is below Blim. However there are no specific, additional measures to safeguard the stock when the stock is below Blim. Nevertheless ICES has evaluated the HCR to be in line with PA and MSY approach, but does refer to the fact that "*a safety rule if SSB falls well below Blim*" should be added (ICES 2014 | Comment acknowledged. The golden redfish stock is currently well above the Btrigger reference point and almost twice above Blim. F is reduced when biomass reaches the Btrigger reference point. The ICES advice regarding the management plan (2014) has the following formulation:<br><br>***Suggestions***<br>*ICES notes that the management plan is not explicit in situations where the SSB falls well below Blim. It is therefore recommended to add a clause calling for management action in such a situation. Also, most management plans implemented in the recent past have a revision clause. This seems to be specifically useful in this case as ICES expects that the knowledge on stock dynamics and recruitment will increase over the next few years, and it should be tested whether the assumptions made during this evaluation still hold. ICES therefore proposes a scientific revision five years after implementation of the management plan.*<br><br>Specific measures if the stock falls well below Blim have not been planned, except for a reduction in F that |

  

| # | Peer Reviewer Comments | Assessment Team Response |
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| | special request). This information should also be added. | starts already at the trigger biomass. The Assessment Team agrees with the Peer Reviewer in so far as creating a new Recommendation for the Client Group to deal with this point.<br><br>**The Assessment Team recommends that the golden redfish FMP should specify that if SSB falls below Blim, additional management action should be taken, depending on the conditions prevailing, with the objective of bringing the stock back to more sustainable levels, above the Blim threshold, within an appropriate timeframe, given that the Icelandic government is in the position to take action as and if needed. This is aligned to and mirrors the ICES recommendation that a safety rule should be added (to the FMP) should SSB falls well below Blim (ICES 2014 Golden Redfish Special Request[1]).**<br><br>Note, a revision was planned after 5 years. A benchmark process with revision of both assessment method and harvest rule is scheduled for 2020.<br><br>**Reflecting the additional clarification and new recommendation provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.1.9.3** | | |
| **1.1.9.4** | | |
| **1.1.10.1** | | |
| **1.1.10.2** | | |
| **1.1.10.3** | | |
| **1.1.10.4** | Please see above points on TAC settings decisions (1.1.2 and 1.1.3). Very little information is provided in this point, while some of the discussion and information provided in 1.1.3 should be instead added to this point. Therefore the information presented does not support the evidence rating assigned**.** | Comment acknowledged. These points have been fully addressed under the response against clause 1.1.2 and 1.1.3. The clause in the text refers to other areas in the reports where the appropriate evidence has been provided.<br><br>**Reflecting the additional clarification provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.1.10.5** | | |
| **1.1.10.6** | Please see above points on monitoring and controlling discards (1.1.3). Again very little information is provided in this | Comment acknowledged. The point on discards has been fully addressed in the response to 1.1.3. We note that this clause does not specifically refer to discards. Other clauses in the standard are and the information is provided under these. |

[1] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/Special%20Requests/Iceland_Faroe_Islands_Greenland_Evaluation_of_ltmp_for_golden_redfish.pdf

  

| # | Peer Reviewer Comments | Assessment Team Response |
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| | point, while some of the discussion and information provided in 1.1.3 should be instead added to this point. Therefore the information presented does not support the evidence rating assigned. | **Reflecting the additional clarification provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.1.10.7** | | |
| **1.2** | **Research and Assessment** | |
| **1.2.1** | What I would like to see here is information specifically related to research on redfish (ex. what data is collected, what survey are done, are there any specific research projects, etc) and less what are the IMFR general objectives and means. | Comment acknowledged. Extensive information regarding redfish research was provided under clause 1.2.2 (the next clause down in the assessment report) where the appropriateness of data collected for stock assessment and its execution was assessed.<br><br>**Reflecting the additional clarification provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.2.2** | A comprehensive analysis on the data available is provided, while perhaps a more summary list of data collected and available could be described (see general comments) | Comment acknowledged. See response above. |
| **1.2.3** | | |
| **1.2.4.1** | "*There are no direct estimates of discards of golden redfish in Icelandic waters.*" This statement alone should provide the basis for only a Medium Evidence Rate. In addition, in accordance with comments above, monitoring at-sea to detected discarding of other commercial species where highgrading exists is limited, and something already identified to be improved by the relevant authorities. | Comment acknowledged. The point about discards has been fully addressed under 1.1.3.<br>The reference "*Comparison of sea and port samples from the Icelandic discard sampling program does not indicate significant discarding due to high grading in recent years*" comes from a Pálsson et. al. (2007)[411] study showing no discarding recorded for saithe and golden redfish over a 7 years' timeframe. The text has been edited and modified accordingly for clarity.<br>Currently, discards in this fishery are considered negligible[412] but recent attempts to quantify discards are lacking for golden redfish. Ongoing work to establish improved ways to detect discarding is of course valuable (See Clause 2.3.2.7), but that should not be taken as a proof that substantial discarding takes place. Further studies of discarding practice with alternative methods should be encouraged, but would probably require methodological innovations that can make the cost-benefit ratio acceptable. |

