Iceland Responsible Fisheries Foundation (IRFF)

Iceland Responsible Fisheries Certification Programme

Icelandic Golden Redfish Commercial Fishery

3rd Surveillance Assessment Report

Certification Body (CB):	**Global Trust Certification**
Assessment team:	Vito Romito, Lead Assessor Dankert Skagen, Assessor
Fishery client:	Samtök fyrirtækja í sjávarútvegi (SFS) (Fisheries Iceland), The National Association of Small Boat Owners, Iceland (NASBO)
Assessment Type:	Surveillance Assessment 3
Report Code:	ICE/RED/002.3/2022
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Foreword

The Iceland Responsible Fisheries (IRF) Certification Programme is based on articles and substantive criteria from the United Nations Food & Agriculture Organization (FAO) reference documents, FAO Code of Conduct for Responsible Fisheries (CCRF(1995)) as well as the FAO Guidelines for the Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries (2005/2009).

A full description of the standard-setting arrangements, normative references and processes can be obtained from the Iceland Responsible Fisheries Foundation owns and operates the brand of Iceland Responsible Fisheries including the certification programme.

1 Contents

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2 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 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
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.

3 Executive Summary

This 3rd Iceland Responsible Fisheries (IRF) surveillance audit was conducted in late 2022 by a team of two auditors, Vito Romito and Dankert Skagen, MD, whose experience, qualification and responsibilities has been detailed below in Section 3.1. These auditors also took part in previous surveillance audits for this fishery. The site visits for the current surveillance were held on site, in Iceland. Meetings with the Client, industry, management, science and enforcement representatives were held on week commencing the 10th of October 2022 to gather information on the fisheries under assessment and to discuss progress relative to any open non-conformances, in addition to the desktop review part of the audit. This fishery audit was combined with the other 6 fisheries certified under the IRF program.

The fishery under assessment continues to remain in compliance with the IRF Standard Revision 2.0. Corrective actions and progress to close the active non-conformance are behind target and new corrective actions have been submitted by the Client and accepted by the CB. No new non-conformance has been identified during the 3rd surveillance activities. The Assessment Team recommends for the existing certification to be maintained.

3.1 Assessment Team Details

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The Assessment Team for this assessment was as follows; further details are provided in Appendix 1:

- Vito Romito – Lead Assessor, responsible for Section 2 (Compliance and Monitoring) and Section 3 (Ecosystem Considerations).
- Dankert Skagen – Assessor, responsible for Section 1 Fisheries Management (which includes requirements on harvest control rule and policy, stock assessment and status, advice and decisions on TAC).

3.2 Details of applicable IRF Documents

This assessment was conducted according to the relevant program documents outlined in Table 1 below.

Table 1. Relevant GULF RFM program documents including applicable versions.

Document title	Version number, Issue Date	Usage
IRF Responsible Fisheries Management Standard Revision 2.0	Revision 2.0, June 2016	Standard
IRF Certification Requirements Revision 1.2	Version 1.2, October 2018	Process

4 Fishery Applicant Details

Table 2. Applicant details.		
Applicant Contact Information		
Organisation/Company Name:		Samtök fyrirtækja í sjávarútvegi (SFS) (Fisheries Iceland)
Date:		November 2020
Address:	**Building:**	
	Street:	Borgartún 35
	City:	Reykjavík
	Country:	Iceland
	Postal Code:	
Phone:		(354) 591 0300
Web:		www.sfs.is
Contact person:		Heiðrún Lind Marteinsdóttir
Position:		CEO
E-mail Address		heidrun@sfs.is
Applicant Contact Information		
Organisation/Company Name:		The National Association of Small Boat Owners, Iceland (NASBO)
Date:		November 2020
Address:	**Building:**	
	Street:	Hverfisgötu 105
	City:	101 Reykjavik
	Country:	Iceland
	Postal Code:	IS-101
Phone:		(354) 552 7922
Web:		www.smabatar.is
Contact person:		Örn Pálsson
Position:		Managing Director
E-mail Address		orn@smabatar.is

5 Units of Certification

The Unit of Certification (i.e., what is covered by the fishery certificate) is described below.

Table 3. Unit of Certification (UoC).		
Species:	**Common name (ENG and ISL):**	Golden redfish (Gullkarfi)
	Latin name:	*Sebastes norvegicus*
Geographical Area(s)		Iceland 200-mile EEZ within FAO Fishing Area 27
Stock(s)		Golden redfish in ICES Divisions 5 and 14
Management System		Ministry of Industries and Innovation (Iceland)
Fishing gear(s)/method(s)		Demersal trawl (principal gear); Nephrops trawl; Long-line; Gears from other Icelandic fisheries legally landing golden redfish *
Client Group		Samtök fyrirtækja í sjávarútvegi (SFS) (Fisheries Iceland), The National Association of Small Boat Owners, Iceland (NASBO)

* Comprised of all other gears contributing <1% to total Icelandic landings of the target species.

6 Assessment Process

This Assessment constitutes a summary evaluation of the applicant fisheries' continuing conformance (or not) to the relevant IRF Fisheries Standard and Scheme Requirements.

Surveillance audits are required to consider all sections of the IRF Standard, although this may take the form of a summary of relevant and new information that demonstrates the level of conformity to the criteria.

IRF surveillance audits are required to include:

- Compliance and progress of the fishery, specific to agreed corrective action plans against non-conformances raised in the initial certification or subsequent surveillance reports.
  - Sufficient detail on progress and evidence of close out shall be presented in surveillance reports.
- Changes in the management regime and processes that may affect the outcome of certification.
- New information on the status of stocks from recent survey, assessment and other information of a scientific basis that may affect the outcome of certification.
- Continued compliance with the IRF Standard.

Where areas of new non-conformity arise, these shall be managed in accordance with the Certification Requirements for assigning non-conformances.

6.1 Surveillance Meetings

The table below provides information about the on-site visit meetings held on October 11th – 13th, 2022 in Iceland for the combined audit of the Icelandic cod, haddock, saithe, Golden redfish, common ling, tusk and summer spawning herring commercial fisheries.

Table 4. Summary of assessment meetings that took place on October 11th – 13th 2022 in Iceland.

Meeting Date and Location	Personnel	Areas of discussion/agenda points
Date: Tuesday 11th October 2022 Location: Fornubúðir 5 220, 220 Hafnarfjörður, Iceland	Marine and Freshwater Research Institute (MFRI): Bjarki Elvarsson, Advisory Group Lead, MFRI. Lisa Anne Libungan, Stock assessment herring, MFRI. Steinunn Olafsdottir, Marine biologist, MFRI. GT Assessment Team: Vito Romito Dankert Skagen	<u>Stock Assessment, Status and Advice</u> ▪ Time schedule for future benchmarks. ▪ Changes or revisions to sampling regimes? Contribution by observers at sea (does that mean Fiskistofa?) vs. at landings. At least for saithe, at sea sampling gets smaller fish, perhaps because that is what the freezer trawlers get. For some stocks (e.g. tusk), the number of samples is low – is it sufficient? Previously logistics has been mentioned as a problem – getting samples from landings far from the nearest observer. Is it still so? How about sampling from catches that are processed on board. ▪ Discards – updates or new studies? Plans for alternative approaches? • Herring: ◦ There is a greater contribution from the East where summer spawners is 'bycatch'. How does that influence your control of the total catch over the whole year? ◦ We see the clever way of including the I. Hoferi contribution to natural mortality. Are there thoughts of other ways to verify the estimates? ◦ Any thoughts of revising reference points according to variations in natural mortality, and more in general: Any plans to revise reference points according to WGREF1-2 and other revisions of standards? ◦ Are there closures to protect herring nowadays? ▪ Tusk: ◦ The contribution from Subarea XIV. Any new developments or initiatives?

		◦ Reasons for the shift in transfer of quotas – from negative to positive? Tusk was presumably less valuable than other species in the long line fishery, still true? ▪ Ling. Apparently, the number of otoliths read goes down for the long liners but not for the trawlers. Problem? ▪ Golden redfish. ◦ Agreement with Greenland - practiced but not formally effective any more: plans to revive it ◦ Plans for firmer action to bring the fishing mortality down to the target as the stock is expected to decline? ▪ Recent changes in assessment method, ling and tusk in particular. Have a brief discussion on motives, effects, further plans. ▪ Cod: ◦ Shift from ADCAM to Muppet. Retro-problem solved? There was a mention in the WG report that the discrepancy in the effect on assessed biomass between the surveys could be worth an in-depth study. Plans for that? ◦ Reviewers comments to WKICECOD 2021: Explore other time blocks and multi-fleet models for the fishery. Plans to do that? ◦ News about stock diversity and metapopulation ideas? ▪ Long term trends in recruitment: For herring, downward until 2017-18. Ling: Peak 2000 – 2010, Golden redfish down since 2013, Spotted wolffish downward 1993 – 2010, low since then. Mostly a scientific question – is there something in common, and are there thoughts about more generic ways of handling these fluctuations. ▪ Retrospective errors: Clearly, a good deal is being done on several stocks, noticed saithe in particular – is there more coming? A related question: Is there a better performance measure than Mohs rho? Another, perhaps related issue: Is this a case for really systematic studies of conflicting evidence in various sources of data – cfr. note on cod. ▪ Reference points: Thoughts on recent developments in ICES. How much does that matter for Iceland? Are there stocks where reference points cause problems (for example undue constraints on the fishery, difficulties with explaining changes and their implications etc.) <u>Ecosystem effects of the fisheries</u> ▪ Non-Conformance 1: (applicable to all certified fisheries): *Although required by legislation, there is evidence of extensive non-reporting/under-reporting of seabirds and marine mammals bycatch in fishing logbooks.* Regarding NC 1, what are the updates and developments addressing the issue for 2021/2022? ▪ Non Conformance 2: *There is insufficient evidence that adverse impacts of the cod, haddock and saithe fisheries on the following ecosystem components:* *1. Spotted wolffish, and;* *2. Common loon* *are being considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.* Regarding NC 2, what are the updates and developments addressing the issue for 2021/2022? ▪ What survey abundance, interaction, catch and / or status updates information can be provided about the OSPAR listed threatened and/or declining species: 1) dogfish/spurdog, 2) Greenland shark 3) porbeagle shark, 4) basking sharks and 5) leafscale gulper sharks? ▪ Can the assessment team be provided with total catch in numbers of Grey skate (*Dipturus flossada / batis*) for the latest available MFRI survey? Any additional

		updates on the state of this endangered species / complex? Any specific management measures for this species? ▪ Whales. Have there been any recent interactions (past 2 years) with Blue whales and Northern right whales for the fisheries under assessment? ▪ Updates on the use of use bycatch mitigation measures on longline fisheries (e.g. tori lines, night settings, acoustic devices) for gillnetters (e.g. pingers trials, actual deployment, other) and for trawlers (escape panels, excluder devices, bobbins, rock hoppers) or equivalent practices? To what extent are such bycatch reduction devices / practices used in these fisheries? ▪ Harbour porpoise updates in Iceland (e.g. surveys), status and management? ▪ Any updates on the work carried out by Iceland in relation to the upcoming US MMPA seafood importing requirements? ▪ Do you have updated bycatch information in Icelandic fisheries (e.g. cod gillnets, lumpfish nets, other gear) for A) harbour porpoise, harbour seals, grey seals, harp, ringed, hooded and bearded seals or B) seabirds for 2020-2021? (data was provided for 2016-2019). ▪ Any updated MFRI or other reports on the by-catch of seabirds and marine mammals in Icelandic fisheries (not specifically relating to lumpfish)? ▪ Any pingers testing updates from 2021 or 2022? ▪ Habitat. The 2021 ICES Ecosystem overview report[1] highlights that based on analysis of electronic logbook data an area of about 79,000 km^2 in total was disturbed/fished by towed bottom-fishing gears in 2013, composing 10% of the ecoregion. This figure jumped to 132,485 km^2 in 2018, corresponding to ca. 17.5 % of the ecoregion's spatial extent. This happened despite the fact that overall bottom trawl effort has decreased (Figure 7) between 2013 and 2018. Is that because the effort has spread out more in the region? Have any management considerations being discussed or made on how to potentially manage the spread of bottom trawl gear effort across the ecoregion (e.g. use of roller gear and/or raised footrope sweep as done in the Alaska BSAI flatfish fleet, other)? ▪ Based on the findings of the Novasarc work a paper on the distribution of indicator VME taxa was published by Burgos et. al (2020)[2]. 12 months ago, the MFRI noted that the group that produced this publication received additional funding to develop this work further including managemental aspects in 2021. It was also noted that "Novasarc II" is now ongoing and will concentrate on updating predictive models and discuss the output for managemental purposes. Are there research or management updates resulting from the work of this group? ▪ Last year the MFRI reported noted that they had proposed new closures to protect vulnerable ecosystems to the Ministry of Fisheries. Did these include coral areas, deep-water sponges, sea pen beds and/or hydrothermal vents? Have there been recent research updates, management actions or new VME closures (proposed or implemented) in the past 12-18 months? ▪ Any new studies, papers or reports on the Icelandic marine ecosystem's structure or foodweb dynamics relating to groundfish or pelagic species?
Date: Wednesday 12th October 2022	Icelandic Coast Guard:	▪ Enforcement Laws and Regulations. In the past 12 months, have there been any significant amendments or changes to Icelandic fisheries laws / regulations with a bearing on enforcement activities?