[411] https://www.hafogvatn.is/static/research/files/fjolrit-142pdf

412 http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | Has there been any comparison between commercial catches and surveys catch length compositions?<br><br>Furthermore, it is stated that "*Comparison of sea and port samples from the Icelandic discard sampling program does not indicate significant discarding due to high grading in recent years*". However, no information is given about this discard sampling programme. To my best knowledge, there are no observers at-sea programme for discard sampling in Iceland (see https://link.springer.com/chapter/10.1007/978-3-030-03308-8_1) so I wonder if its based on self-sampling by fishers, or by control inspectors? The data provided by different sampling schemes provides different levels of sampling coverage, data confidence and uncertainty. Therefore the information presented does not support the evidence rating assigned. | **Reflecting the additional clarification provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.2.4.2** | | |
| **1.2.4.3** | | |
| **1.2.5** | | |
| **1.2.6** | | |
| **1.2.7** | | |
| **1.3** | **The Precautionary Approach** | |
| **1.3.1.1** | ICES has evaluated the HCR to be in line with PA and MSY approach, but does refer to the fact that "*a safety rule if SSB falls well below Blim*" should be added (ICES 2014 special request). This information should be added. | Comment acknowledged. Text added. See also the response to 1.1.9.2 |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| **1.3.1.2** | | |
| **1.3.1.3** | Again the safety rule note should be added. | Comment acknowledged. Text already added in report. |
| **1.3.1.4** | There are two issues to be considered: first the fact that ICES has refer that "*a safety rule if SSB falls well below Blim*" should be added, and of course that this rule is not in place at the moment in the HCR to ensure that additional measures are taken when the stock is below Blim. The statement "*Further measures if SSB gets too low would depend on the reason why the SSB became reduced*" is puzzling as regardless of the reason why stock biomass could decrease, a stock that has very low biomass cannot sustain the same level of exploitation. The absence of additional measures when stock falls below Blim alone prevents reaching High Evidence Rating.<br><br>The second issue is the fact that no MSY biomass levels have been estimated for this stock. MSYBtrigger used by ICES is actually Bpa, and considering the significant difference between Fmsy proxy and Fpa, one suspects that MSYBtriger and Bmsy are significantly higher than Bpa. So there are no "Appropriate reference points" determined for biomass at MSY. And again this fact prevents reaching High Evidence Rating. Therefore the information presented does not support the evidence rating assigned**.** | Comment acknowledged. This Blim point has been addressed under 1.1.9.2 and a new recommendation to the Client Group has been created. Note that there is action taken (reducing F) when SSB declines, which starts already at the trigger biomass, to restoring stock size to levels above Blim. At Blim the target fishing mortality would be 0.07. The statement that further action will depend on why the SSB is reduced is common sense, it will typically involve much more than just an additional reduction in F or closure of the fishery.<br><br>**On the second point referring to MSY reference points.** ICES has defined reference points, which have been adopted by MFRI. Because the management is directed by an F-based harvest rule, most of these reference points are not used actively, and the rationale for some is not quite convincing. In particular, some were derived from an assessment with a previous method that was not accepted by ICES, having different y/R properties. The important reference points are discussed under Clauses 1.3.1 and 1.3.2 in the report:<br><br>• Blim (160 000 tonnes), which sets the bounds for precautionary management. This was the lowest observed in a previous assessment, in the most recent assessment the lowest observed is 147400 tonnes in 1995.<br>• Target F = 0.097, which was proposed by managers and shown in simulations to imply a low risk to Blim. It came from an FMSY estimate with a previous assessment method, while the FMSY with the present assessment method (which is the one approved by ICES) is 0.114. So the target F is on the conservative side of FMSY (Clause 1.3.1.4, see also Section 1.1.2 in the present document)<br>• Btrigger, which is set somewhat arbitrarily, but serves to reduce the fishing mortality if the stock declines too much. It is identical to the Bpa defined by ICES the standard as a safety margin to Blim. Unless biology or exploitation go outside what was assumed, the probability of reaching even the trigger biomass is low.<br><br>Other reference points are set routinely by ICES, but they are not used in the management of golden redfish. In particular, BMSY has no function in the management of golden redfish, the guidance on exploitation is from F which is set on the conservative side of FMSY. In accordance with standard practise in ICES, the management plan is regarded as compatible with the MSY principle as it leads to near maximum long term yield. This is well within the requirements for IRF certification.<br><br>In North-East Atlantic waters, F-rules are the dominating design of harvest rules, and an important reason why ICES defines MSY management in terms of a fishing mortality rather than a biomass. In other areas, a target biomass is used as a management guideline. This is even reflected in the Johannesburg declaration. However, if the recruitment fluctuates independent of SSB, which is typical in boreal waters, aiming for a target SSB will lead to large fluctuations in the catches. |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | | **Reflecting the additional clarification provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.3.1.5** | | |
| **1.3.1.6** | Again safety clause should be referred to. | Comment acknowledged. The safety rule has already been referred to. |
| **1.3.2** | **Management Targets and Limits** | |
| **1.3.2.1** | **Harvesting rate and fishing mortality** | |
| **1.3.2.1.1** | | |
| **1.3.2.1.2** | | |
| **1.3.2.2** | **Stock biomass** | |
| **1.3.2.2.1** | It is stated that "*A long term target for the stock size is not defined. It is considered redundant as the management target is to maintain a fishing mortality that is expected to lead to a biomass fluctuating safely above the precautionary biomass limit*." Although one can refer that since the management target is Fmsy the objectives of MSY are reached, the criteria asks specifically for the target to be specify, explicit or implicit. If it's not specified then High Evidence Rating cannot be reached. | Comment acknowledged. This has been clarified in the response to 1.3.1.4.<br><br>**Reference points.** ICES has defined reference points, which have been adopted by MFRI. The important reference points are discussed under Clauses 1.3.1 and 1.3.2 in the assessment report:<br><br>• Blim (160 000 tonnes), which sets the bounds for precautionary management. This was the lowest observed in a previous assessment, in the most recent assessment the lowest observed is 147400 tonnes in 1995.<br>• Target F = 0.097, which was proposed by managers and shown in simulations to imply a low risk to Blim. It came from an FMSY estimate with a previous assessment method, while the FMSY with the present assessment method (which is the one approved by ICES) is 0.114. So the target F is on the conservative side of FMSY (Clause 1.3.1.4, see also Section 1.1.2 in the present document)<br>• Btrigger, which is set somewhat arbitrarily, but serves to reduce the fishing mortality if the stock declines too much. It is identical to the Bpa defined by ICES the standard way as a safety margin to Blim. Unless biology or exploitation go outside what was assumed, the probability of reaching even the trigger biomass is low.<br><br>Other reference points are set routinely by ICES, but they are not used in the management of golden redfish. In particular, BMSY has no function in the management of golden redfish, the guidance on exploitation is from F which is set on the conservative side of FMSY. In accordance with standard practise in ICES, the management plan is regarded as compatible with the MSY principle as it leads to near maximum long term yield. The target fishing mortality has been demonstrated to provide a long term yield close to the MSY.<br><br>Also see the response made under 1.5.8. |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | | **Reflecting the additional clarification provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.3.2.2.2** | "A precautionary limit biomass Bpa has been defined as SSB = 160000 tonnes". It is not Bpa it is Blim. | Comment acknowledged. Text corrected. |
| **1.3.2.2.3** | | |
| **1.3.2.2.4** | The requirement "Should the estimated stock size approach Blim (or its proxy), then appropriate management action shall be taken with the objective of restoring stock size to levels above Blim (or its proxy) with high probability within a reasonable time frame" is clearly missing in the HCR and it is exactly what ICES was referring to in their advice in 2014 to add as safety clause to the HCR. Therefore more information is needed to support the evidence rating assigned. | Comment acknowledged. This Blim point has been addressed under 1.1.9.2. Note that there is action taken (reducing F) when SSB declines, which starts already at the trigger biomass, with the objective of restoring stock size to levels above Blim. The statement that further action will depend on why the SSB is reduced is common sense, it will typically involve much more than just an additional reduction in F or closure of the fishery. **In so far as the Assessment Team agrees with the Peer Reviewer, a Recommendation has been created for the Client Group to deal with this point in the 2020 benchmark revision process for both assessment method and harvest rule. See clause 1.1.9.2 for further details.**<br><br>**Reflecting the additional clarification and recommendation provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.3.2.3** | **Stock biology and life-cycle (structure and resilience)** | |
| **1.3.2.3.1** | | |
| **1.3.2.3.2** | Figure 28 shows closed areas for golden redfish juveniles in the South West of Iceland. Do these areas coincide with extrusion areas for golden redfish, as they are assumed to be located outside the South-West coast of Iceland? | Comment acknowledged. It is about the same area, but the extrusion area (see figure 9 in report) may be slightly further offshore. However, the intention for the closures in the South-West of Iceland (see figure 25 in clause 1.3.2.3.3) was to close a nursery area for golden redfish, not the extrusion area itself. |
| **1.3.2.3.3** | | |
| **1.4** | **External Scientific Review** | |
| **1.4.1** | | |
| **1.4.2** | Apart from the issues arisen from the statement "*The MFRI advice generally follows the ICES advice unless there is strong reasons to deviate from it*" that I | Comment acknowledged. This point has been addressed previously. Text has been modified. The National TAC has followed ICES advice since the HCR has been implemented in 2015. |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | referred before, here the information requested is about revision of the harvesting policy (i.e. the management plan) and not necessarily on the annual advice given, so this reference should be removed. | |
| **1.5** | **Advice and Decisions on TAC** | |
| **1.5.1** | | |
| **1.5.2** | | |
| **1.5.3** | As stated above, if the Faroes is not included in the share of the TAC agreed by Greenland and Iceland, then the requirement that "Decisions on TAC shall be taken by the competent fisheries management authority" is not reached because one management authority is not consulted. Therefore the information presented does not support the evidence rating assigned**.** | Comment acknowledged. As discussed earlier on (see response to 1.1.8.3), Faroese catches have been very limited in the past (about 1.4% of total catches in 2006-2016, and 2.5% in 2017) and hence a formal TAC may have not been required in the past, partly because the effort control management in the Faroese. The vast majority of the catches are regulated via TACs in Iceland and Greenland. In this respect, TAC decisions are taken by the relevant fisheries management authorities.<br>**However, the Assessment Team acknowledges this issue and agrees with the Peer Reviewer comment in so far as placing a new recommendation to deal with this point. See response to 1.1.8.3.**<br><br>**Reflecting the additional clarification and recommendation provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.5.4** | | |
| **1.5.5** | "*The Ministry has the authority to deviate from the advice, but will only do so if there is strong reasons for that*". This statement makes a strong case against the requirement that "The competent fisheries management authority shall decide on TAC within the boundaries set by the adopted harvesting policy". More explanation is needed to justify the evidence rating assigned**.** | Comment acknowledged. This has been addressed under 1.1.3. The statement has been slightly misunderstood.<br>Please refer to table 7 in the 2018 MFRI advice (http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf).<br><br>The annual TAC has been set according to the harvest control rule and scientific advice since it was adopted. The national TAC is set after subtracting 10% for Greenland and 350 tonnes for other areas.<br><br>**Reflecting the additional clarification provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |
| **1.5.6** | | |
| **1.5.7** | | |
| **1.5.8** | Please see above points on TAC settings decisions (1.1.2 and 1.1.3). Note also the | |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | statement "*Apparently, discards of golden redfish is a minor problem, but the control is sparse*".<br><br>Apart from the clear issues of TAC implementation, due very likely to a combination of a too flexible quota system associated to the lack of Faroes in the TAC agreement, (information that is finally clearly provided in this clause) which would not warrant a High Evidence Rate, there is a clear omission in the information provided of the fact that fishing mortality has not been below Fmsy since 1979. The management system has not been efficient in controlling and decreasing fishing mortality to its target, even considering a lower Fmsy target than recently estimate and having TAC decisions following, in the most part, the scientific advice following the HCR. This clearly shows that the information presented does not support the evidence rating assigned.<br><br>Finally, the statement that "*stock biomass is still well above Btrigger and almost double the Blim threshold, a sign that the harvest strategy and fishery management plan are working*." is incorrect. Not only if F above Fmsy, and thus the expected MSY are not being | Comment acknowledged. See the response to the comments on clause 1.1.2, where the topic of discards has been fully addressed.<br><br>The last sentence apparently regards reaching a stock biomass related to MSY. The rule adopted for golden redfish does not aim for a certain biomass, but lets the biomass fluctuate with a constant standard mortality. Effectively, the target F is not necessarily a target in the real sense, but a parameter in the rule, providing a primary TAC derived from an assessment which may or may not be further modified, for example by catch stabilizers. For the golden redfish, there is no further modifiers in the present rule except some banking and borrowing between years, so one should expect the fishing mortality to fluctuate near the target value. However, the uncertainty in the estimate can be quite big, and hitting the target each year is hardly realistic. In North-East Atlantic waters, F-rules are the dominating design of harvest rules, and an important reason why ICES defines MSY management in terms of a fishing mortality rather than a biomass. In other areas, a target biomass is used as a management guideline. This is even reflected in the Johannesburg declaration. However, if the recruitment fluctuates independent of SSB, which is typical in boreal waters, aiming for a target SSB will lead to large fluctuations in the catches.<br><br>We also note that the latest (2018) assessment[413] shows a downwards revision of the stock biomass (about 12%) and an upward revision of all fishing mortalities since 2005. The reason for this revision was technical, previous assessments had not fully converged to an optimum solution. Robustness tests performed indicated that the 2018 assessment has fully converged and the problem was fixed. Prior to this error being spotted the fishing mortality estimate was floating since 2010 at or slightly above the target fishing mortality reference point (0.098 and 0.099 in most years), as shown in the response to the comments for clause 1.1.2, and as such, the issue was identified more clearly only after this latest revision.<br>**Reflecting the additional clarification provided above addressing the Peer Reviewer comments, the Assessment Team has agreed to maintain the initial score applied.** |

413
https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | reached, which is an objective of the harvest strategy, Btrigger is in fact Bpa, which is likely a underestimation of any proxy for stock biomass at Fmsy. | |
| **1.5.9** | | |
| **1.5.10** | | |

### 10.1.3.4. Section 2 – Compliance and Monitoring

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| **2.1** | **Implementation, Compliance, Monitoring, Surveillance and Control** | |
| **2.1.1** | | |
| **2.1.2** | | |
| **2.2** | **Concordance between actual Catch and allowable Catch** | |
| **2.2.1** | Please see comments above on clause 1.5.8 | Comment acknowledged. These have been dealt with in the response to clause 1.1.2. Text modified accordingly. |
| **2.2.2** | | |
| **2.2.3** | "*Coast Guard is currently investigating additional means to enhance detection of discarding*". This and the reasons for it should be added. | Comment acknowledged. The reason is to enhance the confidence of current discard estimates. Text modified accordingly. |
| **2.2.4.1** | | |
| **2.2.4.2** | | |
| **2.2.4.3** | | |
| **2.3** | **Monitoring and Control** | |
| **2.3.1** | **Vessel registration and catch quotas** | |
| **2.3.1.1** | | |
| **2.3.1.2** | | |
| **2.3.1.3** | | |
| **2.3.1.4** | | |
| **2.3.2** | **Fishing vessel monitoring and control systems** | |
| **2.3.2.1** | "*Coast Guard is currently investigating additional means to enhance detection of discarding*". This and the reasons for it should be added. | Comment acknowledged. The reason is to enhance the confidence of current discard estimates. Text modified accordingly. |
| **2.3.2.2** | | |
| **2.3.2.3** | | |
| **2.3.2.4** | Non-conformity recording of marine mammals and seabirds | |
| **2.3.2.5** | | |
| **2.3.2.6** | | |
| **2.3.2.7** | Please see comments above regarding discarding. | Comment acknowledged. This clause deals with discarding of catch other than the stock under consideration. |
| **2.3.2.8** | | |
| **2.3.2.9** | | |
| **2.3.2.10** | | |
| **2.3.2.11** | | |
| **2.3.2.12** | | |
| **2.3.2.13** | | |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| 2.3.2.14 | | |
| 2.3.2.15 | | |
| 2.3.2.16 | | |
| 2.3.2.17 | | |
| 2.3.3 | Catches are subtracted from relevant quotas | |
| 2.3.3.1 | | |
| 2.3.3.2 | | |
| 2.3.3.3 | | |
| 2.3.3.4 | | |
| 2.3.3.5 | | |
| 2.3.4 | Rules are enforced | |
| 2.3.4.1 | | |
| 2.3.5 | Analysis is carried out | |
| 2.3.5.1 | | |
| 2.3.5.2 | | |
| 2.3.5.3 | | |

### 10.1.3.5. Section 3 – Ecosystem Considerations

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| **3.1** | **Guiding Principle** | |
| **3.1.1** | Recommendation on VMEs deep-sea sponge aggregations and sea pen fields. | No comment. |
| **3.1.2** | Recommendation on VMEs deep-sea sponge aggregations and sea pen fields. | No comment. |
| **3.2** | **Specific Criteria** | |
| **3.2.1** | **Information gathering and advice** | |
| **3.2.1.1** | | |
| **3.2.1.2** | | |
| **3.2.2** | **By-catch and discards** | |
| **3.2.2.1** | | |
| **3.2.2.2** | | |
| **3.2.2.3** | Recommendation harbour porpoise and seals | No comment. |
| **3.2.2.4** | | |
| **3.2.2.5** | | |
| **3.2.3** | **Habitat Considerations** | |
| **3.2.3.1** | | |
| **3.2.3.2** | | |
| **3.2.3.3** | | |
| **3.2.3.4** | | |
| **3.2.4** | **Foodweb Considerations** | |
| **3.2.4.1** | | |
| **3.2.5** | **Precautionary Considerations** | |
| **3.2.5.1** | | |

#### 10.1.3.6. Conclusion – Peer Reviewer 2

As stated above, the report provides generally sufficient information to make a decision in each clause, but there are many clauses where the information provided does not support the conclusion reached, and in many cases it is even contradictory to the conclusion reached. Therefore additional information should be provided, particularly regarding the Fisheries Management System, Stock Biomass and Advice and Decisions on TAC. Nevertheless, the non-conformances raised are appropriate and the Corrective Action Plan is appropriate and likely to address the non-conformance within the specified timeframe.

The Assessment Team thanks the Peer Reviewer for her useful comments. We have addressed all the comments above and raised a number of new Recommendations for the Client group to address the key issues raised.

### 10.1.4. Peer Reviewer 3

#### 10.1.4.1. General comments – Peer Reviewer 3

| Peer Reviewer Comments | Assessment Team Response |
|---|---|
| **General Comments** | |
| A very careful analysis of the criteria has been carried out by the assessment team. Well presented and comprehensive evidence is supplied in the report to illustrate all points. In general Icelandic fisheries are exceptionally well managed in terms of both short and long term objectives. However, I have to agree with the non-conformance and recommendations regarding the non-commercial vulnerable species and marine ecosystems that are not so well managed. | Comments acknowledged. |

#### 10.1.4.2. Scoring element review – Peer Reviewer 3

| Peer Reviewer Comments | Assessment Team Response |
|---|---|
| **Background Section** | |
| This is a good overview of the stock biology, the fishery and the management, it is well written and logical. I see no areas that require further clarification, only points where there may be scope for improving the text. | Comments acknowledged. |

### 10.1.4.3. Section 1 – Fisheries Management

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| **1.1** | **The Fisheries Management System** | |
| **1.1.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.4** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.5** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.6** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1** | **The Fisheries Management Plan** | |
| **1.1.7** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.8.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.8.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.8.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.8.4** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.9.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.9.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.9.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.9.4** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.10.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.10.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.10.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.10.4** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.10.5** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.10.6** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.1.10.7** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.2** | **Research and Assessment** | |
| **1.2.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.2.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.2.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.2.4.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.2.4.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.2.4.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.2.5** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.2.6** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **1.2.7** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| 1.3 | **The Precautionary Approach** | |
| 1.3.1.1 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.1.2 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.1.3 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.1.4 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.1.5 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.1.6 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.2 | **Management Targets and Limits** | |
| 1.3.2.1 | **Harvesting rate and fishing mortality** | |
| 1.3.2.1.1 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.2.1.2 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.2.2 | **Stock biomass** | |
| 1.3.2.2.1 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.2.2.2 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.2.2.3 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.2.2.4 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.2.3 | **Stock biology and life-cycle (structure and resilience)** | |
| 1.3.2.3.1 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.2.3.2 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.3.2.3.3 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.4 | **External Scientific Review** | |
| 1.4.1 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.4.2 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.5 | **Advice and Decisions on TAC** | |
| 1.5.1 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.5.2 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.5.3 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.5.4 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.5.5 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.5.6 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.5.7 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.5.8 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.5.9 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| 1.5.10 | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |

### 10.1.4.4. Section 2 – Compliance and Monitoring

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| **2.1** | **Implementation, Compliance, Monitoring, Surveillance and Control** | |
| **2.1.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.1.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.2** | **Concordance between actual Catch and allowable Catch** | |
| **2.2.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.2.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.2.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.2.4.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.2.4.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.2.4.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3** | **Monitoring and Control** | |
| **2.3.1** | **Vessel registration and catch quotas** | |
| **2.3.1.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.1.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.1.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.1.4** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2** | **Fishing vessel monitoring and control systems** | |
| **2.3.2.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.4** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.5** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.6** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.7** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.8** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.9** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.10** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.11** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.12** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.13** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.14** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.15** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.16** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.2.17** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| **2.3.3** | **Catches are subtracted from relevant quotas** | |
| **2.3.3.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.3.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.3.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.3.4** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.3.5** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.4** | **Rules are enforced** | |
| **2.3.4.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.5** | **Analysis is carried out** | |
| **2.3.5.1** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.5.2** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |
| **2.3.5.3** | <Insert (if comment is not required then you can leave blank or mark as N/A)> | |

### 10.1.4.5. Section 3 – Ecosystem Considerations

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| **3.1** | **Guiding Principle** | |
| **3.1.1** | For Spotted Wolfish 'The status of this stock will be verified again by next year's assessment team to ensure an official TAC has been set and implemented' does this mean a non-conformance? Or is it a recommendation?<br><br>'The WG noted that large ecosystem changes have been observed in the Icelandic ecosystem between 2015 and 2016, which could have affected the abundance and distribution of harbour porpoises' is there more information on these changes in another part of the report? | It is neither, the plan for next year it to check if an official TAC has been implemented, as was advised by the MFRI during the site visits, to improve the management of this species.<br><br>The reference on Harbour porpoises is from a 2018 NAMMCO report (https://nammco.no/wp-content/uploads/2018/01/08-nammco-26-scientific-committee-report.pdf) but there is nothing more specific about these ecosystem changes and how they may relate to harbour porpoises abundance.<br><br>Key environmental changes and signals registered in 2017 and recent years in the Icelandic ecosystem have been provided early on in this same clause. |
| **3.1.2** | N/A | |
| **3.2** | **Specific Criteria** | |
| **3.2.1** | **Information gathering and advice** | |
| **3.2.1.1** | N/A | |
| **3.2.1.2** | N/A | |
| **3.2.2** | **By-catch and discards** | |
| **3.2.2.1** | N/A | |
| **3.2.2.2** | N/A | |
| **3.2.2.3** | N/A | |
| **3.2.2.4** | The effect of the fishery on the critically endangered grey skate (Dipturus batis), in particular, really should be assessed here and should result in a non-conformance that ensures management strategies are improved substantially. The only steps available currently is a ban on directed fishing. 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 | Comment acknowledged. We note that there is no directed fishery for this grey skate, catches (as bycatch) have been stable at around 135 tonnes in the past 10 years and catches from the spring bottom trawl survey have been increasing since 2010.<br>Recent studies have shown that the common skate in the Northeast Atlantic may actually be one of two nominal species; the smaller blue skate or grey skate (*Dipturus flossada*) and the large flapper skate (*Dipturus intermedia*); together they are more commonly referred to as the *D. batis* (listed as Critically Endangered under the IUCN Red list[414], last assessed in 2006) species-complex (Iglésias, 2009)[415]. Investigation of skates in Icelandic waters have shown that |

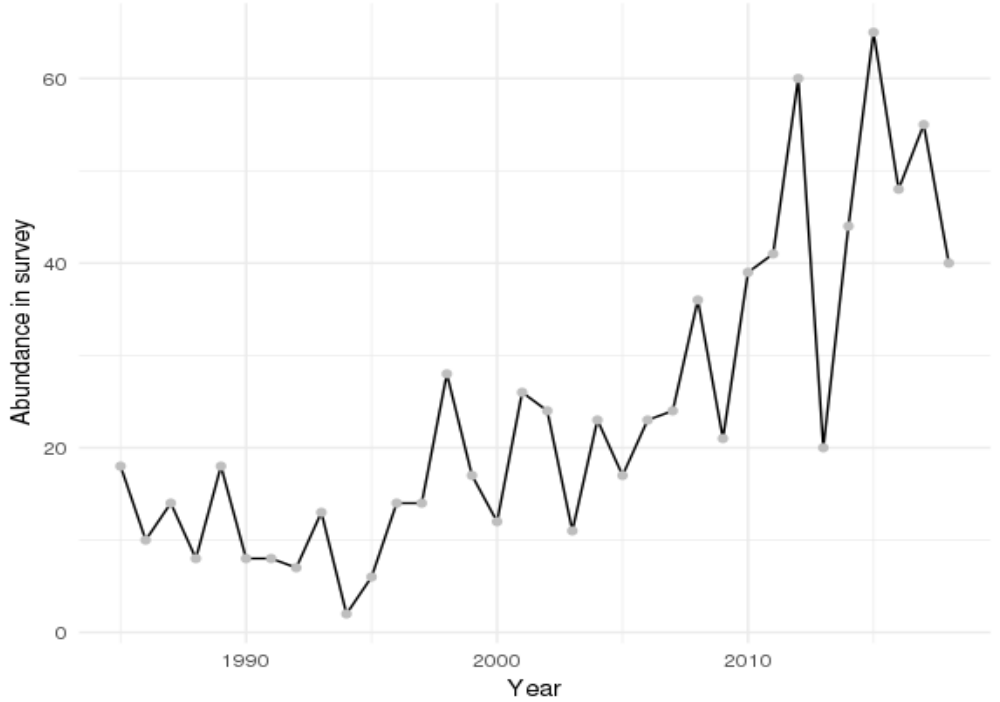
[414] https://www.iucnredlist.org/species/39397/10198950#assessment-information
[415] https://onlinelibrary.wiley.com/doi/abs/10.1002/aqc.1083

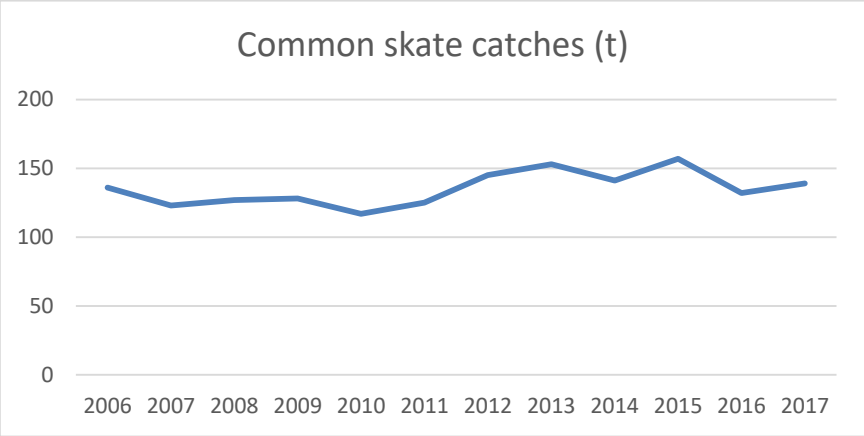
| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | dogfish (Squalus acanthias) given reasonable amounts are taken in the fishery. | the skate currently found in Icelandic waters, and caught as bycatch in Icelandic fisheries, is the smaller grey skate (*D. flossada*) (Jonbjorn Pálsson, unpublished material) with the larger sister species, the flapper skate (*D. intermedia*), believed to be almost extinct in the Atlantic.<br>A taxonomic revision of these species has concluded that the smaller-bodied blue skate should retain the scientific name *Dipturus batis* and the larger-bodied flapper skate is now referred to as *Dipturus intermedius* (Last et al., 2016). FAO have accepted the latter name, assigning it the ASFIS code DRJ. Flapper skate is reported predominantly from the northern North Sea and north-west Scotland and is occasionally found in the Celtic Sea. Blue skate is reported predominantly in the Celtic Sea, and its distribution extends northwards to Iceland. The southern limits of both species are uncertain[416].<br>No TAC is available for this species because there is no directed fishery for it. It is caught as bycatch in mainly longline, bottom trawl and Danish seine gear. No assessment is carried out for grey skate and indices of abundance are uncertain as only limited survey data exists. Recent survey trends indicate some increase in the scientific groundfish survey performed in Iceland (Figure below). |

[416] http://ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/rjb.27.89a.pdf

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| | |  <br>Total catch in numbers of Grey skate (*Dipturus flossada/batis*) in MFRI spring survey (1985 – 2018) (Source: MFRI data provided to assessment team during Nov. 2018 site visits).<br><br>MFRI will continue to report on incidences of capture and distribution of skate during the spring bottom trawl survey as they have been doing since the survey began in 1985. In addition, catches in commercial fisheries will continue to be collected and the MFRI will monitor whether significant changes either the survey results or the level of landed catches occur. Bycatch amounts have been stable in recent years, as shown in the figure below. |