[1] https://www.hafogvatn.is/static/files/2022_2/ecosystemoverview_icelandicwaters_2021.pdf
[2] https://www.frontiersin.org/articles/10.3389/fmars.2020.00131/full

Location: Skógarhlíð 14, 105 Reykjavík	Asgrimur L. Asgrimsson, Chief of Operations, Icelandic Coast Guard. Björgólfur H. Ingason, Chief controller, Icelandic Coast Guard; GT Assessment Team: Vito Romito Dankert Skagen	▪ Post Covid operational updates. ▪ Has the level of resources and monitoring effort remained similar/changed in past 1-2 years? ▪ Have there been changes over the 2021/2022 season in the systems or patrolling vessels/assets used for enforcement (i.e. new vessels or other)? ▪ How many airborne fisheries patrol hours have been conducted over the last fishing season? ▪ Any other updates regarding enforcement assets (e.g. drones)? Use other electronic reporting systems? ▪ Boardings rate and type/ number of violations recorded (most recent year/season)? What are the most commonly occurring violations? Is enforcement data available by gear type or fishery (i.e. for cod, haddock, saithe, golden redfish, ling, tusk, herring under assessment)? Foreign vessels boarded? *Could you please provide us with tables/figures for this information as done in past years?* ▪ How many prosecutions and reprimands made against skippers did these activities (overall enforcement activities) result in? *Could you please provide us with tables/figures for this information as done in past years?* ▪ Are there many violations of fishermen fishing over their TAC, or buying new TAC late (for overages)? ▪ This is the topic of Non Conformance 1. Enforcement of, and levels of compliance with, logbook reporting of interactions/bycatch between seabirds and marine mammal (especially in gillnets, longlines and trawl gear)? Is the new App in use in small vessels effective for catch recording? Updates and changes in the past 1-2 years? Any prosecutions for failing to report bycatch? ▪ This is the topic of Non Conformance 2. Spotted wolffish can now be released after capture as per new 2020 regulation. Are fishermen reporting released vs landed spotted wolffish as different entries in the logbooks? Any other information on the subject? ▪ Have there been any major changes in overall violation/compliance rate in the past 2-3 years? ▪ Reporting requirements and or issues with lost fishing gear (e.g. longline, gillnets)? ▪ Any changes to the range of monetary and operational penalties for infractions to fisheries regulations? ▪ Are there any repeating offenders in Icelandic waters? ▪ Any instances of serious IUU fishing by Icelandic or foreign vessels in the past 2 years?
Date: Wednesday 12th October 2022 Location: Planned to be in at the Fiskistofa HQ but revised to remote video call due to staff unavailability.	Directorate of Fisheries/Fiskistofa: Erna Jónsdóttir, Head of Administration Division, Fiskistofa. Sævar Guðmundsson, Head of Department, Fiskistofa. GT Assessment Team: Vito Romito Dankert Skagen	▪ Legislation. Changes that matter? Plans for revisions – there was a process some years ago to revise fishery regulations as a whole, has it stopped? Any good places to find laws and regulations on the internet, English translations in particular. ▪ Rules and regulations for the smaller vessels – any updates for the past 2 seasons? ▪ Transfer of quotas, in particular between species. Is this a potential problem if they lead to overages – are there thoughts of revisions or modifications of that rule? Is there information about which species are source and receiver? ▪ What is the actual status now for accounting for expected catches by foreign vessels when setting the local TAC? Haddock and several others. ▪ Changes or revisions to sampling regimes? Contribution by observers at sea (does that mean Fiskistofa?) vs. at landings. At least for saithe, at sea sampling gets smaller fish, perhaps because that is what the freezer trawlers get. For some stocks (e.g. tusk), the number of samples is low – is it sufficient? Previously, logistics has been mentioned as a problem – getting samples from landings far from the nearest observer. Is it still so? How about sampling from catches that are processed on board. ▪ Discards – any monitoring activities by Fiskistofa?

- How many days have directorate inspectors spent on board of fishing vessels in the last fishing season for which information is available? What is the average inspector coverage % on bottom trawlers, longliners, gillnetters (cod if possible) and pelagic trawlers? Can the assessment team be provided with figures for the 2021/2022 season, as done in previous audits?
- The short-term closure monitoring system was transferred to Fiskistofa in the fall of 2020. Regulation regarding the short-term closures was changed in 2020, and the size limit was increased for cod, which led to significant decrease in the number of closures." How many closures have there been in 2021/2022 for each species in question (cod, haddock, saith, redfish, ling, tusk, ISS herring)?
- Monitoring of less valued species including elasmobranchs in the catch record (landed species) – is this something which has been started already by Fiskistofa? We note that a number of shark species are listed by OSPAR as threatened and/or declining species: 1) dogfish/spurdog, 2) Greenland shark 3) porbeagle shark, 4) basking sharks and 5) leafscale gulper sharks?
- We discussed previously a report from the Icelandic National Audit Office (NAO) from 2018, noting that more quantitative data are needed to substantiate the conclusions that rate if discards are low and that there are few irregularities in connection with re-weighing of catches after de-icing in Iceland. In continuing to review actions implemented to improve some of the shortcoming identified in the report, what progress / updates have there been in the past 12 months? Act No. 57/1996 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 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, has this measured been applied in 2021/22? Are there examples of this?

  1. Corrective Action relating to Non-Conformance 1 (applicable to all certified fisheries): *Although required by legislation, there is evidence of extensive non-reporting/under-reporting of seabirds and marine mammals bycatch in fishing logbooks.* Regarding NC 1, are there updates, new information or developments addressing the issue?
  2. Corrective Action relating to Non-Conformance 2: *There is insufficient evidence that adverse impacts of the cod, haddock and saithe fisheries on the following ecosystem components:*

  - *Spotted wolffish, and;*
  - *Common loon*

  are being considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.
  Regarding NC 2, are there updates, new information or developments addressing the issue?
- According to section 2 of Act no. 57/1996, concerning the treatment of commercial marine stocks, discard of catches is prohibited. However, minor exceptions include: a) Non-value catches and b) Heads and other refuse from working or processing. What species or species groups are considered non value catches?
- 2021 Fiskistofa Annual report (https://www.fiskistofa.is/media/arsskyrslur/arsskyrsla-2021.pdf). We have questions about a few entries when compared form 2020 and 2021. Can you comment on some of the entries where we couldn't find and compare data in the

		2021 report, especiailly the Afladagbók, Vanskil afladagbókar and the Mál vegna umframafla entries? ▪ Collaboration between the Coast Guard and Fiskistofa relating to fisheries monitoring and enforcement activities. Updates for the past 12-18 months? Any specific updates relating to work on discards, bycatch monitoring, new app reporting (small vessels)? ▪ Updates on the use of use bycatch mitigation measures on longline fisheries (e.g. tori lines, night settings, acoustic devices) for gillnetters (e.g. pingers trials, actual deployment, other) and for trawlers (escape panels, excluder devices, bobbins, rock hoppers) or equivalent practices? To what extent are such bycatch reduction devices / practices used in these fisheries? What can Fiskistofa observers say about the use of these devices in the Icelandic fisheries? ▪ Any other mentionable changes or updates for the 7 fisheries in question that may relate to day to day operations and monitoring activities worth discussing?
Date: Thursday 13th October 2022 Location: Remote, Video Call	Yann Rouxel, Bycatch Programme Manager The Royal Society for the Protection of Birds (RSPB) GT Assessment Team: Vito Romito Dankert Skagen	▪ Seabird bycatch data ▪ Adoption of bycatch reduction devices in the fleet ▪ Non Conformances relating to seabird bycatch and timeline for closure
Date: Thursday 13th October 2022 Location: Iceland Ocean Cluster (Hus Sjavarklasans ehf. (Grandagardi 16, Reykjavík) – new IRFF office	Client meeting (including closing meeting) Kristján Þórarinsson, Population Ecologist, Fisheries Iceland; Hrefna Karlsdóttir, Senior Advisor at Fisheries Iceland. Iceland Responsible Fisheries foundation (IRFF) Sigrid Merino, CEO, IRFF. GT Assessment Team: Vito Romito Dankert Skagen	▪ Brief review or key highlights of the 2021/2022 fishing season for cod, haddock, saithe, golden redfish, ling, tusk and ISS herring. Any key issues or updates from an industry perspective? ▪ Any significant changes in the management system, key laws or regulations in the past 12 months? Other regulatory updates of mention? ▪ Any updates relating to the day to day operations of the large and small fleet sectors? ▪ U.S. MMPA seafood importing requirements. What work has occurred in Iceland in the past 12 months to address these restrictions? ▪ Updates on the use of use bycatch mitigation measures on longline fisheries (e.g. tori lines, night settings, acoustic devices) for gillnetters (e.g. pingers trials, actual deployment, other) and for trawlers (escape panels, excluder devices, bobbins, rock hoppers) or equivalent practices? To what extent are such bycatch reduction devices / or practices used in these fisheries? Any updates? Non-Conforming Areas and Corrective Actions ▪ Corrective Action relating to Non-Conformance 1: *Although required by legislation, there is evidence of extensive non-reporting/under-reporting of seabirds and marine mammals bycatch in fishing logbooks* Regarding NC 1, what are the updates, new information or developments addressing the issue? Any recent updates relating to the smartphone app deployed to facilitate recording of marine mammal and seabirds' bycatch in smaller vessels? Feedback from the small vessel sector about implementation? Is it helping collect bycatch information?

		▪ Corrective Action relating to Non-Conformance 2: *There is insufficient evidence that adverse impacts of the cod, haddock and saithe fisheries on the following ecosystem components:* *Spotted wolffish, and;* *Common loon* *are being considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.* Regarding NC 2, what are the key developments regarding spotted wolffish (e.g. relating to research activities and/or live releases in the fishery)? Has spotted wolffish been released in the past season? Catches in 2020/2021 were 1,300 t against a TAC of 314 t, while catches in 2021/2022 were 927 t (Fiskistofa website) against a 377 t TAC. Is the excess catch (over the TAC) released alive? Can we confirm if the excess catch (over the TAC) has been released alive and if that catch is reported as a separate entry in the logbooks? ▪ Any other changes or updates of mention for the 7 fisheries in question that may relate to day to day operations and industry activities, management, research, assessment and advice, or mitigation of ecosystem effects of fisheries we should discuss? ▪ General summary of findings from the week's meetings. ▪ Corrective actions for active non-conformances, updates, clarifications and discussions. ▪ Reporting timelines and next steps in the audit process. ▪ Questions and answers.

7 Summary Findings

7.1 Relevant changes to Legislation/Regulations and the Management Regime

Fisheries legislation

Iceland has an established Marine Policy and a structured management system[3] covering all commercial species, including golden redfish[4]. There is a principal Act *(last amendment No 116/2006)*[5] and a number of supporting Acts and Regulations for the management of the fishery.[6] 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.*

Institutions

There are a number of inter-related government agencies within the system under the direction of Ministry of Food, Agriculture and Fishery which has ultimate responsibility. The Ministry of Food, Agriculture and Fishery[7] 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 (Alþingi), and according to advice from the Marine and Freshwater Research Institute (MFRI). The executive body is the Fisheries Directorate (Fiskistofa)[8], which is responsible for the implementation of Fishery Regulations on behalf of the Ministry. Key functions of the Directorate of Fisheries include implementation of regulations, collection and collation of fishery catch data, managing and policing the Icelandic ITQ system and supporting research, survey work and Coastguard surveillance activities. The Icelandic Coast Guard[9] is responsible for control at sea, both of the catches and the safety of the vessels. It performs sea and air patrols and monitoring of fishing within the Icelandic zone. It also operates the Icelandic Maritime Traffic Service within its operations centre which has a key role in ensuring safety at sea but can also take action if the behaviour of a fishing vessels is unusual. The Marine and Freshwater Research Institute (MFRI)[10] conducts a wide range of marine research and provides the Ministry with scientific advice. MFRI has wide international cooperation in all major fields of marine science, as indicated by its publication record[11].

A recent change in the legislation has strengthened surveillance of activities at sea, in order to facilitate enforcement of rules and regulations in fishing operations and handling of catches[12].