<table>
<tr><th>#</th><th>Peer Reviewer Comments</th><th>Assessment Team Response</th></tr>
<tr><td></td><td></td><td>


Catches of grey skate in Iceland from 2006 and 2017.<br><br>
Spiny dogfish<br>
When foreign fleets operated in Iceland, hundreds of tonnes of spiny dogfishes were fished annually. However, Icelandic catches have always been low, less than 10 tonnes, in recent years. Catches in 2015, 2016, and 2017 were 8, 8 and 2 tonnes, respectively.
<table>
<tr><td>Year</td><td>2006</td><td>2007</td><td>2008</td><td>2009</td><td>2010</td><td>2011</td><td>2012</td><td>2013</td><td>2014</td><td>2015</td><td>2016</td><td>2017</td></tr>
<tr><td>Spiny dogfish catches (t)</td><td>82</td><td>43</td><td>68</td><td>102</td><td>62</td><td>53</td><td>51</td><td>6</td><td>19</td><td>8</td><td>8</td><td>2</td></tr>
</table>
As spiny dogfish are an aggregating species, landings can be dominated by relatively few large hauls leading to large fluctuations in annual landings and/or survey results. There is no directed fishery for spiny dogfish and current catches are solely bycatch in other fisheries, primarily gillnet fisheries off the southern coast during the summer months. Recent catches of spiny dogfish appear to be unlikely to significantly affect the status of the stock.<br><br>
The Assessment Team has retained the original score applied to this clause.
</td></tr>
<tr><td>3.2.2.5</td><td>N/A</td><td></td></tr>
<tr><td>3.2.3</td><td colspan="2">Habitat Considerations</td></tr>
<tr><td>3.2.3.1</td><td>Clauses specify stony corals and hydrothermal vents only; I agree with Recommendation #2 regarding sponges</td><td>No comment needed.</td></tr>
</table>

| # | Peer Reviewer Comments | Assessment Team Response |
|---|---|---|
| 3.2.3.2 | N/A | |
| 3.2.3.3 | N/A | |
| 3.2.3.4 | N/A | |
| 3.2.4 | **Foodweb Considerations** | |
| 3.2.4.1 | N/A | |
| 3.2.5 | **Precautionary Considerations** | |
| 3.2.5.1 | N/A | |

### 10.1.5. Conclusion – Peer Reviewer 3

I agree with the conclusion of the assessment team based on the evidence presented in the assessment report, that the fishery should be certified.

Where non-conformances requiring corrective actions on behalf of the fishery have been raised, for each such non-conformance, please provide:

- An indication of whether or not you believe the non-conformances are appropriate.
- An indication of whether or not you believe the Corrective Action Plan is appropriate and likely to address the non-conformance within the specified timeframe.

**Non-conformance #1 (Clause 2.3.2.4: Minor Non-conformance).** Although required by legislation, there is some evidence of non-reporting/under-reporting of seabirds and marine mammals bycatch such that the Assessment Team cannot be fully confident that catch amounts by species and fishing area (of marine mammals and seabirds) are estimated and continually recorded in fishing logbooks.

From the evidence supplied it is clear that under-reporting of seabirds and marine mammals is occurring, therefore the minor non-conformance is appropriate.

The Corrective Action Plan is appropriate especially with regards to the technology and training of fishermen, which will help to inform and deliver. I believe the timeframe is reasonable to address the non-conformance but ongoing training of fishermen would help with continued success.

The Assessment Team thanks the Peer Reviewer and acknowledges the comments. Fishermen training is part of the efforts of the MFRI and Fiskistofa, based on communications had at the site visits in November 2018.

# 11. Non-conformances and Corrective Actions

This fishery did not have past corrective action plans active at the start of this re-assessment, in 2018.

During this re-assessment audit all clauses but one were found to be in full conformance. Accordingly, the Assessment Team has identified a Minor Non Conformance against clause 2.3.2.4 of the IRFM Standard.

***Clause 2.3.2.4.*** *Catch amounts by species and fishing area shall be estimated and continually recorded in fishing logbooks on-board the fishing vessels.*

**Rationale:** The recording of marine mammals and seabirds by number and species is required by Icelandic regulation[417]. Despite the implementation of new mandatory logbook reporting procedures for seabird and marine mammal bycatch, available evidence suggests that far fewer incidences of seabird and marine mammal bycatch are reported via the electronic logbook system than would be expected given the levels reported by onboard observers. This suggests significant levels of under-reporting and/or non-reporting of seabird and marine mammal bycatch. Examples of available evidence to support this conclusion include the findings of Pálsson *et al.* 2015[418] and the March 2018 MFRI report titled: "Bycatch of Seabirds and Marine Mammals in lumpsucker gillnets 2014-2017".

Pálsson *et al.* 2015 highlighted the fact that their bycatch estimates were based on limited data that needed to be increased and improved with a functioning reporting system for the fishery and better follow up.

The 2018 MFRI report found that although reported bycatch in E-logbooks by the fleet has increased (suggesting better compliance with reporting requirements) the overall bycatch rates are still much lower than observed in the trips by inspectors. Overall, the marine mammal and seabird bycatch rate during inspector trips was around four times higher than reported by the fleet in 2017[419].

Furthermore according to a 2017 presentation to NAMMCO's Working group on bycatch of marine mammals; *"logbooks have unfortunately proven unreliable"* and *"bycatch of birds and marine mammals* [is] *18x higher when observer is present vs logbook records"*.[420]

While much of the evidence related to non-compliance with reporting requirements may relate to the lumpsucker fishery, this fishery is still part of the management system under review. In addition, there is insufficient evidence to show that compliance in the fisheries under assessment is better.

**Non-conformance #1 (Clause 2.3.2.4: Minor Non-conformance).** Although required by legislation, there is some evidence of non-reporting/under-reporting of seabirds and marine mammals bycatch such that the Assessment Team cannot be fully confident that catch amounts by species and fishing area (of marine mammals and seabirds) are estimated and continually recorded in fishing logbooks.

[417] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967
[418] https://www.hafogvatn.is/static/research/files/fjolrit-178pdf
[419] https://www.hafogvatn.is/static/files/skjol/techreport-bycatch-of-birds-and-marine-mammals-lumpsucker-en-final-draft.pdf
[420] https://nammco.no/wp-content/uploads/2017/04/nammco-meeting-iceland-gms.pptx

**The Client has provided the following corrective action letter and plan.**

ATVINNUVEGA- OG
NÝSKÖPUNARRÁÐUNEYTIÐ

*Ministry of Industries and Innovation*

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

To whom it may concern

Reykjavík February 15, 2019
Reference: ANR18030330/11.02.09

The Icelandic fisheries management system is based on responsible conservation and sustainable use of living marine resources and an integral part of the system is to manage ecosystem effects of fishing, including bycatches of commercial and non-commercial species. All management decisions are taken based on the best available science.

Effective control and enforcement is a pivotal element of a responsible fisheries management system. The Directorate of Fisheries monitors fisheries to ensure that rules are being followed. Real-time status of landings is delivered to a live database through a synchronized weight control system at all landing ports. The Directorate also carries out surveillance and inspections of the fishing operations, landing of catches and processing plants in close collaboration with the Icelandic Coast Guard, the Food and Veterinary Authority as well as accredited municipal harbor officials responsible for proper recording of the weight of the landed catch.

Icelandic law explicitly prohibits discards of commercial species, i.e. bycatches of unwanted species or undersized fish. There are certain flexibility options and incentives for compliance incorporated into the system, to make it function well in practice.
Incidental catch of non-commercial species such as seabirds and marine mammals is monitored by mandatory recordings in electronic logbooks. These measures are meant to maintain the delicate balance between effective harvesting and good environmental health to support sustainable fisheries.

The Marine and Freshwater Institute in Iceland issues reports on incidental bycatches of non-commercial species. One issue that is currently being addressed as a result of the recommendations of these reports is the need for further measures to encourage the reporting of these catches in logbooks to prevent the transition from paper-logbooks to electronic reporting from resulting in lower levels of reporting. According to the reports from the MFRI, bycatch of marine mammals and seabirds are most frequent in gillnet fisheries.

The Minister of Fisheries recently received a response to his request to the Committee for consultation on responsible management of living marine resources regarding addressing

non-commercial bycatches. On the basis of the conclusions of this committee, work has commenced to improve data recording, data availability and reliability and explore certain management measures to reduce bycatch of these species.

The committee comprises individuals from main stakeholder organizations in the fishing industry as well as the Marine and Freshwater Research Institute and the Ministry of Fisheries.

The Ministry will be working with the MFRI, the Directorate and the fishing industry in the next months with the aim of acquiring accurate and more detailed information on frequency of non-commercial bycatches, by fishing-gear, area and time. This information is essential for the MFRI as basis for recommendation on management actions to address any significant adverse impacts of fisheries on these species in question and the ecosystem health in general. These actions could include time and area closures and fishing gear amendments.

On behalf of the Minister of Fisheries and Agriculture

Brynhildur Benediktsdóttir

### 11.1. Audit Team Response to the Corrective Action Plan

The Audit Team commends the client and the Ministry of Industries and Innovation for providing a Corrective Action Plan relative to the identified minor non-conformance against clause 2.3.2.4 of the IRFF Standard (V2).

Accordingly, the Team acknowledges that work has commenced from the Committee on Consultation on Responsible Management of Living Marine Resources towards addressing the non-commercial bycatches issue. This work is focused around improvement of data recording, data availability and reliability and to explore management options. We also note, through the Committee, the stated collective commitment of the Icelandic industry and fishery management authorities, in the next months, to acquire better and more detailed data on bycatch frequency, by fishing gear, area and time, and that resulting action recommended by the MFRI could include time and area closures and fishing gear amendments.

The Audit Team has determined that the corrective action plan is a step in the right direction to address the identified bycatch issue in a general sense, and more specifically, the minor non-conformance identified.

Further to the corrective action letter provided, the client also clarified that the Committee has recommended the following to the Ministry of Industries and Innovation:

1) Improvement of information collection and monitoring activities to gather reliable seabird and marine mammal bycatch information from vessel e-logbooks (and directly addressing the non-conformance) through technology development (e.g. mobile app in development by the Directorate), a species identification training program for fishermen and observers, and a general improvement in the quality of bycatch data (i.e. narrower confidence limits) and depth of information recorded (e.g. catch information on area, time, depth etc.) to help design mitigation measures that will result in appropriate industry acceptance and buy in;

2) Measures to reduce bycatch (e.g. potential spatial/temporal closures at sensitive times such as around seal pupping or bird breeding season); and

3) US Marine Mammal Protection Act importing requirements collectively dealt with through improvements in the previous two points (i.e. information gathering and management measures).

Accordingly, the Ministry is now considering further action with a view to determine what arrangements are realistically achievable and by when, potentially resulting in the following corrective action timelines:

Year 1: Ongoing work to further refine the actions identified above in terms of specific deliverables with their accompanying timeline;
Year 2: Initiate deliverable x, y, z identified in Year 1;
Year 3: Fully implement and report on progress;
Year 4: Continued implementation and reporting.

**The Assessment Team has accepted the Corrective Action Plan provided by the Client for the fishery under assessment.**

## 11.2. Future Surveillance Actions

The following table details the projected future surveillance actions.