3 http://www.fiskistofa.is/english/fisheries-management/
https://www.government.is/topics/business-and-industry/fisheries-in-iceland/fisheries-management/
5 https://www.althingi.is/lagas/nuna/2006116.html
6https://www.stjornarradid.is/library/04-Raduneytin/Atvinnuvega---og-nyskopunarraduneytid/ANR-ymislegt/Stj%c3%b3rn%20fiskvei%c3%b0a%202021-2022%20-%20loka%20-%20rafr%c3%a6n%20%c3%batg%c3%a1fa%20v2.pdf
7 https://www.government.is/ministries/ministry-of-food-agriculture-and-fisheries/
8 http://www.fiskistofa.is/english
9 http://www.lhg.is/english
10 https://www.hafogvatn.is
11 https://www.hafogvatn.is/is/midlun/utgafa/ritaskra
12https://www.althingi.is/altext/stjt/2022.085.html

TAC and ITQ system

Limiting the total annual catch of golden redfish is achieved primarily by an annual TAC. The TAC is set by the Ministry taking advice from MFRI, which is responsible for collecting and analysing scientific data on the stock. Management also includes fora for consultation with stakeholders.

The MFRI advice is based on calculations done within the framework of ICES (The International Council for Exploration of the Sea) by the ICES North-Western Working Group (NWWG), according to standards approved by ICES in regular benchmark assessments. ICES provide advice, which normally, but not necessarily is followed by MFRI and subsequently by the Ministry. The ministry also seeks advice from ICES on management plans.

In 2020, because of the ongoing Covid 19 epidemic, the advice was made by MFRI according to the management plan, based on an assessment performed by MFRI following ICES standards, without involving ICES. In 2021, the normal procedure was resumed.

There is a management plan in place for most commercial stocks in Iceland, including golden redfish, The statement by the Ministry on the management process was revised in 2022 and now states: *The decision on the annual TAC for each stock is by law anchored in the formal advice presented by the Marine and Freshwater Research Institute in June each year. ICES provides advice as well so both ICES and the MFRI advise on research and harvesting policy in general. The recommendation given by the MFRI for the main commercial species is peer reviewed by the Advisory Committee (ACOM) of ICES every year. While the scientific advice has been closely followed by the Minister of Fisheries and Agriculture in recent years, the purely scientific advice is nonetheless subject to a wide formal and informal consultative process involving industry stakeholders et al.*[13]

The current management plan for golden redfish was examined and approved by ICES in 2014.[14,] A new benchmark is planned in spring 2023. The plan is publicly available [15]

The total annual TAC is distributed on vessels as individual transferable quotas (ITQ), managed by the Directorate. The ITQ system has evolved gradually in Icelandic fisheries management and was fully implemented in 1990. The legal basis for the ITQ system is the principal fisheries management act (116/2006)[16]. The main elements are:

1 Each vessel is assigned a quota share (%) in each stock, initially based primarily on catch history over a reference period.
2 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. For most stocks, including golden redfish, quotas can also be transferred between years and between species, but only within limits. Quota transfer is intended to promote rationalisation and thus increase profitability in the industry, but there has been concern that it can be used to legalize over-exploitation of vulnerable but valuable species. An overview of the system is provided in Agnarson & al, 2016[17]. A recent study of the transfer system in

13 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/fisheries-management/
14 https://ices-library.figshare.com/articles/report/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_/19207812 f
15 https://www.hafogvatn.is/static/extras/images/05-goldenredfish1328557.pdf
16 https://www.althingi.is/lagas/nuna/2006116.html
17 https://www.sciencedirect.com/science/article/pii/S0308597X16302238

Iceland (Oostdijk & al 2020) [18] describes the performance of this system in detail and concludes that *'The trend toward individual quota and discard bans presents a challenge for mixed fisheries: how to avoid widespread under-utilization of quota due to choking effects of individual species for which quota is exhausted. Iceland's demersal fishery has met this challenge using the most elaborate set of balancing mechanisms in the world……The absence of persistent overfishing of individual stocks is attributed to limits that have been tightened over time and are very strict for the primary target species. These results highlight the potential for balancing mechanisms to facilitate sustainable exploitation of distinct interconnected resources and the importance of adapting implementation to local circumstances.'*

Control of landings

All fish that is caught (with very few exceptions) has to be landed and the landings have to take place in authorized ports and weighed by authorized weighers[19]. These landings are reported to the Directorate and are the primary source of catch data. All landings have to be accounted against a quota. If the vessel does not have a quota for a landing, it has to buy one, and there is an efficient market for buying and selling quotas. To reduce the incentive for high-grading, undersized fish that is caught has to be sold but only part of the catch is subtracted from the quota and the fisher gets a strongly reduced price. The surplus goes to a fund to promote scientific work of the MFRI.

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. In addition, parts of the total TAC is set aside for special purposes (for example Strandveidar[20], Bygdakvoti[21]), mostly to support local communities and small-scale fisheries.

Logbooks are compulsory, and recently, only electronic logbooks (or mobile phone apps) are accepted[22]. The fishing year in Iceland runs from 1st September - 31st August.

Protective measures

These include area closures (temporary and permanent), gear restrictions and discard ban.

There is an extensive system of area closures that are to a large extent, but not exclusively, designed to avoid exploitation of cod at the spawning grounds in the spawning season and to avoid catching juvenile fish. Closures can be permanent or temporary. Permanent closures are according to regulations by the Ministry and can be valid for parts of the year or the whole year. They are intended to protect spawning grounds, nursery areas, vulnerable habitats etc. and most of them have been in place for many years (Figure 1). The latest revision was in 2019[23]. The Directorate has recently launched a map solution (Hafsjá) to inform about all closures (permanent and short term) as well as other information (Figure 1)[24] .

18 www.pnas.org/cgi/doi/10.1073/pnas.2008001117
19 https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/20213
20 https://island.is/reglugerdir/nr/0460-2022
21 https://island.is/byggdakvoti
22 https://island.is/afladagbok
23 https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21660 and https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21661
24 http://atlas.lmi.is/mapview/?application=haf

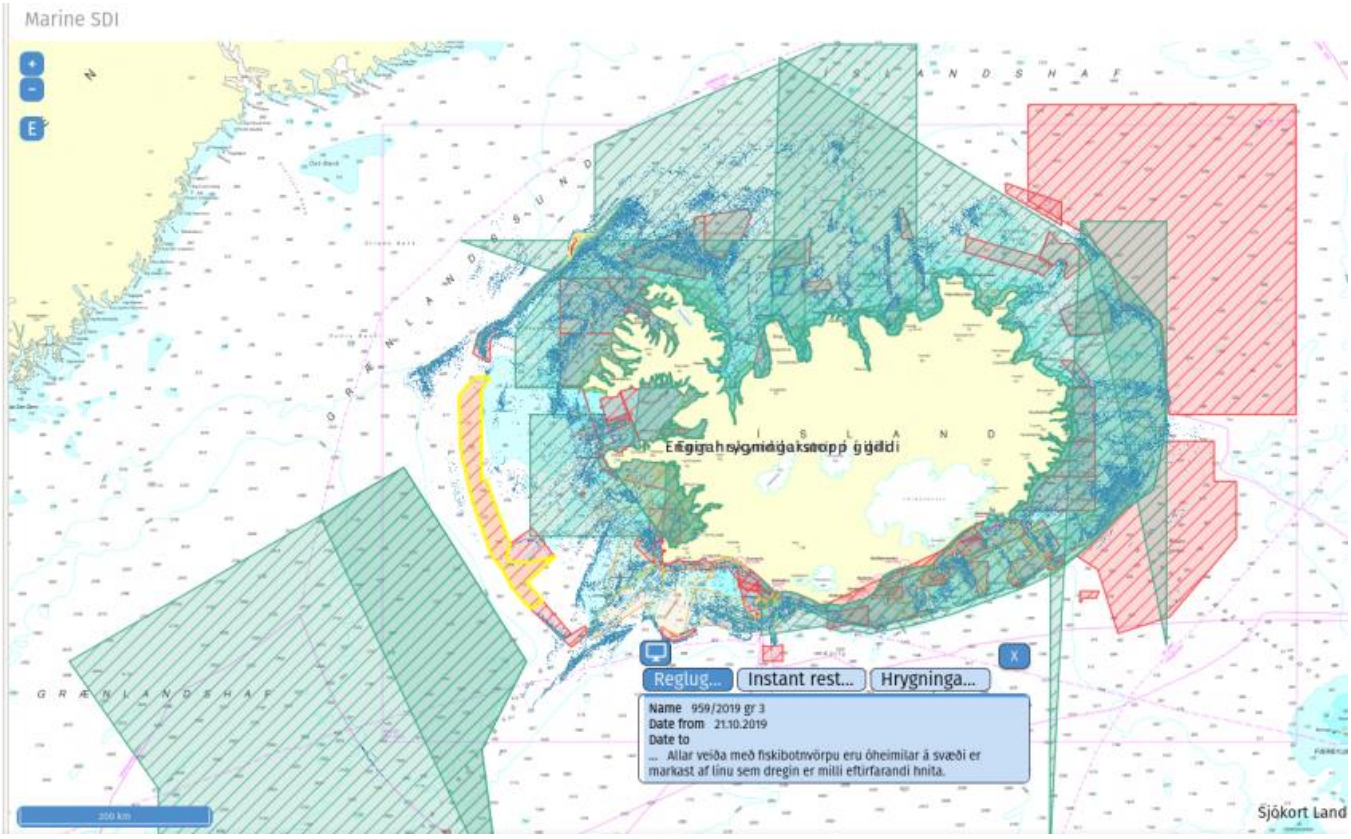

Figure 1. Screenshot of an example of the map in Hafsjá. The coloured fields are various closures. One (with yellow outline in the West) has been marked, and the label at the bottom gives details of that regulation. The small dots are location of catches (all gears in this example).

Temporary closures are as a rule triggered by reports from the Coast Guard, Directorate or others of too much undersized fish. Recently in 2020, the Directorate has taken over the administration of these closures from the MFRI. Such closures are introduced on short notice (hours) and are valid for 2 weeks. They are published on the website of the Directorate, and shown in the Hafsjá map. Because of Covid restrictions and new criteria for undersized fish, there were no temporary closures last year.

There are mesh size regulations in place to protect juveniles; the standard mesh size in trawl is 135 mm[25]. If undersized fish are caught, they have to be landed. Special rules apply for payment to encourage landing, but discourage catching of undersized fish.

Discards are prohibited in Iceland.[26] Discards are not included in the assessment and are considered to be small. To some extent they are monitored, mostly for cod and haddock. A previous estimate of discards in Icelandic fisheries did not reveal measurable discards of golden redfish[27].

25 https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/4032
26 https://www.althingi.is/lagas/nuna/1996057.html
27 https://www.hafogvatn.is/static/research/files/fjolrit-142.pdf

East Greenland is a nursery area. In Icelandic and Faroese waters, most golden redfish is > 30 cm. The area to the West of Iceland where small redfish may be found is permanently closed, all year or in periods (Figure 2) . During closure bottom trawling is prohibited.

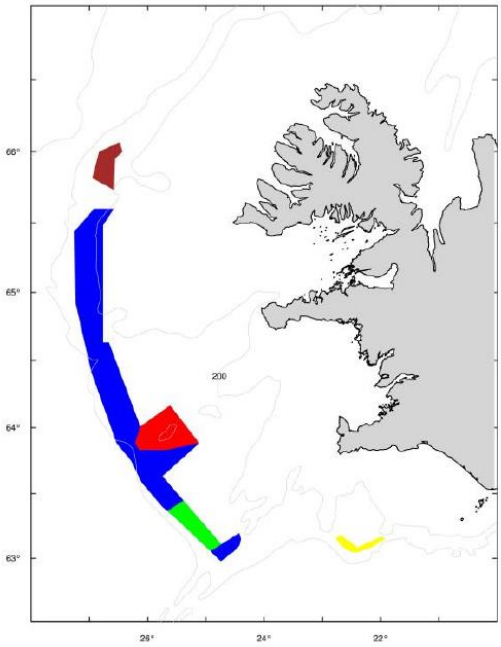

Figure 2. Schematic overview of closed areas for protection of juvenile *S. norvegicus* in Icelandic waters (ICES Division Va). These areas are either closed permanently or temporarily. The blue area is closed all year long; the red area is only open during the night or from 20:00–08:00 from October 1 to April 1 to allow fishing for saithe; the brown area is open for bottom trawling during the night or from 20:00 to 08:00; the green area is open for bottom trawling February 1 to April 15; the yellow area is closed for bottom-trawl fishery from June 1 to October 31. From the Stock annex.[28]

Temporary closures are as a rule triggered by reports from the Coast Guard, Directorate or others of too much undersized fish. Recently in 2020, the Directorate has taken over the administration of these closures from the MFRI. Such closures are introduced on short notice (hours) and are valid for 3 weeks. They are published on the website of the Directorate and shown in the Hafsjá map.

There are mesh size regulations in place to protect juveniles; the standard mesh size in trawl is 135 mm[29]. If undersized fish are caught, they have to be landed. Special rules apply for payment to encourage landing, but discourage catching of undersized fish.

28 https://ices-library.figshare.com/articles/report/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_/18622406

29 https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/4032

International relations

Policies incorporate a number of International Agreements and declarations [30], including UN Convention of the Law of the Sea, Agenda 21 of the Rio Declaration, FAO Code of Conduct for Responsible Fisheries and the International Plan of Action to prevent, deter and eliminate Illegal, Unregulated and Unreported Fishing. Iceland has broad international scientific cooperation through organisations such as the Northeast Atlantic Fisheries Commission (NEAFC)[31], the Northwest Atlantic Fisheries Organization (NAFO)[32], and the North Atlantic Marine Mammal Commission (NAMMCO)[33]. Icelandic scientists have been involved in many international projects arranged by these organizations and in co-operative projects with research institutes and universities.

Golden redfish is a shared stock between Iceland, Greenland and the Faroes. The majority (~90%) of the fishery takes place in Icelandic waters, the rest is mostly in East Greenland and in Faroese waters. Data from these areas are included in the assessment, while data from ICES Sub-areas 6 and 12, where only minor (<100t) catches are taken, are not considered. The assessment and advice covers all components except Sub-areas 6 and 12.

There was an agreement between Iceland and Greenland, where a certain amount of the quota is set aside for Greenland. The agreement was from 2016 to the end of 2018 and 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. The agreement has not been renewed so at present no management agreement is effective although Iceland and Greenland still follow this agreement. There is no similar agreement with the Faroes.

7.2 Stock status update

Stock identity

The golden redfish is a shared stock. The assessment unit as defined by ICES covers ICES subareas 5, 6, 12, and 14 (Iceland and Faroes grounds, West of Scotland, North of Azores, East of Greenland). The majority (~90%) of the fishery takes place in Icelandic waters, the rest is mostly in East Greenland and in Faroese waters. Data from these areas are included in the assessment, while data from ICES Sub-areas 6 and 12, where only minor (<100t) catches are taken, are not considered. The distribution is shown in Figure 3.

30 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/international-policy/
31 http://www.neafc.org/
32 http://www.nafo.int/
33 http://www.nammco.no/

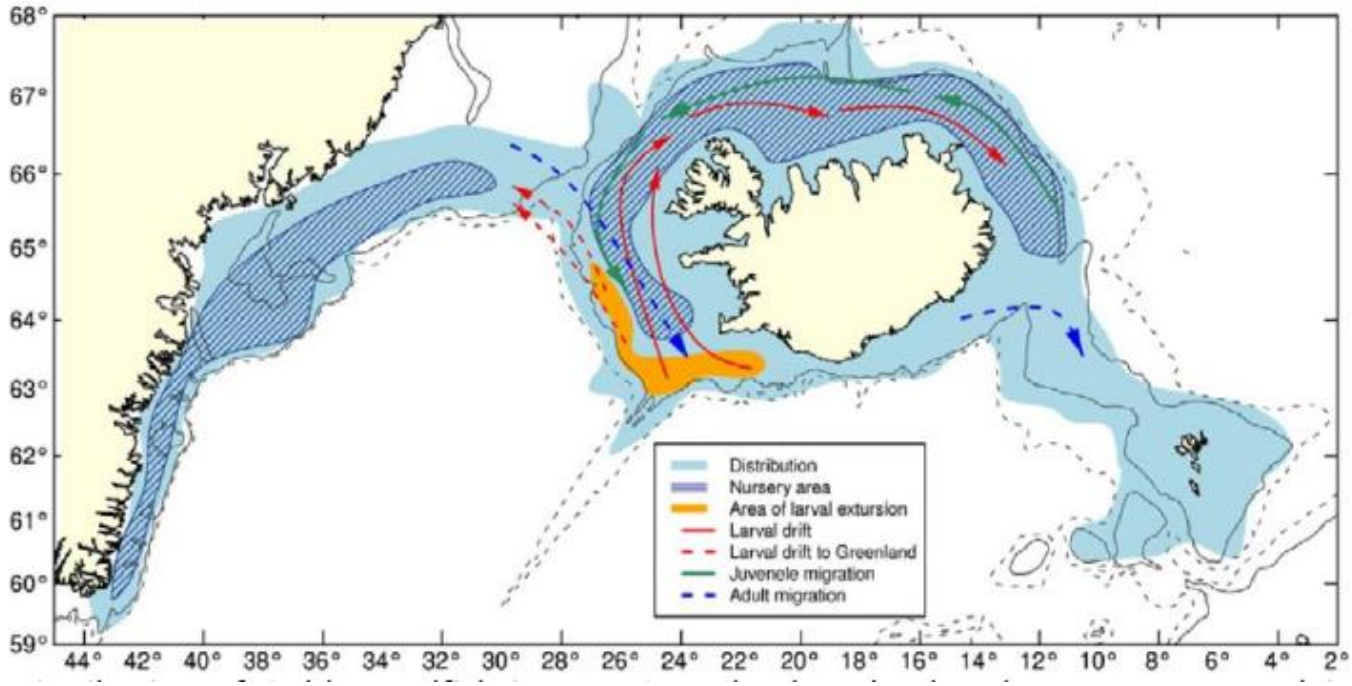

Figure 3. Distribution of Golden redfish in East Greenland, Iceland and Faroese waters.

Assessment method

The assessment is done with the Gadget software[34], which has a combined age-length disaggregated forward projecting population model that is fitted to observations by the maximum likelihood approach. The method as currently used was approved by ICES at a combined benchmark and management plan evaluation in 2014[35], The model operates on 3 commercial fleets (one for each nation), for which there are data on the length distribution and total landings. Two survey index series are used, as a length disaggregated abundance indices: The Icelandic groundfish survey in the spring and the German Greenland survey. Also included are mean lengths at age and age-length keys from the Icelandic groundfish survey in the autumn and Icelandic commercial catches, and total landings by half year periods. The approval implies that the data are regarded as sufficient for the method.

A fixed natural mortality (0.05 for most lengths, but 0.10 for the largest (oldest)) fish is assumed.

Assessment data

Commercial catch data

All three nations provide landings data. Iceland provides catches by age and length distributions, the Faroes contribute length data while Greenland has not done so for some years. The majority of the catches are taken by Icelandic vessels in Icelandic waters. Splitting of catches on species is now (since 2010/11) done routinely at sea in the Icelandic fishery, and redfish is landed by species. Previously, landing statistics were common for all redfish. Separating by species is regarded as easy when the fish is at fishable size (> 30 cm), which is mostly the case in the Icelandic fishery. The Icelandic landings data are assembled in a database that is managed by the Directorate of

34 https://gadget-framework.github.io/gadget2/docs/userguide/

35 https://ices-library.figshare.com/articles/report/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_/19207812

Fisheries and used as catch data in the assessment.

The catches of redfish in Greenland waters have varied over the years. From 1995 to 2007 the catches in Greenland waters were very small and there was no directed fishery for redfish. A directed fishery was opened in 2008 in restricted areas and/or seasons, with restrictions aiming at protecting juvenile cod. Redfish in Greenland is not recorded by species, based on survey information, the amount of golden redfish caught in East Greenland is assumed to be 20% of the reported catch of demersal redfish derived from logbooks.

The majority of the golden redfish caught in Faroese waters is bycatch in other fisheries. For the Faroese catches, the split on species is based on data from research vessel 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)[36].

In Iceland, the strategy 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. In 2020, 65 samples were taken, 9191 fish were length measured and 834 were aged. The Faeroese length measured 116 fish.

Discards

Discards are not included in the assessment, and are considered to be negligible[37]. In Iceland, discards are prohibited. A previous estimate of discards in Icelandic fisheries did not reveal measurable discards of golden redfish[38].

Survey data

The survey series is a combination of abundance by length from the Icelandic Spring groundfish survey (IS-SMB) (Figure 4) and the German Groundfish Survey in East Greenland in the summer (Figure 5). Age-length keys are obtained from the Icelandic Groundfish survey in October and from samples from commercial catches in the Icelandic fishery.

36 https://www.ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2019/reg.27.561214_SA.pdf
37 Communicated by MFRI at site visit 27/11-2018
38 https://www.hafogvatn.is/static/research/files/fjolrit-142.pdf

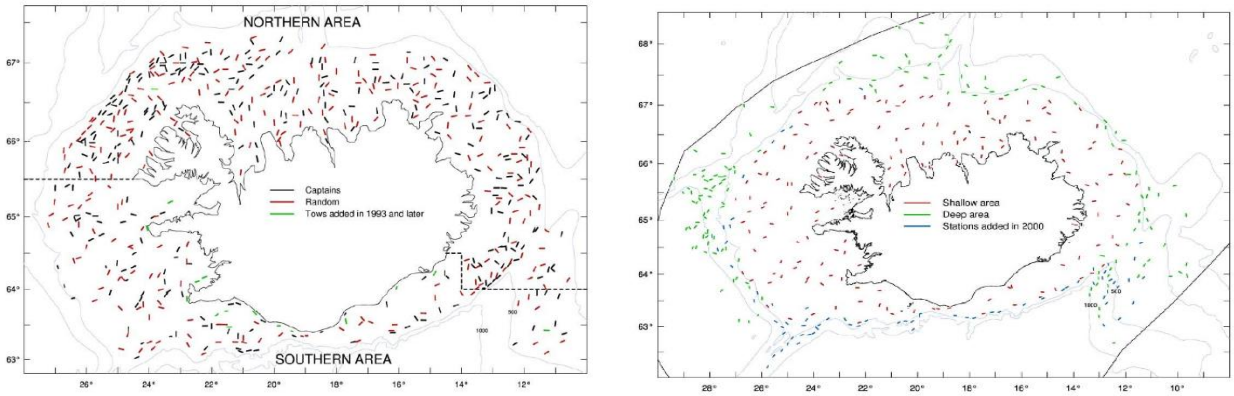

Figure 4. Trawl stations in the bottom trawl surveys. The stations are similar from year to year, with only small deviations: Left: Spring survey. Right: Autumn survey.

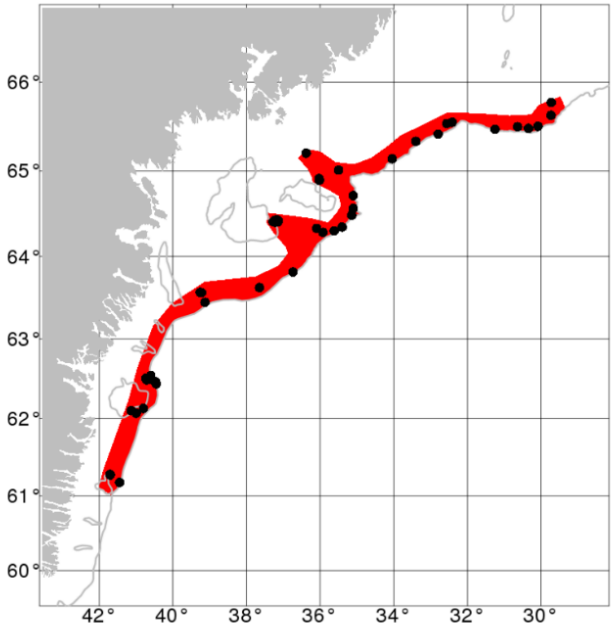

Figure 5. Trawl stations and coverage area for the German redfish survey in East Greenland.

It should be noted that the length disaggregated indices are from the spring survey, but the age data are from the autumn survey conducted six months later. The surveys could have different catchability, but the age data are used as proportions within each 2 cm length group, so it should not have an impact on the results. Growth in between March and October is included in the model.

Assessment performance

The Gadget method is sufficiently versatile to make proper use of the data that are available. The quality of the data is generally good, although fitting the model to some of the length distributions may be problematic. The data on incoming year classes are sparse, making estimates of recent recruitment uncertain. There is some retrospective discrepancies, with lower biomass estimates and higher F-estimates as more years are included

(Figure 6). The changes are within the range of uncertainty assumed when the harvest rule was evaluated (CV=0.3, with autocorrelation coefficient = 0.9). Accordingly, the harvest rule should be robust to assessment uncertainty of the magnitude observed. Since about 2010, the stock has been above Btrigger.

However, the 2022 NWWG report[39] notes that there appears to be an internal conflict between indices of lengths of 42 cm and above and the large number of smaller fish that was observed in the survey few years earlier. This may be the cause of some strong trends in the survey residuals (Figure 6). Since 2003 most of the biomass in the Icelandic survey has been observed to be aggregated in very dense schools west of Iceland, caught on 5–10 stations every year. The size distribution in those schools is narrow and fish larger than 40 cm were rare. The suggestion by NWWG is to raise this in a broader context at the next benchmark.