**Table 26**. Key future surveillance actions.

| Clause No. | Surveillance Action |
|---|---|
| 2.3.2.4. Catch amounts by species and fishing area shall be estimated and continually recorded in fishing logbooks on-board the fishing vessels | According to the corrective action plan stating that such work will be carried out in the "next (coming) months", and considering that clause 2.3.2.4 is a *Fishing Vessel Monitoring and Control System* clause dealing with the continuous recording of catch amounts by species and fishing area in logbooks (as opposed to data collection generated by research programs), the Client shall provide, in time for the next audit, measurable evidence of corrective action towards the appropriate recording of marine mammal and seabirds catches in fishing logbooks on-board of fishing vessels, as per regulation no.126/2014[421]. |

## 11.3. Recommendations

Further to the Minor Non-Conformance identified, five Recommendations have been recorded.

**Recommendation #1 (relating to clause 1.1.9.2).** The Assessment Team recommends that the golden redfish FMP should specify that if SSB falls below Blim, additional management action should be taken, depending on the conditions prevailing, with the objective of bringing the stock back to more sustainable levels, above the Blim threshold, within an appropriate timeframe, given that the Icelandic government is in the position to take action as and if needed. This is aligned to and mirrors the ICES recommendation that a safety rule should be added (to the FMP) should SSB falls well below Blim (ICES 2014 Golden Redfish Special Request).

**Recommendation #2 (relating to clause 1.3.1.3).** The Assessment Team recommends that the issue of TAC overshooting (due to flexibility measures in Iceland as well as the Faroese catches to a smaller degree) is addressed at the next management plan revision in 2020 and that the harvest control rule is evaluated through simulation by addressing the implementation bias in the order of magnitude experienced in recent years.

**Recommendation #3 (relating to clause 1.5.4).** The Assessment Team recommends that the Faroes catches of golden redfish be taken more formally into account through a formal catch sharing agreement, as it currently exist (i.e. in 2019) between Iceland and Greenland, or equivalent, and *evaluated* through simulations as part of the next golden redfish benchmark evaluation scheduled for 2020.

**Recommendation #4 (relating to clause 3.1.1 and 3.1.2)**
Several fisheries management plans (e.g. those for cod, haddock, saithe and redfish) state that it is the policy of the Icelandic government to protect vulnerable marine ecosystems (VMEs). VMEs of particular importance within Iceland include cold water coral communities and hydrothermal vent areas, but also deep sea sponge aggregations (a threatened and declining habitat, according to OSPAR[422]) and sea-pen fields[423]. Currently,

[421] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967
[422] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Ecosystem_overview-Icelandic_Waters_ecoregion.pdf
[423] https://novasarc.hafogvatn.is/project/

there are explicit conservation measures for cold water corals and hydrothermal vents (i.e. area closures) but nothing explicit for either deep sea sponge aggregations or sea pen fields. The assessment team recommends that more formal conservation plans/measures are formulated for these VMEs.

**Recommendation #5 (relating to clause 3.2.2.3)**
The assessment team recommends that the population and status of harbour porpoise (*Phocoena phocoena)* and that of harbour seal (*Phoca vitulina*) in Iceland are appropriately monitored due to risk of significant depletion to both populations, specifically in regards to their performance in relation to current targets (i.e. FMRI management objective of 12,000 harbour seals) and annual replacement potential (e.g. ASCOBANS threshold of 1.7% for harbour porpoises [424]).

**It is noted that the issues highlighted in these recommendations will be reviewed in subsequent surveillance audits, and that some of these have the potential to develop into non-conformances if the issues persist or worsen.**

[424] http://www.ascobans.org/en/document/ospar-background-document-harbour-porpoise-phocoena-phocoena

# 12. Recommendation and Determination

**The assessment team recommends that the management system of the applicant fishery, the Icelandic Golden redfish (*Sebastes norvegicus*) commercial fishery under state management by the Icelandic Ministry of Industries and Innovation, fished directly by demersal trawl (principal gear), long-line, gill net, Danish seine net, and hook and line by small vessel gear, and indirectly with Nephrops trawls, shrimp trawls, pelagic trawls and purse seines within Iceland's 200 nautical miles Exclusive Economic Zone (EEZ), be granted certification.**

# 13. References


| Bibliography | Weblink |
|---|---|
| Bjornsson H., Thorsteinn S. 2003. Assessment of golden redfish (Sebastes marinus L) in Icelandic waters*. SCI. MAR., 67 (Suppl. 1): 301-314. | http://scimar.icm.csic.es/scimar/pdf/67/sm67s1301.pdf |
| ABCBIRDS. 2015. In-Depth Analyses of Seabird Bycatch in Individual Marine Stewardship Council Fisheries. American Bird Conservancy. | https://abcbirds.org/wp-content/uploads/2015/05/ABC_Analysis_of_MSC_Certification_on_Seabird_Bycatch_Pt_2_Fishery_Analyses.pdf |
| ACAP (2017) ACAP Review and Best Practice Advice for Reducing the Impact of Pelagic Longline Fisheries on Seabirds. In: ACAP - Tenth Meeting of the Advisory Committee. ACAP, Wellington, New Zealand. | https://acap.aq/en/bycatch-mitigation/mitigation-advice/3242-acap-2017-review-and-best-practice-advice-for-reducing-the-impact-of-pelagic-longline-fisheries-on-seabirds/file |
| Agnarsson, S., and Arnason, R. 2003. The Role of the Fishing Industry in the Icelandic Economy. A historical Examination. WR:03. Institute of Economic Studies. | http://www.ioes.hi.is/sites/hhi.hi.is/files/W-series/2003/w0307.pdf |
| Althingi. 1996. Act 1996 nr. 57 on the conduct of marine fish stocks. Accessed 21 March 2019. | http://www.althingi.is/lagas/148a/2015112.html |
| Althingi. 2017. Act amending the Act on Access to Marine Marine Stocks and the Act on the Directorate of Fisheries (monitoring of weighing license holders). Accessed 21 March 2019. | https://www.althingi.is/altext/stjt/2017.048.html |
| Althingi. 2018. Act on fishing in Iceland's exclusive fishing zone 1997 no. May 26. Icelandic law, 20 January 2019. Issue 149a | https://www.althingi.is/lagas/nuna/1997079.html |
| Althingi. Act 2015 nr. 112 on Marine Research Institute, research and advisory body for sea and water. Accessed 21 March 2019. | https://www.althingi.is/lagas/nuna/2015112.html |
| Althingi. Act Concerning the Treatment of Commercial Marine Stocks (Act No. 57 1996). Ministry of Business and Innovation. Accessed 04 January 2019. | https://www.althingi.is/lagas/149a/1996057.html |
| Althingi. Act concerning the Treatment of Commercial Marine Stocks No. 57-1996. | https://www.althingi.is/altext/pdf/131/s/0982.pdf |
| Althingi. Act on a Special Fee for Illegal Marine Catch (1992 nr. 37). Ministry of Business and Innovation. Accessed 04 January 2019. | https://www.althingi.is/lagas/149a/1992037.html |
| Althingi. Act on the Directorate of Fisheries (1992 no. 36). Ministry of Business and Innovation. Accessed 21 March 2019. | https://www.althingi.is/lagas/149a/1992036.html |
| Anita Gilles, Thorvaldur Gunnlaugsson, Bjarni Mikkelsen, Daniel G. Pike, Gísli A. Víkingsson. Harbour porpoise Phocoena phocoena summer | http://www.hafro.is/Bokasafn/Greinar/sc_18-AESP11.pdf |

| | |
|---|---|
| abundance in Icelandic and Faroese waters, based on aerial surveys in 2007 and 2010. NAMMCO SC/18/AESP/11 | |
| ASCOBANS. 2009. OSPAR Background Document for Harbour porpoise Phocoena phocoena. Agreement on the Conservation of Small Cetaceans of the Baltic, North East Atlantic, Irish and North Seas. | https://www.ascobans.org/en/document/ospar-background-document-harbour-porpoise-phocoena-phocoena |
| BirdLife International 2018. Alca torda. The IUCN Red List of Threatened Species 2018: e.T22694852A131932615. | https://www.iucnredlist.org/species/22694852/131932615#population |
| BirdLife International 2018. Cepphus grylle. The IUCN Red List of Threatened Species 2018: e.T22694861A132577878. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22694861A132577878.en. | https://www.iucnredlist.org/species/22694861/132577878#conservation-actions |
| BirdLife International 2018. Clangula hyemalis. The IUCN Red List of Threatened Species 2018: e.T22680427A132528200. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22680427A132528200.en. | https://www.iucnredlist.org/species/22680427/132528200#population |
| BirdLife International 2018. Fratercula arctica. The IUCN Red List of Threatened Species 2018: e.T22694927A132581443. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22694927A132581443.en | https://www.iucnredlist.org/species/22694927/132581443#conservation-actions |
| BirdLife International 2018. Fulmarus glacialis. The IUCN Red List of Threatened Species 2018: e.T22697866A132609419. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22697866A132609419.en | https://www.iucnredlist.org/species/22697866/132609419#conservation-actions |
| BirdLife International 2018. Gavia immer. The IUCN Red List of Threatened Species 2018: e.T22697842A132607418. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22697842A132607418.en | https://www.iucnredlist.org/species/22697842/132607418#conservation-actions |
| BirdLife International 2018. Morus bassanus. The IUCN Red List of Threatened Species 2018: e.T22696657A132587285. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22696657A132587285.en | https://www.iucnredlist.org/species/22696657/132587285#conservation-actions |
| BirdLife International 2018. Rissa tridactyla. The IUCN Red List of Threatened Species 2018: e.T22694497A132556442. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22694497A132556442.en. | https://www.iucnredlist.org/species/22694497/132556442#conservation-actions |
| BirdLife International 2018. Uria aalge. The IUCN Red List of Threatened Species 2018: e.T22694841A132577296. http://dx.doi.org/10.23 | https://www.iucnredlist.org/species/22694841/132577296#conservation-actions |

| | |
|---|---|
| 05/IUCN.UK.2018-2.RLTS.T22694841A132577296.en | |
| BirdLife International 2018. Uria lomvia. The IUCN Red List of Threatened Species 2018: e.T22694847A132066134. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22694847A132066134.en | https://www.iucnredlist.org/species/22694847/132066134 |
| BirdLife International. 2018. Phalacrocorax carbo. The IUCN Red List of Threatened Species 2018: e.T22696792A132592923. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22696792A132592923.en. | https://www.iucnredlist.org/species/22696792/132592923#population |
| BirdLife International. 2018. Somateria mollissima. The IUCN Red List of Threatened Species 2018: e.T22680405A132525971. http://dx.doi.org/10.2305/IUCN.UK.2018-2.RLTS.T22680405A132525971.en | https://www.iucnredlist.org/species/22680405/132525971#conservation-actions |
| Bjornsson H., Thorsteinn S. 2003. Assessment of golden redfish (Sebastes marinus L) in Icelandic waters*. SCI. MAR., 67 (Suppl. 1): 301-314. | http://scimar.icm.csic.es/scimar/pdf/67/sm67s1301.pdf |
| Boveng, P. 2016. Pusa hispida ssp. hispida. The IUCN Red List of Threatened Species 2016: e.T61382318A61382321. http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T61382318A61382321.en | https://www.iucnredlist.org/species/61382318/61382321 |
| Bowen, D. 2016. Halichoerus grypus. The IUCN Red List of Threatened Species 2016: e.T9660A45226042. http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T9660A45226042.en | https://www.iucnredlist.org/species/9660/45226042 |
| Collette, B., Fernandes, P. & Heessen, H. 2015. Anarhichas minor. The IUCN Red List of Threatened Species 2015: e.T18263655A44739959. | https://www.iucnredlist.org/species/18263655/44739959#population |
| Dulvy, N.K., Notarbartolo di Sciara, G., Serena, F., Tinti, F. & Ungaro, N., Mancusi, C. & Ellis, J. 2006. Dipturus batis. The IUCN Red List of Threatened Species 2006: e.T39397A10198950. http://dx.doi.org/10.2305/IUCN.UK.2006.RLTS.T39397A10198950.en. | https://www.iucnredlist.org/species/39397/10198950#assessment-information |
| ECOLEX. 2019. Fisheries Management Act, 1990. Accessed 04 January 2019. | https://www.ecolex.org/details/legislation/fisheries-management-act-1990-lex-faoc003455/ |
| EMODnet. 2019. EMODnet Seabed Habitats. European Marine Observation and Data Network (EMODnet). | https://www.emodnet-seabedhabitats.eu/ |