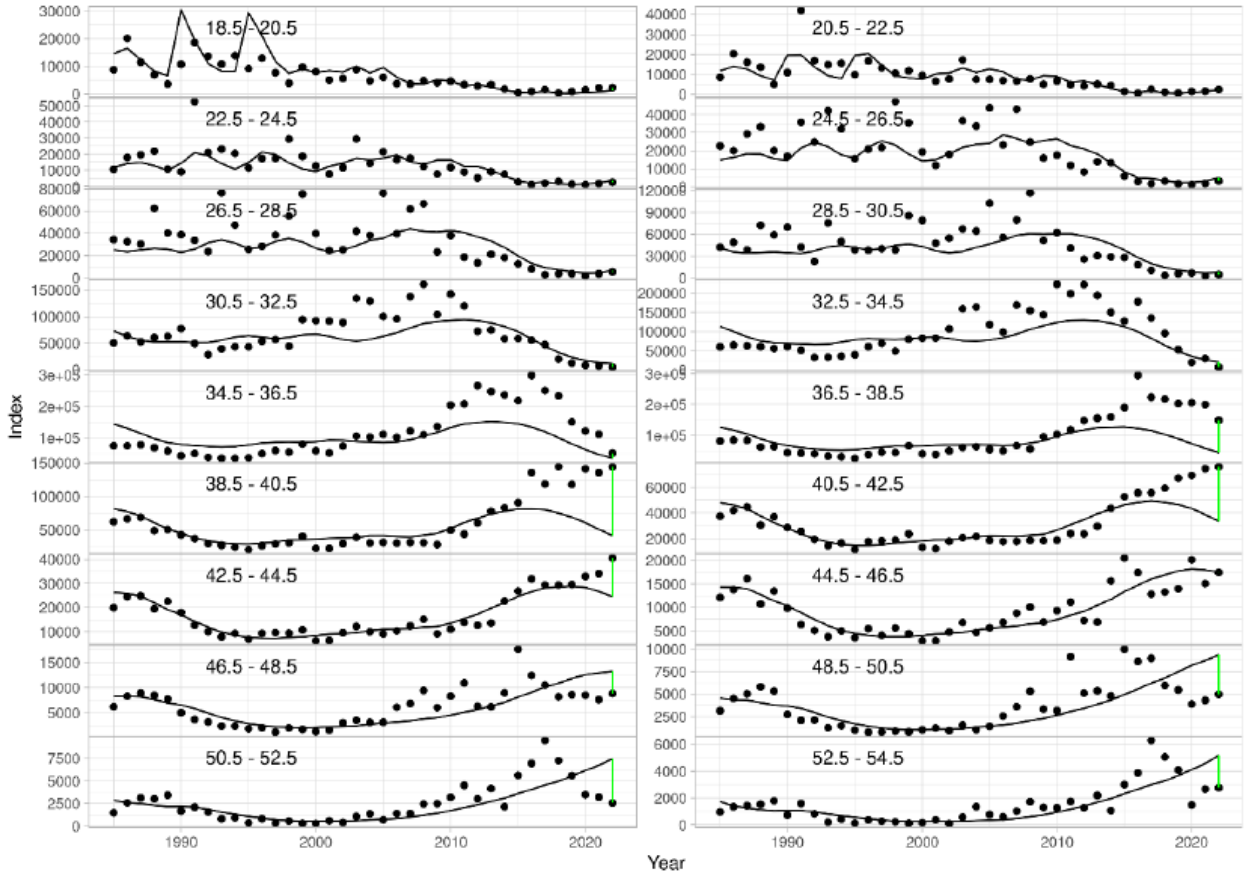

Figure 6. Gadget fit to indices from disaggregated abundance by length indices from the spring survey.

The last benchmark for golden redfish was in 2014. A new benchmark meeting scheduled in 2020 was delayed because of lack of resources within the ICES system. The plan now is a benchmark in 2023. The proposed benchmark meeting will explore several issues of current assessment model. These include poor fit to survey indices for fish between 30–40 cm, potential dome-shape in selectivity, uncertainty estimates that are not available at present and the appropriateness of the current growth and maturity model used in the assessment. In addition, the meeting will explore alternative assessment methods and underutilized data sources from ICES

39 https://ices-library.figshare.com/articles/report/Northwestern_Working_Group_NWWG_/19771381?file=36007568

Divisions 5b and 14b, mainly relevant survey and commercial samples of age and length. Biological reference points will need to be redefined depending on the assessment method. A change in form of harvest control rule from an F-rule to a Harvest rate rule is planned.

Assessment results

The main results of the 2022 stock assessment are indicated in Figure 7. Since about 2010, the stock has been above Btrigger. The fishing mortality has been above the target (marked as FMSY) but well below the precautionary bound. Some strong year classes appeared around 2010, which lifted the SSB in the subsequent years. Since then, recruitment has been poor and a decline in stock abundance is to be expected. At present, according to the most recent estimate, it is close to $B_{trigger}$

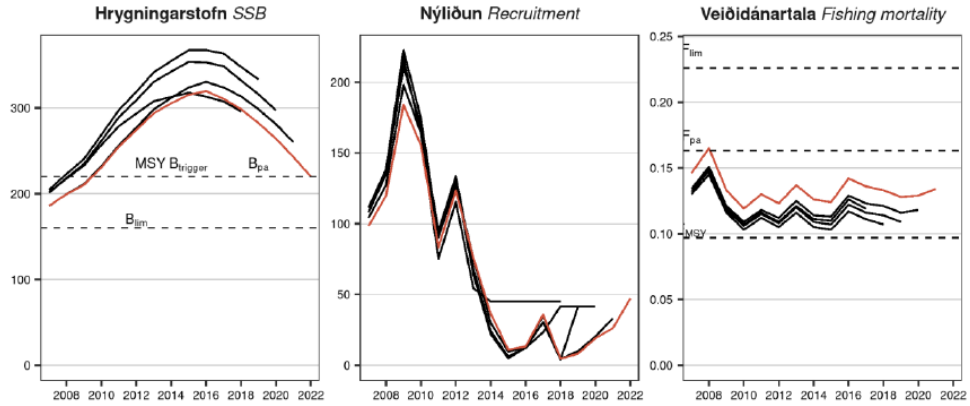

Figure 7. Historic retrospective errors for Golden redfish. Current assessment (red line) compared with previous estimates (2018–2021).

Reference points and harvest rule

The precautionary approach is implemented through a harvest rule that implies low risk of stock depletion. The harvest rule, which is based on a fixed target F, was approved by ICES in 2014 in response to a request by the governments of Greenland, Iceland and the Faroe Islands and has been used since then.

Reference points were developed as part of the harvest rule development process and have remained unchanged since then. They are tabulated below (Table 5):

Table 5. Reference points for Golden redfish

Nálgun *Framework*	Viðmiðunarmörk *Reference point*	Gildi *Value*	Grundvöllur *Basis*
MSY *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. *Average of ages 9–19. 80% of F_{MAX} in the 2012 Gadget run.*
Varúðarnálgun *Precautionary approach*	B_{lim}	160 000 t	Lægsta sögulega gildi hrygningarstofns í úttekt árið 2012. *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. *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 limit biomass, which is the key parameter, is the lowest SSB estimated in 2012 (160 kt in 1996). The present estimate of SSB in 1996 of 139 kt is still the lowest in the series. Bpa = 220kt is derived as the 95 percentile of Blim, assuming a CV of 0.2. Flim is the F leading to Blim in equilibrium, and Fpa the 5 percentile of that, again assuming a CV of 0.2. The MSYBtrigger was set at Bpa. It is used as a trigger value in the management plan. The FMSY at 0.097, which is also the target F in the management plan, was Fmax when estimated in 2014. The current estimate is higher – the present estimate of Fmax is 0.114.

A management plan has been in place for Golden redfish since 2014, and the TAC is set according to this plan.

The management plan states that[40]:
If SSBY ≥ SSBMGT: the catch for year Y+1 corresponds to the fishing mortality F (Y+1) = FMGT
If SSBY < SSBMGT: the catch for year Y+1 corresponds to F (Y+1) = FMGT × SSBY/SSBMGT

where SSBY is the spawning-stock biomass in year Y, FMGT = 0.097, and SSBMGT = 220 000 tonnes.

The expected range of realized fishing mortality (F) following the management plan (FMGT) is between 0.07 and 0.16.

Simulations with realistic assumptions about assessment uncertainty (including a large autocorrelated assessment error) and recruitment variation indicate very low probability of the spawning stock going below $B_{trigger}$ and B_{lim} when applying the harvest rule. However, in a 'worst case' scenario with protracted low recruitment and underestimating the fishing mortality, the trigger biomass would be reached.[41] The expected long-term yield by following the rule was tested by the simulations and found to be near the maximum obtainable. A long-term target for the stock biomass is not defined explicitly, as the harvest strategy is defined in terms of mortality.

7.3 Landings update

Iceland

The majority of the catches are taken by Icelandic vessels in Icelandic waters. More than 90% is taken by bottom trawlers in a targeted fishery. The majority is taken in the South and West, and there has been a shift towards the NW shelf (Figure 7). Landings in Iceland are restricted to authorized ports where the amounts landed are recorded by authorized weighers[42]. Splitting of catches on species is now (since 2010/11) done routinely at sea in the Icelandic fishery, and redfish is landed by species. Separating by species is regarded as easy when the fish is at fishable size (> 30 cm). The Icelandic landings data are assembled in a database that is managed by the Directorate of Fisheries and used as catch data in the assessment.

40 https://www.hafogvatn.is/static/extras/images/05-goldenredfish1328558.pdf

41 https://ices-library.figshare.com/articles/report/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_/19207812 4

42 https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/20213

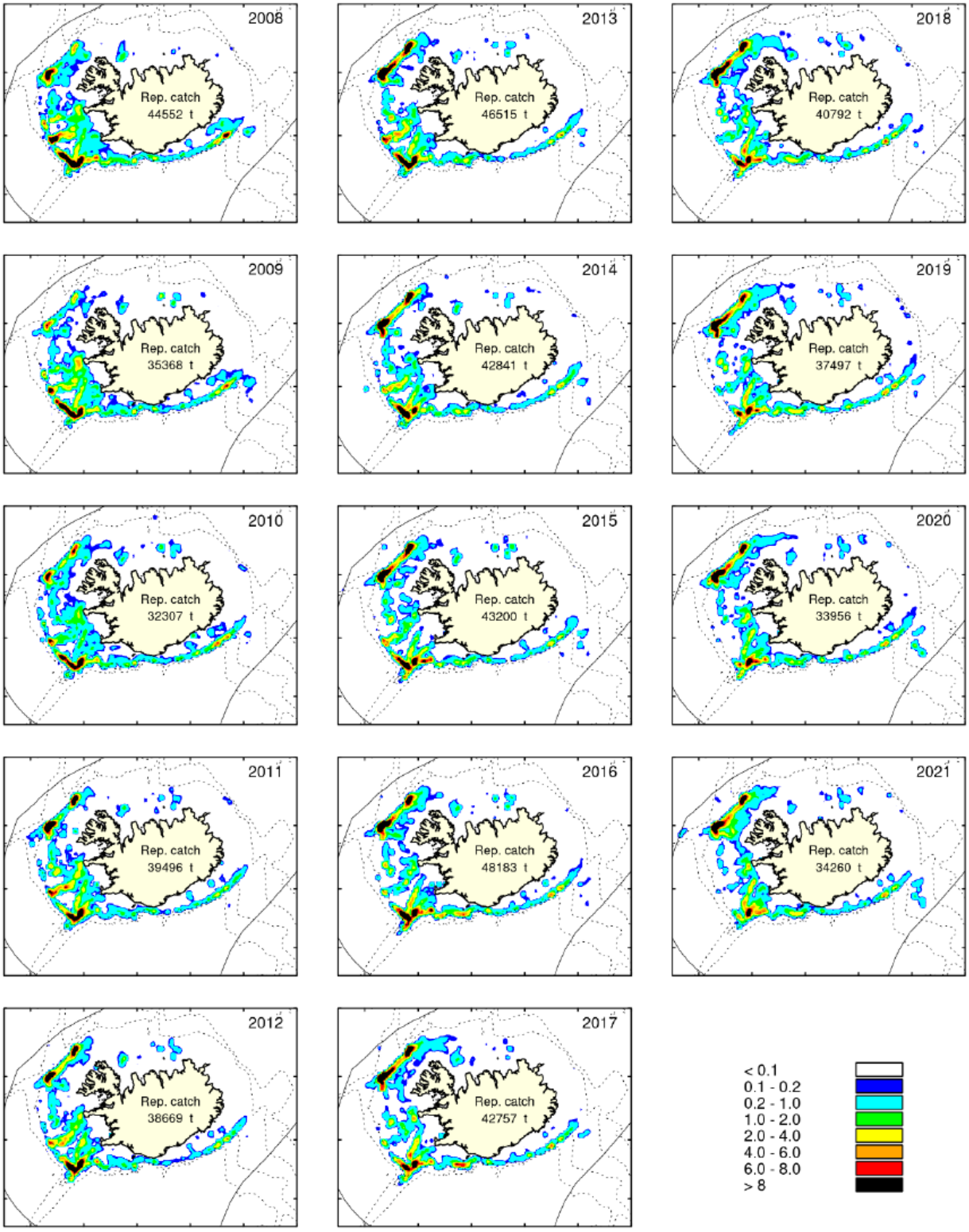

Figure 7. Geographical distribution of golden redfish bottom trawl catches in ICES Division 5.a 2008–2021.