| | |
|---|---|
| FAO. 2019. Sebastus marinus. Fisheries and Aquaculture Department. Food and Agricultural Organization of the United Nations. Accessed 21 March 2019. | http://www.fao.org/fishery/species/3324/en |
| Fishbase. 2019. Ecology of Sebastes norvegicus. Accessed 04 January 2019. | https://www.fishbase.se/Ecology/FishEcologySummary.php?StockCode=517&GenusName=Sebastes&SpeciesName=norvegicus |
| Fishbase. 2019. Sebastes norvegicus. FishBase. Accessed 21 March 2019. | https://www.fishbase.in/summary/Sebastes-norvegicus |
| Fishbase. 2019. Sebastes norvegicus (Ascanius, 1772) Golden redfish. Accessed 04 January 2019. | https://www.fishbase.se/summary/Sebastes-norvegicus.html |
| Fisheries Management 2018/2019 Laws and regulations. Sjórn fiskveiða 2018/2019 Lög og reglugerðir. Accessed 04 January 2019. | http://vefbirting.oddi.is/raduneyti/fiskveidar2018/ |
| Fiskistofa. 2005. Reglugerð Nr. 30/2005 on spawning closures. Accessed 21 March 2019. | http://www.fiskistofa.is/media/veidisvaedi/Hrygningarstopp_2.pdf |
| Fiskistofa. 2017. Fiskistofa Annual Report, 2017. Maritime surveillance chapter. Directorate of Fisheries | http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/eftirlit-a-sjo/ |
| Fiskistofa. 2018. Directorate of Fisheries Organisational Chart. Directorate of Fisheries. Accessed 21 March 2019. | http://www.fiskistofa.is/umfiskistofu/skipurit/ |
| Fiskistofa. 2019. About Fisheries Management. Accessed 21 March 2019. | http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Kroka aflamarksbatar |
| Fiskistofa. 2019. About the Directorate of Fisheries. Accessed 21 March 2019. | http://www.fiskistofa.is/umfiskistofu/ |
| Fiskistofa. 2019. About the Directorate. Accessed 04 January 2019. | http://www.fiskistofa.is/english/about-the-directorate/ |
| Fiskistofa. 2019. Allocation of catch quotas for the fishing year 2018/2019. Accessed 21 March 2019. | http://www.fiskistofa.is/veidar/aflaheimildir/uthlutadaflamark/ |
| Fiskistofa. 2019. Catch and quota status by fish species. Accessed 04 January 2019. | http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/ |
| Fiskistofa. 2019. Catch and quota status by fish species. Accessed 04 January 2019. | http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/aflastodulisti.jsp?lang=en |
| Fiskistofa. 2019. Catch, quota concessions and catch value. Accessed 21 March 2019. | http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/afli-og-aflaverdmaeti/ |
| Fiskistofa. 2019. Catches of all species. Accessed 04 January 2019. | http://www.fiskistofa.is/veidar/aflaupplysingar/afliallartegundir/ |
| Fiskistofa. 2019. Closures. Accessed 21 March 2019. | http://www.fiskistofa.is/fiskveidistjorn/veidibann |
| Fiskistofa. 2019. Cod equivalents. Accessed 04 January 2019. | http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/thorskigildisstudlar/ |
| Fiskistofa. 2019. District quota fishing season 2018/2019. Accessed 21 March 2019. | http://www.fiskistofa.is/veidar/aflaheimildir/byggdakvoti/byggdakvoti-1819/ |
| Fiskistofa. 2019. Fisheries Management Division. Accessed 21 March 2019. | http://www.fiskistofa.is/umfiskistofu/starfsemi/veidieftirlitssvid/ |

| | |
|---|---|
| Fiskistofa. 2019. Fisheries Management. Accessed 21 March 2019. | http://www.fiskistofa.is/fiskveidistjorn/ |
| Fiskistofa. 2019. Gutting factor. Accessed 04 January 2019. | http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/slaegingarstudlar/ |
| Fiskistofa. 2019. List of species caught. Accessed 21 March 2019. | http://www.fiskistofa.is/veidar/aflaheimildir/aflahlutdeildalisti/ |
| Fiskistofa. 2019. Overview of VS catches by species. Accessed 04 January 2019. | http://www.fiskistofa.is/veidar/aflastada/vs-afli/vsafli.jsp |
| Fiskistofa. 2019. Regulatory Closures. Accessed 21 March 2019. | http://www.fiskistofa.is/fiskveidistjorn/veidibann/reglugerdarlokanir/ |
| Fiskistofa. 2019. Transfer of fishing rights. Accessed 04 January 2019. | http://www.fiskistofa.is/eydublod/flutningurveidiheimilda/ |
| Fiskistofa. Fiskistofa 2016 Annual Report, Chapter 8. Directorate of Fisheries | http://www.fiskistofa.is/media/arsskyrslur/kafli8_2016.pdf |
| Fiskistofa. Fiskistofa 2017 Annual Report, Chapter 8. Directorate of Fisheries | http://www.fiskistofa.is/media/arsskyrslur/medferd_mala_og_urskurdir.pdf |
| Fiskistofa. Land surveillance. Accessed 21 March 2019. | http://www.fiskistofa.is/umfiskistofu/arsskyrsla-2013/eftirlit-a-landi/ |
| Fiskistofa. The Icelandic Directorate of Fisheries - Responsibilities and main tasks. | http://www.fiskistofa.is/media/utgefid_efni/DOF.pdf |
| Fiskistofa. Weighing catch. Accessed 21 March 2019. | http://www.fiskistofa.is/fiskveidistjorn/vigtunafla/ |
| Government of Iceland. 2014. Fisheries Management Plan – Golden Redfish. Ministry of Industries and Innovation. | https://www.government.is/news/article/?newsid=e747dac7-fb88-11e7-9423-005056bc4d74 |
| Government of Iceland. 2019. Fisheries in Iceland. Accessed 04 January 2019. | https://www.government.is/topics/business-and-industry/fisheries-in-iceland/ |
| Government of Iceland. 2019. Fisheries Management. Accessed 21 March 2019. | https://www.government.is/topics/business-and-industry/fisheries-in-iceland/fisheries-management/ |
| Government of Iceland. 2019. History of Fisheries. Accessed 21 March 2019. | https://www.government.is/topics/business-and-industry/fisheries-in-iceland/history-of-fisheries/ |
| Government of Iceland. 2019. Management Strategy and Harvest Control Rules. Accessed 04 January 2019. | https://www.government.is/news/article/?newsid=cf30e5ad-584f-11e8-9429-005056bc4d74 |
| Government of Iceland. 2019. Ministry of Industries and Innovation. Accessed 04 January 2019. | https://www.government.is/ministries/ministry-of-industries-and-innovation/ |
| Government of Iceland. 2019. New agreement with Greenland on the allocation of a golden redfish. Accessed 04 January 2019. | https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2015/09/18/Nyr-samningur-vid-Graenland-um-skiptingu-a-gullkarfa/ |
| Government of Iceland. 2019. Organisational chart. Accessed 21 March 2019. | https://www.stjornarradid.is/default.aspx?PageID=c2a9c95f-ec71-11e6-9417-005056bc530c |
| Government of Iceland. 2019. Statement on Responsible Fisheries in Iceland. Accessed 04 January 2019. | https://www.government.is/news/article/2018/05/15/Fisheries/ |

| | |
|---|---|
| Hammond, P.S., Bearzi, G., Bjørge, A., Forney, K., Karczmarski, L., Kasuya, T., Perrin, W.F., Scott, M.D., Wang, J.Y., Wells, R.S. & Wilson, B. 2008. Phocoena phocoena. The IUCN Red List of Threatened Species 2008: e.T17027A6734992. http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T17027A6734992.en. | https://www.iucnredlist.org/species/17027/6734992 |
| Hampidjan. 2018. Better Selectivity with four-panel T90 codend. Accessed 04 January 2019. | http://www.hampidjan.is/news/news-article/better-selectivity-with-four-panel-t90-codend1 |
| Hampidjan. 2019. Clear advantages of flying doors. HAMPIÐJAN GROUP | http://www.hampidjan.is/news/news-article/clear-advantages-of-flying-doors |
| ICEFISH. 2019. Better redfish selectivity with four panel codend. Accessed 04 January 2019. | https://www.icefish.is/news101/better-redfish-selectivity-with-four-panel-codend |
| Iceland Application for Membership to the EU: Chapter 13 the Coast Guard. Powerpoint Presentation. | https://slideplayer.com/slide/4644333/ |
| ICES. 2005. AREA A ICELAND GREENLAND Ecosystem Overview. International Council for the Exploration of the Sea. | http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2005/may/Iceland%20and%20East%20Greenland.pdf |
| ICES. 2007. Report of the North Western Working Group (NWWG): Redfish in Subareas V, VI, XII and XIV. International Council for the Exploration of the Sea. | http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2007/NWWG/07-Redfish%20in%20Subareas%20V,%20VI,%20XII%20and%20XIV.pdf |
| ICES. 2012. Report of the Benchmark Workshop on Redfish (WKRED 2012), 1–8 February 2012, Copenhagen, Denmark. ICES CM 2012/ACOM:48. 291 pp. | http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2012/WKRED%202012/wkred_2012.pdf |
| ICES. 2013. Evaluation of Harvest Control Rule for golden redfish. Marine Research Institute | http://www.ices.dk/sites/pub/CM%20Doccuments/CM-2013/Theme%20Session%20H%20contributions/H2913.pdf |
| ICES. 2013. Overview on ecosystem, fisheries and their management in Icelandic waters: ICES NWWG REPORT 2013. International Council for the Exploration of the Sea. | http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Sec%2007%20Overview%20on%20Ecosystem,%20fisheries%20and%20their%20management%20in%20Icelandic%20waters.pdf |
| ICES. 2013. Report of the Workshop on Guidelines for Management Strategy Evaluations (WKGMSE) , 21 - 23 January 2013, ICES HQ, Copenhagen, Denmark. | http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WKGMSE/Report%20of%20the%20Workshop%20on%20Guidelines%20for%20Management%20Strategy%20Evaluations.pdf |
| ICES. 2014. Iceland, Faroe Islands, and Greenland request to ICES on evaluation of a proposed long-term management plan and harvest control rule for golden redfish (Sebastes marinus). International Council for the Exploration of the Sea. | http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/Special%20Requests/Iceland_Faroe_Islands_Greenland_Evaluation_of_ltmp_for_golden_redfish.pdf |
| ICES. 2014. Report of the Workshop on Redfish Management Plan Evaluation (WKREDMP), 20–25 January, Copenhagen, Denmark. ICES CM 2014/ACOM:52. 269 pp. | http://www.ices.dk/sites/pub/Publication%20Reports/Forms/defaultone.aspx?RootFolder=%2fsites%2fpub%2fPublication%20Reports%2fExpert%20Group%20Report%2facom%2f2014%2fWKREDMP&FolderCTID=0x0120005DAF18EB10DAA049BBB066544D790785 |