Greenland

Management of redfish in Greenland waters is by the Greenland Ministry of Fisheries, Hunting and Agriculture. The fishery for Golden redfish in Greenland waters has varied over the years. There was a substantial fishery by foreign fleets around 1980, amounting to 15,000 t – 30,000 t. Since 1995 the catches in Greenland waters were very small and there was no directed fishery for redfish. A directed fishery was opened in 2008 in restricted areas and/or seasons, with restrictions aiming at protecting juvenile cod. At present, the catch in Greenland is close to 10% of the total recommended TAC. Catch statistics are based on logbooks that are reported to the Greenland Institute of Natural Resources. Catches in Greenland are a mixture of *S. mentella* and *S. norvegicus*. Routinely, it is assumed that 20% is *S. norvegicus*.

Faroes

For the Faroese catches, the split on species is based on data from Research Vessel 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)[43].

Discards

Discards are not included in the assessment and are considered to be negligible[44]. In Iceland, discards are prohibited. A previous estimate of discards in Icelandic fisheries did not reveal measurable discards of golden redfish[45]. The area where small redfish may be found is permanently closed, all year or in periods (Figures 1 and 2). During closure bottom trawling is prohibited.

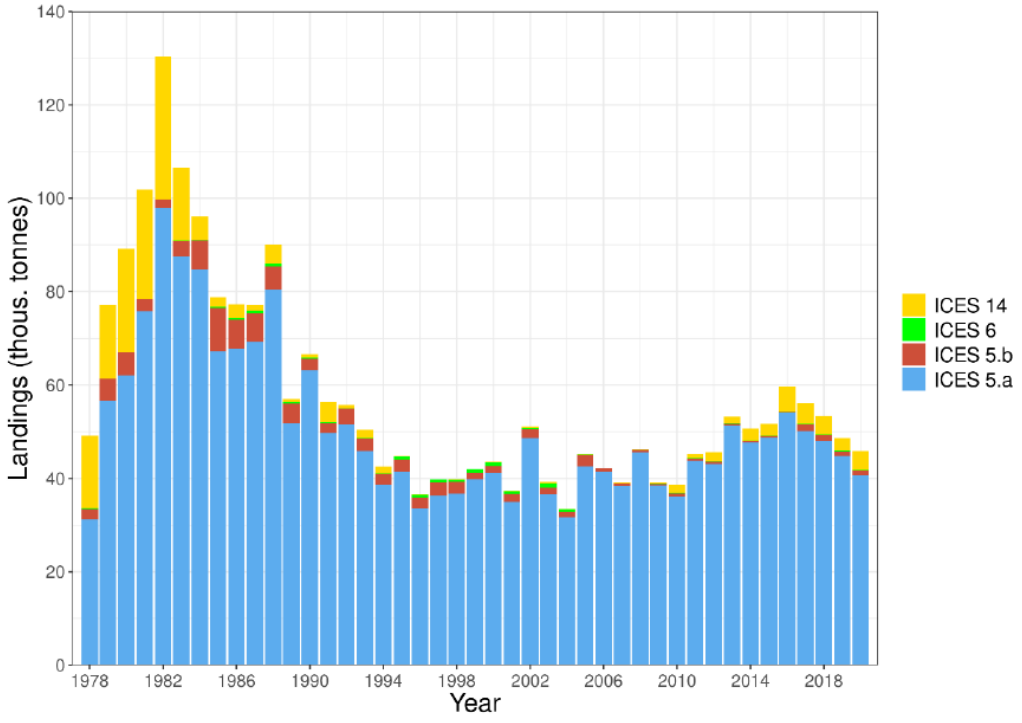

Figure 8. Nominal landings of golden redfish in tonnes by ICES Subareas and Divisions 1978–2020.

43 https://www.ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2019/reg.27.561214_SA.pdf
44 Communicated by MFRI at site visit 27/11-2018
45 https://www.hafogvatn.is/static/research/files/fjolrit-142.pdf

Most catches are taken in Iceland, and mostly in the Western side of the island. The area distribution of the catches is fairly stable.

Recent trends

As shown in Figure 8, there was a big fishery for golden redfish in the 1980ies. Since then, the catches have fluctuated with the stock abundance, that is driven by the occurrence large and small year classes. The last good year classes recruited before 2010. Hence, the stock is declining as are the catches, and this is expected to continue in the coming years.

Since 2014, when the management plan was introduced, the fishing mortality has been slightly above the target. The highest value according to the most recent assessment was 0,129 in 2016. The total catch has consistently been above the recommended TAC (Figure below). There seems to be several reasons for that: the gap between the Icelandic TAC and the advice is not sufficient to cover the catches by the other nations and the Icelandic TAC has been overfished. There has also been some retrospective bias in the assessment, leading to higher recommended TACs than justified in later estimates of the fishing mortality.

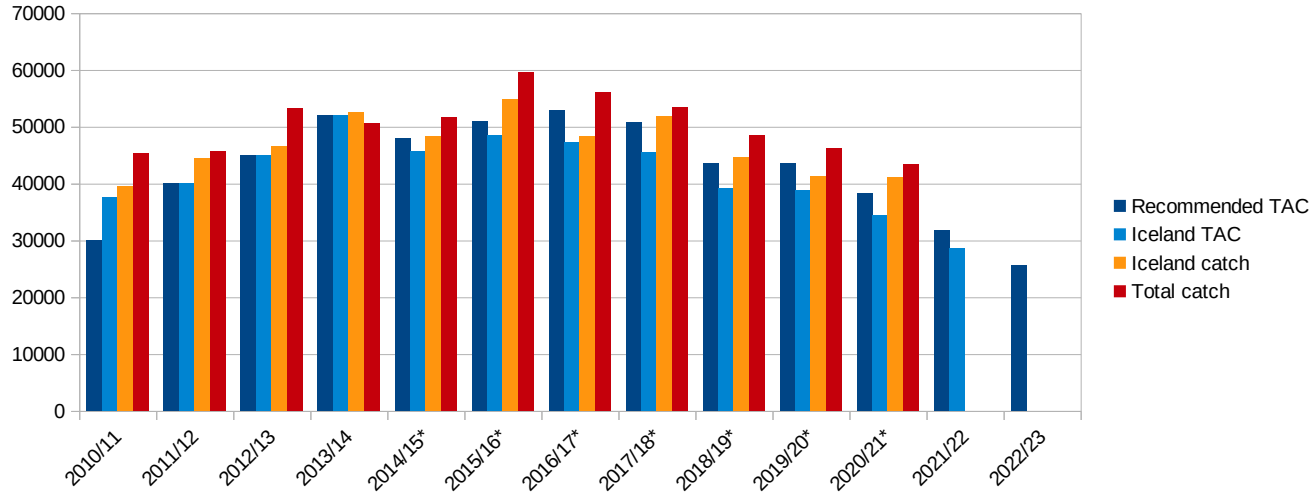

Figure 9. TAC and landings of golden redfish.

7.4 Enforcement and Compliance update

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)[46], the Fisheries Management Act (no. 116/2006)[47], 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[48]. 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, Port Authorities and the MFRI. A full list of regulations which was harmonised and streamlined starting in 2019 is available on https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2021/09/23/Stjorn-fiskveida-2021-2022-Log-og-reglugerdir/.

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[49]). Provisions of the Act on a Special Fee for Illegal Marine Catch[50] are also applied as appropriate. Penalties range from the issue of reprimands by the Directorate of Fisheries and the 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).

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. Fiskistofa also performs check at sea to check for differences in catches of certain vessels when the Fiskistofa inspector in on beard and when not, to detect discards. Some findings have been published in 2019[51] and 2020[52].

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[53].

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[46] https://www.althingi.is/lagas/149a/1992036.html
[47] https://www.ecolex.org/details/legislation/fisheries-management-act-1990-lex-faoc003455/
[48] http://www.fiskistofa.is/english/about-the-directorate/
[49] https://www.althingi.is/lagas/149a/1996057.html
[50] https://www.althingi.is/lagas/149a/1992037.html
[51] http://www.fiskistofa.is/umfiskistofu/frettir/aflasamsetning-a-botnvorpu-og-dragnotarveidum
[52] http://www.fiskistofa.is/umfiskistofu/frettir/aflasamsetning-i-thorskanetum-og-botnvorpu
[53] https://www.stjornartidindi.is/Advert.aspx?RecordID=884be309-64a5-4367-9e4d-f5e7216b6f40

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. Starting from September 2020 smaller Icelandic vessels are required to log their catches in an App (essentially an e-logbook) which contains information on catch and bycatch, including that of marine mammals and seabirds. This follows regulation 298/2020[54]. The App also called Afladagbókina or catch diary[55] [56] automatically records the location of the boat during fishing and the captains then records the catch, its condition and by-catch, in a very simple way. The app replaces paper logbooks in the small boat sector, with an electronic catch recording system. More information on this topic has been provided as part of minor Non Conformance #1 progress update (Section 8 of this report).

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.

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 vessel's 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)[57] 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 several fishing fleets in Iceland. During the 2022 audit, Fiskistofa confirmed that they worked on this issue by increasing surveillance. Two incidents were registered in 2022. The results of this surveillance are published online to show the violations and deter other potential violators[58].

As a result of this process new Regulation has been put in place which essentially places additional Fiskistofa surveillance at the operators cost, for those that do not comply. This is Regulation 990/2020[59] on (7th)

[54] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887
[55] http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla
[56] https://www.mbl.is/200milur/frettir/2020/08/31/oll_aflaskraning_rafraen_fra_og_med_morgundeginum/
[57] https://rikisendurskodun.is/wp-content/uploads/2019/01/Eftirlit-Fiskistofu-Stjornsysluuttekt.pdf
[58] https://island.is/s/fiskistofa/frett/birting-ishlutfalls-vid-endurvigtun-undir-eftirliti
[59] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/22140

amendment to Regulation no. 745/2016, on weighing and registration of marine catch. Paragraph 3 Article 8 of the Regulation now reads as follows:

The weigher may deduct 12% when cooling with ice cream or 7% when cooling with an ice concentrate of unprocessed catch which is weighed on a weighbridge finished for export, directly into a transport vessel. The master shall ensure that refrigerant information is received at the port of landing before the catch is weighed and recorded. If the Directorate of Fisheries' inspection reveals a significant deviation from the ice ratio in the vessel's catch, the vessel's catch shall be weighed in accordance with Article 11 for the next 8 weeks. If there are repeated significant deviations from the reported ice ratio in the vessel's catch, the vessel's catch shall be weighed in accordance with Article 11 the next 16 weeks.

Also, in 2019, the Directorate of Fisheries began implementing ISO-31000 the standard intended for effective guidance on risk management for institutions and companies. This is being implemented in an effort to strengthening confidence in the Agency's oversight, and increase efficiency and transparency in the operations of the Directorate of Fisheries [60].

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)[61].

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.[62]

All scientific advice is available online[63]. Harvest control rules are scrutinised on request by an independent scientific body (ICES) with reports being published online.

Up-to-date maps of fisheries closures are available on-line on the Fisheries Directorate website[64].

Temporary/sudden closures (generally 2 weeks triggered by high juvenile abundance on fishing grounds) are announced by the Coastguard on VHF radio on a specified wavelength and on the radio before the news and weather. They are also published on the MFRI website. The short-term closure monitoring (and issuing of) was transferred to Fiskistofa in the fall of 2020. Some regulation regarding the short-term closures was also changed in 2020, whereby the trigger size limit was increased for cod, which led to significant decrease in the number of closures. An updated table as provided by the management authorities (MFRI and Fiskistofa) is shown below.

Table 6. Short term closures in Iceland for the years 2018-2022.

Year	Species	Number of closures
2018	Cod	90

[60] http://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2020.pdf
[61] https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2021/09/23/Stjorn-fiskveida-2021-2022-Log-og-reglugerdir/
[62] http://www.fiskistofa.is/
[63] https://www.ices.dk/advice/Pages/Latest-Advice.aspx
[64] http://atlas.lmi.is/mapview/?application=haf

2018	Saithe	4
2018	Shrimp	2
2018	Haddock	1
2019	Cod	50
2019	Haddock	1
2020	Cod	9
2020	Haddock	1
2020	Greenland halibut	1
2021	Sea cucumber	2
2021	Cod	3
2021	Haddock	1
2022	Cod	2
2022	Haddock	2
2022	Sea cucumber (quota finished)	1

Directorate Inspections at Sea

Days spent by Fisheries Directorate inspectors at sea inspecting vessels is shown in the table below.

Table 7. Directorate inspector days on fishing vessels (Source: Fiskistofa, October 2022 on-site audit).

Season	Fishery type: Bottom Trawl	Fishery type: Longline	Fishery type: Gillnet	Other Gears (e.g. pelagic gears used to catch herring)?
2015/16 season days	553	Not Available	81 (60 days cod, 21 days lumpsucker)	Not Available
2016/17 season days	780	230	117 (60 days cod, 57 lumpsucker)	195
2017/2018 season days	570	202	154 (41-113)	156
2018/2019 season days	674	190	155 (59- 36- (Greenland halibut 60)	102
2019/2020 season days	468	92	85 (44-37-4)	127
2021 calendar year season days*	315 (1.3% of trips)	2 (0.0% of trips)	0 specifically for cod	59 trips on pelagic trawls (3.4% of trips)

* This season was been heavily affected by Covid-19 restrictions and the Fiskistofa observers were limited by social distancing regulations in their capacity to board and inspect vessels.

7.4.1 Enforcement by Fiskistofa

The Directorate of Fisheries monitors compliance with laws and regulations which apply to fishing, handling of commercial stocks and treatment catch. In many cases, the Directorate of Fisheries is intended to respond to violations of laws and regulations through the application of administrative sanctions. Sanctions are intended to have a protective effect to reduce or prevent further violations. The main resources available to the Directorate

of Fisheries for violations are reprimands and revocation of a fishing license. Alleged violations can also be prosecuted by the police and in some cases it is the only available remedy to respond to violations. Then the Directorate of Fisheries can in individual cases, deprive individuals of a fishing license to enforce law enforcement and rules. The most recent violations detected by Fiskistofa are shown below.

Table 8. Fiskistofa suspected violations in 2020 and 2021. Source: Fiskistofa 2020[65] and 2021 Annual Report[66]. Note, the information between 2020 and 2021 is not directly comparable, and offenses of a similar nature may have been combined into one case.

Suspected violation	2020 No.	2021 No.
Veiðar án leyfis / Fishing without a permit	14	1
Brottkast / offences	11	70
Vigtun afla / weighing of catch	24	2
þar af vigtun vigtarleyfishafa / of which the weighing by the weighing licensee	9	3
Framhjálöndun / landing	6	1
Afladagbók / logbook	40	91
Vanskil afladagbókar / submitting logbook late	470	
Veiðar án aflaheimilda / Fishing with insufficient catch quotas	6	1
Mál vegna umframafla / Cases due to excess catch * mostly daily allowance in coastal vessels	1321	1456
Lax og silungsveiði / salmon and trout fishing	24	13
Undirmálsfiskur / bottom fish fishing	4	11
Röng tilgreining tegunda / Incorrect identification of species	3	3
Grásleppuveiðar / Lumpsucker fishing	13	2
Strandveiðar / coastal fishing	42	2
Annað s.s. tilkynningarskylda, löggilding vigtarmanns, vigtun án löggilts vigtarmanns, ónákvæmni við áætlun afla og hindrun eftirlits. / Other s.s. notification obligation, certification of the weigher, weighing without a certified weigher, inaccuracy in the catch plan and obstruction of control.	14	16

7.4.2 Enforcement by the Icelandic Coast Guard

At sea surveillance is primarily the remit of the Icelandic Coast Guard (ICG). 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, among others.

During the remote audit in October 2022 the ICG reported that surveillance in 2020 and 2021 and 2022 was challenging due to the COVID 19 pandemic. By beginning of March 2020, severe restrictions on direct interactions between people were imposed. This restricted surveillance possibilities on board vessels for Maritime Surveillance and Control agency such as the Icelandic Coast Guard. All restrictions were lifted by February 25th 2022.

[65] https://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2020.pdf
[66] https://www.fiskistofa.is/media/arsskyrslur/arsskyrsla-2021.pdf

To meet the situation the ICG patrol vessels increased their visibility, using their boats to monitor the fisheries close to the fishing vessels. There was also increased support and cooperation with Directorate of Fisheries by operating drones for surveillance from ICG patrol vessels.

In spite of the Coast Guard efforts the pandemic has had its impact. Fewer inspections and boardings of vessels resulted in less measuring of fish, which was reflected in fewer Short Time Closures in 2020 and 2021 and 2022 (see Table 7) and none based on Fisheries inspections by ICG. The overall number of inspections since 2012 is shown below.

Figure 10. Overall number of ICG inspection from 2012 to 2022**.** Source: ICG, November 2022.

Instead of regular boardings the ICS used more surveillance drones, in partnership with Fiskistofa. Trials with a bigger drone from EMSA (type Schiebel S 100 Camcopter, Figure below) proved to be a lesson for future use of larger drones operating from a vessel. The trials with the EMSA drone tied up, in part, the activities of the vessels which can in part explain fewer boardings. However, the drones are an extension of the vessel and information is used to inspect vessels more selectively than doing random checks. In the summer of 2022 the ICG recorded several incidents of inspections after anomalies were spotted by the drone crews. These include registry of crew but also discard of fish. Air Surveillance hours by RPAS (drone) between May 31st until August 31st 2022 are shown below.

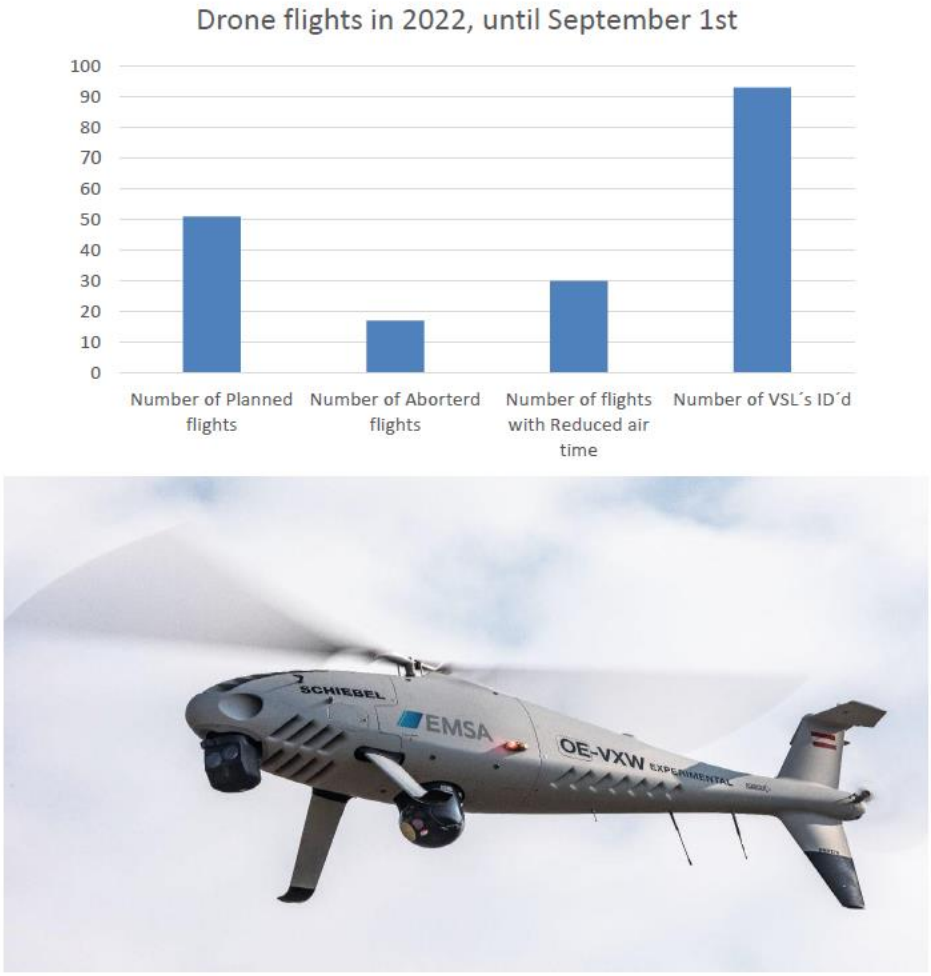


Figure 11. Air Surveillance hours by RPAS (drone) between May 31st until August 31st 2022.

In terms of overall infringements, 11 reports of apparent infringements were reported in 2022, noting however that not all reports are due to fishing infringements and one report can include more than one type of Apparent Infringement. The types of apparent infringement in 2022, included: Lögskráningar /Crew registry, Réttindi /License, Veiðar /Fisheries, Veiðileyfi /Fishing permit, Ferilvöktun /Vessel monitoring, Farþegafjöldi /Passengers, Haffæri /Sea worthiness and a new addition För yfir landamæri /Border Control. These are shown below (until the 1st September 2022) compared to historical data up to 2017.

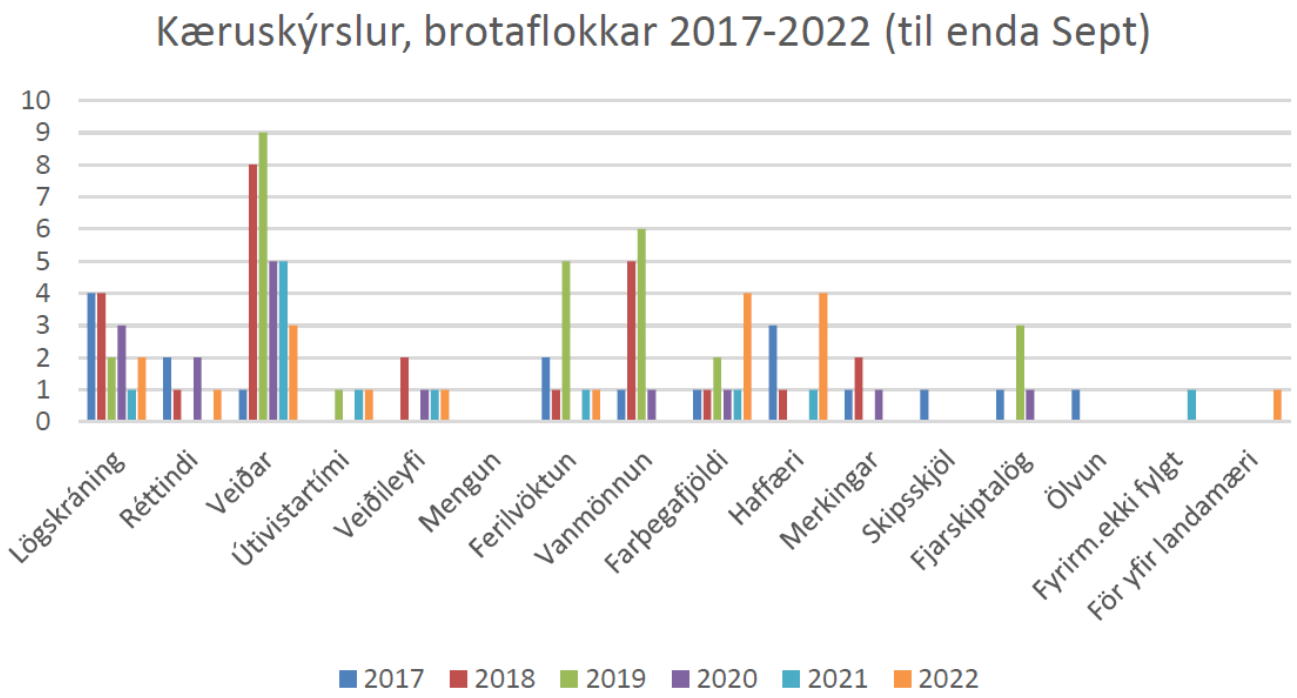


Figure 12. Overview of ICG infringement reports in 2017- (1st September) 2022. Source: provided by the ICG on the 8th of November 2022.

For 2022, infringements on Passenger and Sea Worthiness are most common 4 each, Fishing is next with 3 Apparent Infringements. No apparent infringement were reported in 2022 in the following categories; Mengun /Pollution, Vanmönnun /Manning, Merkingar /Markings, Skipsskjöl /Ships documents, Fjarskiptalög /Communications, Fyrirm.ekki fylgt /Instructions not obeyed or Ölvun /intoxication.