| | |
|---|---|
| ICES. 2014. Report of the Workshop on Redfish Management Plan Evaluation (WKREDMP). International Council for the Exploration of the Sea. | http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/WKREDMP/wkredmp_2014.pdf |
| ICES. 2014. Stock Annex: Golden redfish (Sebastes norvegicus) in subareas 5, 6, 12, and 14 (Iceland and Faroes grounds, West of Scotland, North of Azores, East of Greenland). International Council for the Exploration of the Sea. | http://ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2015/smr-5614_SA.pdf |
| ICES. 2015. Golden redfish (Sebastes norvegicus) in Subareas V, VI and XIV; ICES NWWG Report 2015. International Council for the Exploration of the Sea. | http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2015/NWWG/21%20NWWG%20Report%20-%20Sec%2019%20Golden%20redfish%20(Sebastes%20norvegicus)%20in%20Subareas%20V,%20VI%20and%20XIV.pdf |
| ICES. 2017. 2017 Icelandic Waters ecoregion – Ecosystem overview. International Council for the Exploration of the Sea. | http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Ecosystem_overview-Icelandic_Waters_ecoregion.pdf |
| ICES. 2017. Golden redfish (Sebastes norvegicus) in subareas 5, 6, 12, and 14 (Iceland and Faroes grounds, West of Scotland, North of Azores, East of Greenland). International Council for the Exploration of the Sea. | http://ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/reg.27.561214.pdf |
| ICES. 2017. ICES WGBYC REPORT 2017. Report of the Working Group on Bycatch of Protected Species (WGBYC) ICES CM 2017/ACOM:24. Woods Hole, Massachusetts, USA | http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2017/WGBYC/wgbyc_2017.pdf |
| ICES. 2017. Report of the ICES/NAFO Joint Working Group on Deep-water Ecology (WGDEC), 20–24 March 2017, Copenhagen, Denmark. ICES CM 2017/ACOM:25. 121 pp. | http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2017/WGDEC/wgdec_2017.pdf |
| ICES. 2018. 2018 Icelandic Waters ecoregion – Ecosystem overview. International Council for the Exploration of the Sea. | https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/IcelandicWatersEcoregion_EcosystemOverview.pdf |
| ICES. 2018. Golden redfish (Sebastes norvegicus) in subareas 5, 6, 12, and 14 (Iceland and Faroes grounds, West of Scotland, North of Azores, East of Greenland). International Council for the Exploration of the Sea. | http://ices.dk/sites/pub/Publication%20Reports/Advice/2018/2018/reg.27.561214.pdf |
| ICES. 2018. ICES NWWG REPORT 2018. Golden redfish (Sebastes norvegicus) in subareas 5, 6 and 14. International Council for the Exploration of the Sea. | http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%2019_Golden%20redfish%20in%20subareas%205,%206%20and%2014.pdf |
| ICES. 2018. ICES REPORT WGBYC 2018. Report from the Working Group on Bycatch of Protected Species (WGBYC) ICES CM 2018/ACOM:25. Woods Hole, Massachusetts, USA | http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGBYC/wgbyc_2018.pdf |
| ICES. 2018. ICES WGEF REPORT 2018 Greenland shark Somniosus microcephalus in the Northeast | http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/WGEF/26%20WGEF%20Report%202018_Section%2024%20Greenland%20shark_NEA.pdf |

| | |
|---|---|
| Atlantic. International Council for the Exploration of the Sea. | |
| ICES. 2018. Report of the North Western Working Group (NWWG): Golden redfish (Sebastes norvegicus) in Subareas 5, 6 and 14. International Council for the Exploration of the Sea. | https://www.hafogvatn.is/static/extras/images/05-ICES_NWWG_loka731445.pdf |
| ICES. 2019. Basis for advice. International Council for the Exploration of the Sea. Accessed 21 March 2019. | http://www.ices.dk/community/advisory-process/Pages/Basis-for-ICES-Advice.aspx |
| ICETRA. 2019. Ships and cargoes. Icelandic Transport Authority. | https://www.icetra.is/maritime/ships-and-cargoes/ |
| ICG. 2019. Icelandic Coast Guard. Accessed 04 January 2019. | http://www.lhg.is/english/ |
| ICG. 2019. The Icelandic Coast Guard "Always Prepared". Icelandic Coast Guard | http://www.lhg.is/media/LHG80/Landhelgisgasla_Islands_enska2_.pdf |
| Iglésias S.P., Toulhoat L., Sellos D.Y. 2009. Taxonomic confusion and market mislabelling of threatened skates: important consequences for their conservation status. Aquatic Conservation: Marine and Freshwater Ecosystems. Vol 20, Issue 3. | https://onlinelibrary.wiley.com/doi/abs/10.1002/aqc.1083 |
| Jaworski A., Ragnarsson S., A. Feeding habits of demersal fish in Icelandic waters: a multivariate approach. ICES Journal of Marine Science, Volume 63, Issue 9, 1 January 2006, pp 1682–1694, https://doi.org/10.1016/j.icesjms.2006.07.003 | https://academic.oup.com/icesjms/article/63/9/1682/699283 |
| Kovacs, K.M. 2015. Pagophilus groenlandicus. The IUCN Red List of Threatened Species 2015: e.T41671A45231087. http://dx.doi.org/10.2305/IUCN.UK.2015-4.RLTS.T41671A45231087.en | https://www.iucnredlist.org/species/41671/45231087#conservation-actions |
| Kovacs, K.M. 2016. Cystophora cristata. The IUCN Red List of Threatened Species 2016: e.T6204A45225150. http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T6204A45225150.en | https://www.iucnredlist.org/species/6204/45225150 |
| Kulka, D.W., Sulikowski, J., Gedamke, J., Pasolini, P. & Endicott, M. 2009. *Amblyraja radiata*. *The IUCN Red List of Threatened Species* 2009: e.T161542A5447511. http://dx.doi.org/10.2305/IUCN.UK.2009-2.RLTS.T161542A5447511.en. Downloaded on 09 April 2019. | https://www.iucnredlist.org/species/161542/5447511#assessment-information |
| Lowry, L. 2016. Phoca vitulina. The IUCN Red List of Threatened Species 2016: e.T17013A45229114. http://dx.doi.org/10.2305/IUCN.UK.2016-1.RLTS.T17013A45229114.en | https://www.iucnredlist.org/species/17013/45229114 |

| | |
|---|---|
| MFRI. 2017. 2017 Golden redfish advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Gullkarfi265.pdf |
| MFRI. 2017. 2017 Harbour seal advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Landselur277.pdf |
| MFRI. 2017. Aerial census of the Icelandic harbour seal (Phoca vitulina) population in 2016: Population estimate, trends and current status. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/research/files/hv2017-009pdf |
| MFRI. 2018. 2018 Anglerfish advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Skotuselur_20187295 34.pdf |
| MFRI. 2018. 2018 Atlantic halibut advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/luda_2018729535.pdf |
| MFRI. 2018. 2018 Atlantic wolfish advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Steinbitur_2018729531.pdf |
| MFRI. 2018. 2018 Blue ling advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Blalanga_2018729178.pdf |
| MFRI. 2018. 2018 Capelin advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/LodnaHaust20181100274.pdf |
| MFRI. 2018. 2018 Cod advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/%C3%9Eorskur_2018729230.pdf |
| MFRI. 2018. 2018 Demersal beaked redfish advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Djupkarfi_2018729474.pdf |
| MFRI. 2018. 2018 Golden redfish advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Gullkarfi_2018729282.pdf |
| MFRI. 2018. 2018 Greater silver smelt advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Gulllax_2018729229.pdf |
| MFRI. 2018. 2018 Greater silver smelt advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Skarkoli_2018729536.pdf |
| MFRI. 2018. 2018 Greenland halibut advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Graluda_2018729471.pdf |
| MFRI. 2018. 2018 Haddock advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Ysa_2018729280.pdf |
| MFRI. 2018. 2018 Icelandic Ecosystem Overview. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/files/Veidiradgjof/2018/vistkerfi_2018.pdf |
| MFRI. 2018. 2018 Lemon sole advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Tylura_2018729537.pdf |
| MFRI. 2018. 2018 Ling advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Langa_2018729172.pdf |
| MFRI. 2018. 2018 Megrim advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/storkjafta_2018729539.pdf |
| MFRI. 2018. 2018 Norway lobster advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Humar230.pdf |
| MFRI. 2018. 2018 Saithe advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Ufsi_2018729281.pdf |
| MFRI. 2018. 2018 Spotted wolfish advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Hlyri_2018729533.pdf |

| | |
|---|---|
| MFRI. 2018. 2018 Tusk advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Keila_2018729226.pdf |
| MFRI. 2018. 2018 Whiting advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Lysa_2018729530.pdf |
| MFRI. 2018. 2018 Witch advice. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/extras/images/Langlura_2018729538.pdf |
| MFRI. 2018. BYCATCH OF SEABIRDS AND MARINE MAMMALS IN LUMPSUCKER GILLNETS 2014-2017. Marine and Freshwater Research Institute, March 2018. | https://www.hafogvatn.is/static/files/skjol/techreport-bycatch-of-birds-and-marine-mammals-lumpsucker-en-final-draft.pdf |
| MFRI. 2018. MFRI Organisational Chart. Marine and Freshwater Research Institute. Accessed 04 January 2019. | https://www.hafogvatn.is/static/files/enska/skipurit_hafrannsoknastofnun_enska.pdf |
| MFRI. 2018. Working Document to ICES Working Group on Widely Distributed Stocks (WGWIDE, No. 05), Havstovan, Tórshavn, Faroe Islands, 28. August – 3. September 2018 Cruise report from the International Ecosystem Summer Survey in the Nordic Seas (IESSNS) 30th of June – 6 th of August 2018. | https://www.hafogvatn.is/static/files/skjol/wd05_iessns_survey_report_2018.pdf |
| MFRI. 2019. Marine and Freshwater Research Institute. Accessed 04 January 2019. | https://www.hafogvatn.is/en/about/mfri |
| MRI. 2010. Manuals for the Icelandic bottom trawl surveys in spring and autumn. Hafrannsóknir nr. 156. Marine Research Institute. | http://www.hafro.is/Bokasafn/Timarit/fjolrit-156.pdf |
| NAFO. 2019. Northwest Atlantic Fishery Organisation. Accessed 04 January 2019. | https://www.nafo.int/About-us/History |
| NAMMCO 2017. Report of the 24th Scientific Committee meeting, 14-17 November 2017 | https://nammco.no/wp-content/uploads/2018/01/08-nammco-26-scientific-committee-report.pdf |
| NAMMCO. 2017. Iceland PROGRESS REPORT ON MARINE MAMMALS IN 2017, NAMMCO/ 26/NPR-I-17. | https://nammco.no/wp-content/uploads/2018/07/report_by-catch_wg_may_2017.pdf |
| NAMMCO-North Atlantic Marine Mammal Commission (2018) Report of the NAMMCO Scientific Working Group on By-catch. Available at https://nammco.no/topics/sc-working-group-reports/ | https://nammco.no/wp-content/uploads/2018/05/report-nammco-sc-bycwg-04042018.pdf |
| NEAFC. 2019. North East Atlantic Fisheries Commission. Accessed 04 January 2019. | https://www.neafc.org/about |
| NOVASARC. 2013. Nordic Project On Vulnerable Marine Ecosystems And Anthropogenic Activities In Arctic And Sub-Arctic Waters. Second workshop in 2017 20 – 24 November in Torshavn, Færøyene. | https://novasarc.hafogvatn.is/docs/NovasArc_report_workshop_4.pdf |
| NOVASARC. 2019. Nordic Project On Vulnerable Marine Ecosystems And Anthropogenic Activities In Arctic And Sub-Arctic Waters. Accessed 04 January 2019. | https://novasarc.hafogvatn.is/project/ |

| | |
|---|---|
| Ólafur K. Pálsson, Höskuldur Björnsson, Ari Arason, Eyþór Björnsson, Guðmundur Jóhannesson and Þórhallur Ottesen. Discards in demersal Icelandic fisheries 2007. Marine Research Institute, report series no. 142. | https://www.hafogvatn.is/static/research/files/fjolrit-142pdf |
| Ólafur K. Pálsson, Höskuldur Björnsson, Ari Arason, Eyþór Björnsson, Guðmundur Jóhannesson and Þórhallur Ottesen. Discards in demersal Icelandic fisheries 2007. Marine Research Institute, report series no. 142. | https://www.hafogvatn.is/static/research/files/fjolrit-142pdf |
| Ólafur K. Pálsson, Þorvaldur Gunnlaugsson and Droplaug Ólafsdóttir. 2015. By-catch of sea birds and marine mammals in Icelandic fisheries. Marine and Freshwater Research Institute. | https://www.hafogvatn.is/static/research/files/fjolrit-178pdf |
| Promote Iceland. 2019. Fisheries. Accessed 21 March 2019. | https://www.iceland.is/trade-invest/fisheries |
| Reglugerd. 2002. Regulation No. 543, July 22, 2002, on mesh sizes and equipment for catching bottomfish, shrimp and lobster. The Ministry of Industry and Innovation. Accessed 21 March 2019. | https://www.reglugerd.is/reglugerdir/allar/nr/543-2002 |
| Reglugerd. 2006. Regulation 115/2006 on cod fishing. The Ministry of Industry and Innovation. Accessed 21 March 2019. | https://www.reglugerd.is/reglugerdir/allar/nr/115-2006 |
| Reglugerd. 2006. Regulation 202/2016 on lumpfish fishing. The Ministry of Industry and Innovation. Accessed 21 March 2019. | http://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/20032 |
| Reglugerd. 2014. Regulation amending Regulation no. No. 557, June 6, 2007, on catch books, with subsequent amendments no. 126/2014. The Ministry of Industry and Innovation. | https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967 |
| Reglugerd. 2016. Regulation 745/2016 on weighing and registration of marine catch. The Ministry of Industry and Innovation. Accessed 21 March 2019. | https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/20213 |
| Reglugerd. 2018. Ban on fishing for spiny dogfish, Porbeagle sharks and Basking shark no. 456/2017. Ministry of Fisheries and Agriculture. | https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/0456-2017 |
| Reglugerd. 2018. Regulation on halibut hunting no. 470/2012. Ministry of Fisheries and Agriculture. | https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/18302 |
| Reglugerd. 2019. Regulation amending the Regulation on the practices of the Registry of Vehicles, no. 79 January 30, 1997. Ministry of Justice. | https://www.reglugerd.is/reglugerdir/eftir-raduneytum/domsmalaraduneyti/nr/1154 |
| Reglugerd. 2019. Regulation on mesh sizes and equipment no. 543/2002. Ministry of Justice. Accessed 04 January 2019. | https://www.reglugerd.is/reglugerdir/allar/nr/543-2002 |

| | |
|---|---|
| Results of a working group for auditing a regulatory framework for the use of fishing gear, fishing grounds and protection areas in Icelandic waters - final report to the Minister of Fisheries and Agriculture. 2018 | https://www.stjornarradid.is/lisalib/getfile.aspx?itemid=0b53db18-ba77-11e8-942c-005056bc530c |
| Seaiceland. 2018. Greenland Shark. Accessed 04 January 2019. | https://seaiceland.is/what/fish/sharks-and-skates/greenland-shark |
| Sobel, J. 1996. Hippoglossus hippoglossus. The IUCN Red List of Threatened Species 1996: e.T10097A3162182. http://dx.doi.org/10.2305/IUCN.UK.1996.RLTS.T10097A3162182.en. | https://www.iucnredlist.org/species/10097/3162182 |
| Stjornartidind. 2019. Regulation 1012/2013 on trap fishing. Ministry of Justice. Accessed 21 March 2019. | https://www.stjornartidindi.is/Advert.aspx?RecordID=024102ac-de04-45ce-99e3-5e83af6d6aae |
| Stjornartidind. 2019. Regulation 1070/2015. Ministry of Justice. Accessed 21 March 2019. | http://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/19883 |
| Stjornartidind. 2019. Regulation No. 923/2010 on monkfish fishing. Ministry of Justice. Accessed 21 March 2019. | https://www.stjornartidindi.is/Advert.aspx?RecordID=437308e0-8ad1-4009-98cb-10266317ed3e |
| Stjornartidind. 2019. Regulation on weighing and registration of marine catch No. 745/2016. Ministry of Justice. | https://www.stjornartidindi.is/Advert.aspx?RecordID=884be309-64a5-4367-9e4d-f5e7216b6f40 |
| Stjornartidindi. 2016. Regulation on logbooks No. 746/2016. Accessed 21 March 2019. | https://www.stjornartidindi.is/Advert.aspx?RecordID=42a16a67-60a7-4ae7-ad7c-0f53fc254654 |
| Stjornartidindi. 2018. Regulation 674/2018. Accessed 04 January 2019. | https://www.stjornartidindi.is/Advert.aspx?RecordID=4819cdde-0a89-4f80-b21a-46bb071dd15f |
| Stjornartidindi. 2018. Regulation on fishing for commercial fishing year 2017/2018. | https://www.stjornartidindi.is/Advert.aspx?RecordID=9874e782-c577-4248-b835-845bd0fa1806 |
| Sturludottir, E., Desjardins, C., Elvarsson, B., Fulton, E. A., Gorton, R., Logemann, K., and Stefansson, G. 2018. End-to-end model of Icelandic waters using the Atlantis framework: Exploring system dynamics and model reliability. Fisheries Research, 207: 9–24. | https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/HAPISG/2018/01%20WGSAM%20-%20Report%20of%20the%20Working%20Group%20on%20Multispecies%20Assessment%20Methods.pdf |
| UN. 1992. Agenda 21 of the Rio Declaration. A/CONF.151/26 (Vol. IV). United Nations. Accessed 21 March 2019. | http://www.un.org/documents/ga/conf151/aconf15126-4.htm |
| UN. 2018. Chronological lists of ratifications of, accessions and successions to the Convention and the related Agreements. United Nations. | https://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm |
| UNU. 2009. A MODEL OF TRACEABILITY OF FISH PRODUCTS FOR THE DOMESTIC MARKET IN CHINA BASED ON TRACEABILITY STUDIES IN ICELAND AND CHINA. Mechanical Engineering Institute, Dalian Fisheries University | http://www.unuftp.is/static/fellows/document/pan09prf.pdf |
| UST. 2001. Regulation on hydrothermal vents nr. 249/2001. | https://www.ust.is/library/Skrar/Einstaklingar/Fridlyst-svaedi/Auglysingar/hverastrytur_eyjafirdi_249_2001.pdf |

| | |
|---|---|
| UST. 2007. Regulation on hydrothermal vents nr. 510/2007. | https://www.ust.is/library/Skrar/Einstaklingar/Fridlyst-svaedi/Auglysingar/Hverastrytur_Arnarnesnofum_kort.pdf |

# 14. Appendix 1. Assessment Team Bios

Based on the technical expertise required to carry out the above fishery assessment, SAI Global is pleased to confirm the Assessment team members for the fishery as follows.

**Vito Romito (Lead Assessor)**
Vito is an ISO14001 Certified Lead Auditor and MSC approved Fisheries Team Leader for SAI Global with extensive experience in ecosystems effects of fisheries. Vito received a BSc (Honours) in Ecology and a MSc in Tropical Coastal Management from Newcastle University (U.K.), in between which he spent a year in Tanzania, carrying out biodiversity assessments and monitoring studies of pristine and dynamited coral reef and seagrass ecosystems around the Mafia Island Marine Park. For five years he worked at Global Trust Certification/ later SAI Global as Lead Assessor for all the fisheries assessments in Alaska, Iceland and Louisiana. Vito has also carried out several International Fishmeal and Fishoil Organisation (IFFO) forage fisheries assessments in Chile, Peru, Europe and other various pre-assessments in Atlantic and Pacific Canada. To date, Vito has headed and conducted dozens of fishery assessments involving 40+ different species including salmonid, groundfish, pelagic, flatfish, crustacean and cephalopod species in Europe, North and South America, and SE Asia while managing expert teams. For three years, as a senior consultant and then manager with RS Standards Ltd., Vito was involved in various work that included fishery reviews, development and testing of a Data Deficient Fisheries framework and coordination of V2 fisheries standard development for the ASMI Alaska RFM Scheme, and work on IFFO RS Improver/FIP projects related to South East Asia multispecies bottom trawl fisheries. Vito re-joined the SAI Global Fisheries Team in Q4 of 2018.

**Conor Donnelly (Assessor)**
Conor is an experienced marine ecologist and environmental manager with a background of over 17 years at the UK statutory nature conservation body, Natural England, where he was Senior Marine Adviser responsible for marine delivery across the East Midlands, Norfolk and Suffolk. He has a BSc. in Environmental Science from King's College, University of London and an M.Res. in Marine and Coastal Ecology and Environmental Management from the University of York. Conor is also an MSC approved Fisheries Team Leader. Conor has extensive experience of working with fisheries managers, the fishing sector, local communities and eNGOs, particularly from assessing the environmental impacts of mussel, cockle and shrimp fisheries in The Wash, UK and providing advice on their management. He was Natural England's representative on the Eastern Inshore Fisheries and Conservation Authority and its predecessor. He also advised and supported the UK's Department for Environment, Food and Rural Affairs (Defra) on fisheries casework in the southern North Sea under the Common Fisheries Policy (CFP) including meetings with other member states. Other experience includes Marine Protected Area designation, conservation advice and condition assessment; conservation legislation and policy; and working with partners and stakeholders to deliver positive environmental outcomes. Conor is certified as a Fisheries Team Leader under MSC FCR versions 1.3 and 2 and a fisheries assessor under the IFFO RS Standard.

**Dankert Skagen, (Assessor)**
Dankert has recently retired from the Institute of Marine Research (IMR), Bergen, where he worked for 22 years. His responsibilities included stock assessment, multispecies work, in particular in the North Sea, work connected to the introduction of the precautionary approach in fisheries and recently, on development of

harvest control rules and management strategies. He was leader of the IMR research program for population dynamics and multispecies investigations in 1996-97 and for the development of new assessment tools for North-East arctic cod in 1998-99 and the assessment package TASACS in 2007-08. In addition, he has developed several programs for simulating harvest control rules that are commonly used in fisheries management today. Within ICES, he has participated in a wide range of working groups and been chairman of several of them, including the Study Group of Management Strategies. He was chairman of the Resource Management Committee for 3 years and member of ACFM for 7 years.

**Gisli Svan Eirnasson, (Assessor)**

Gísli Svan Einarsson has in depth knowledge of the management system and operational management of Icelandic ground fish fisheries during his previous employment as a Fleet Manager of FISK Seafood for 18 years. Specialist assessor skills stem from his knowledge of quota setting, allocation and monitoring and compliance. Local knowledge of fishery management concerns, current knowledge, fleets, organizations, fleet structure and supply chains. Gísli Svan has been a Project Manager of many Projects concerning the Fishing Industry and a specialist in fish traceability. Gisli is currently employed as Manager by VERID Science Park, Iceland. Qualifications include a BA from the University of Bifröst and Diploma in Administration in Fishing Industry from “Tækniskóli Íslands” now the University of Reykjavík.