Foreign vessels inspection 2022

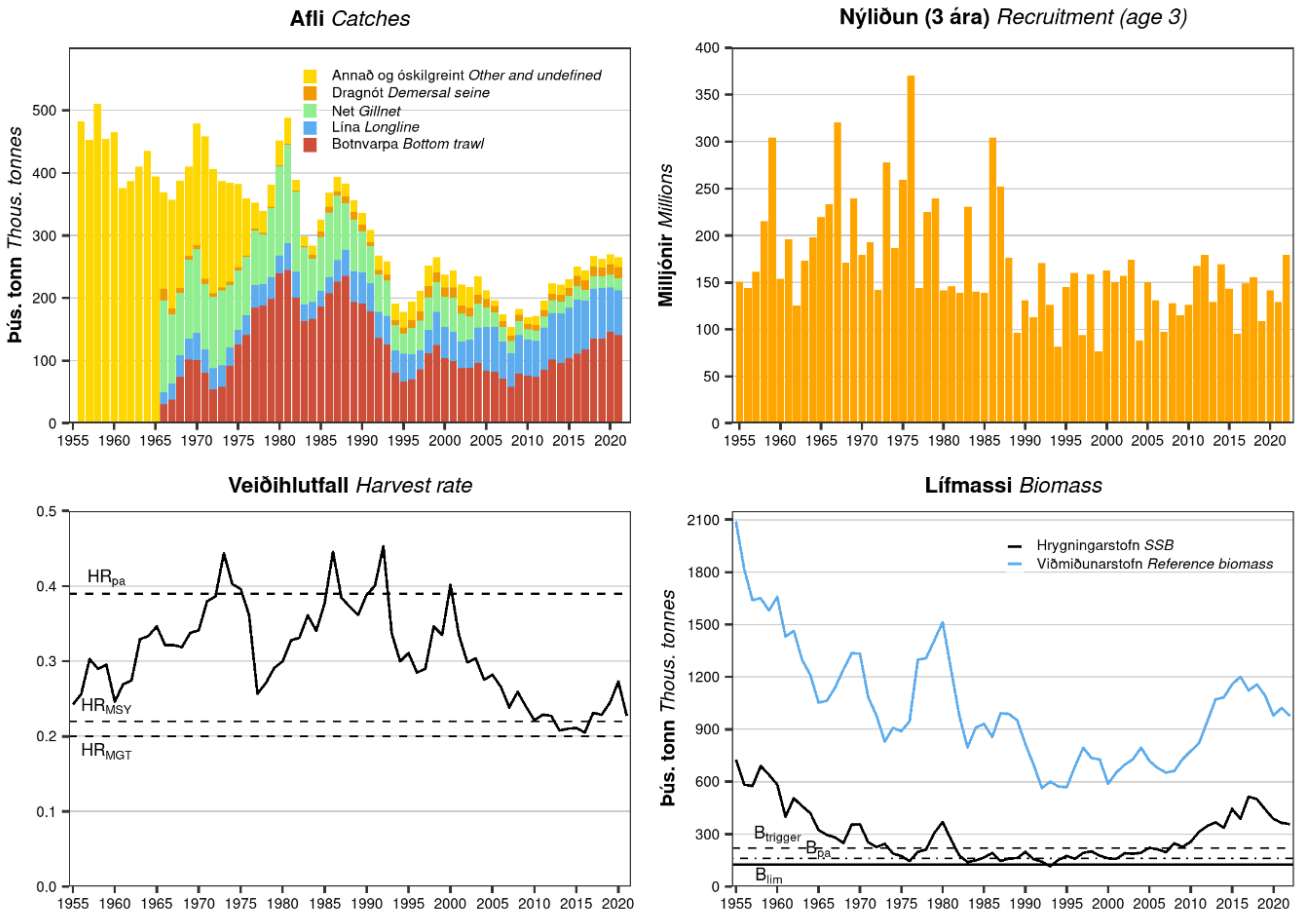
Eight foreign flag vessels inspected in 2022, one Faroese longliner, six Norwegian Capelin vessel, and another Capelin vessel from Greenland, all in the Icelandic EEZ. No infractions were reported.

7.5 Bycatch, habitat and ecosystem update

Associated species catch and bycatch to the fishery

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. The species listed below are those that were identified during the Golden Redfish re-assessment in 2019[67]. A status update on each of these species is provided below.

Table 9. Status of bycatch and associated species in the golden redfish target and non-target fisheries.

Status of bycatch and associated species in the golden redfish target and non-target fisheries as identified during the re-assessment from historic average catches for each relevant gear type. All data and information is derived from the MFRI Advice page[68] for each individual species.
ÞORSKUR – *COD* (*Gadus morhua*)[69] Fishing pressure is above HRMGT and HRMSY but below HRpa; spawning stock size is above MSY Btrigger, Bpa, and Blim.  **Figure 13.** Icelandic cod harvest rate and biomass.

[67] https://www.responsiblefisheries.is/media/1/form-9e-irf-icelandic-redfish-re-assessment-final-certification-report-july-2019.pdf
[68] https://www.hafogvatn.is/en/harvesting-advice
[69] https://www.hafogvatn.is/static/extras/images/01-cod1325962.pdf

ÝSA – HADDOCK (*Melanogrammus aeglefinus*)[70]

The spawning-stock biomass (SSB) has decreased since 2008, but stabilized above MSY Btrigger in recent years. MFRI and ICES assesses that fishing pressure is above both HRMSY and HRpa and below HRlim; spawning stock size is above MSY Btrigger, Bpa and Blim.

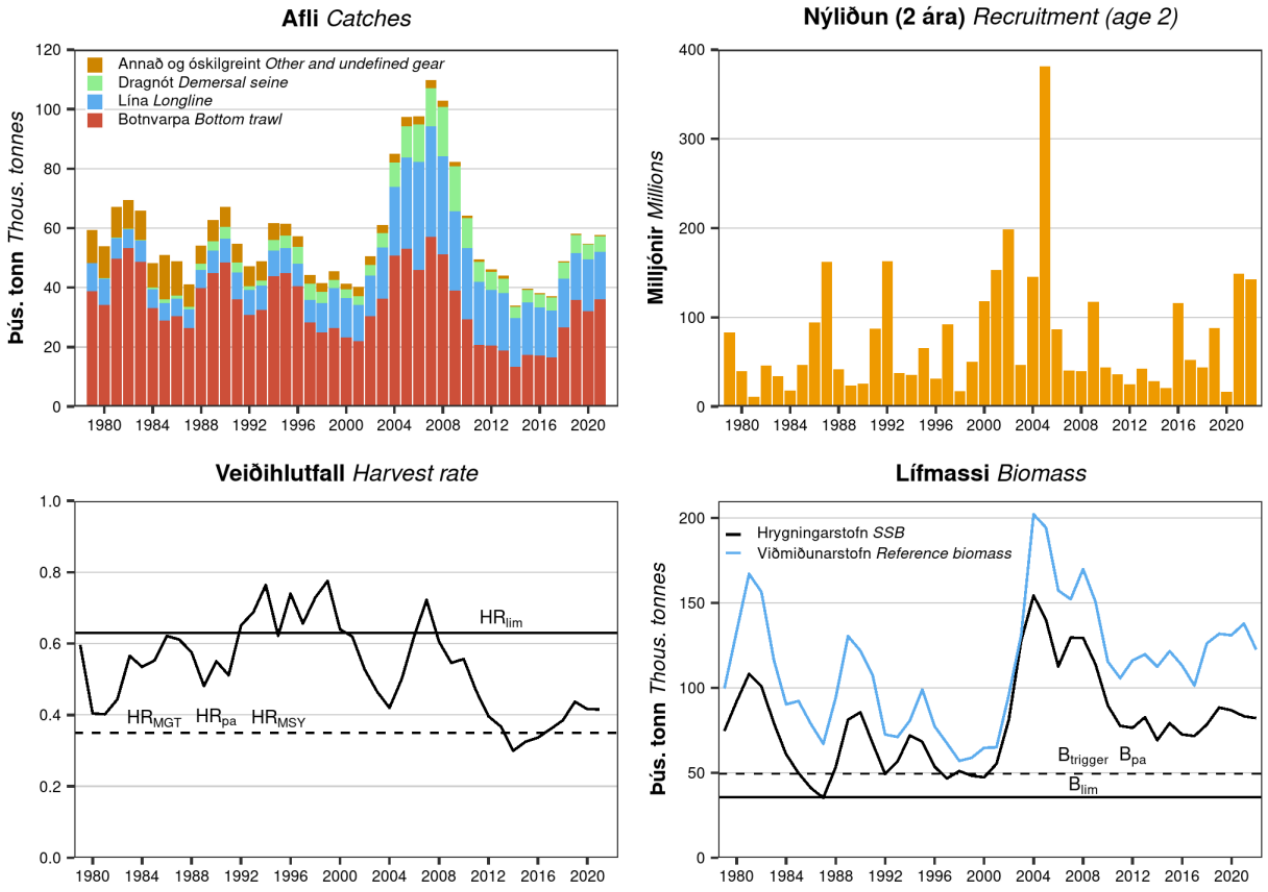


Figure 14. Icelandic haddock harvest rate and biomass.

UFSI – SAITHE (*Pollachius virens*)[71]

Fishing pressure is above HRMGT and HRMSY but below HRpa, and HRlim; spawning stock size is above MSY Btrigger, Bpa, and Blim and Blim.

[70] https://www.hafogvatn.is/static/extras/images/02-haddock1325964.pdf
[71] https://www.hafogvatn.is/static/extras/images/03-saithe1325968.pdf

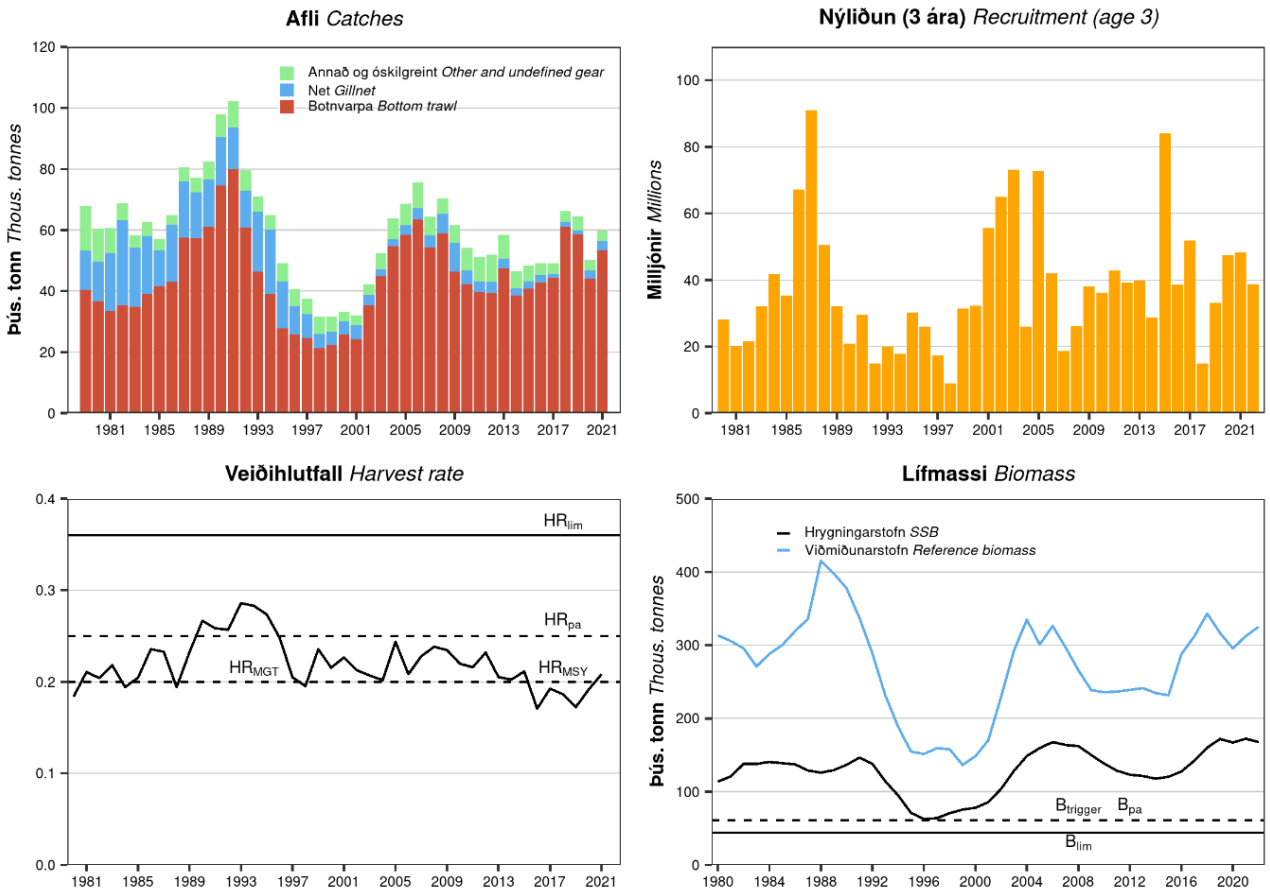


Figure 15. Icelandic saithe harvest rate and biomass.

DJÚPKARFI – DEMERSAL BEAKED REDFISH (*Sebastes mentella*)[72]

MFRI and ICES cannot assess the stock and exploitation status relative to maximum sustainable yield (MSY) and precautionary approach (PA) reference points because the reference points are undefined. MFRI and ICES advise that when the precautionary approach is applied, catches in the fishing year 2022/2023 should be no more than 6336 tonnes.

[72] https://www.hafogvatn.is/static/extras/images/05-demersalsmentella1325976.pdf

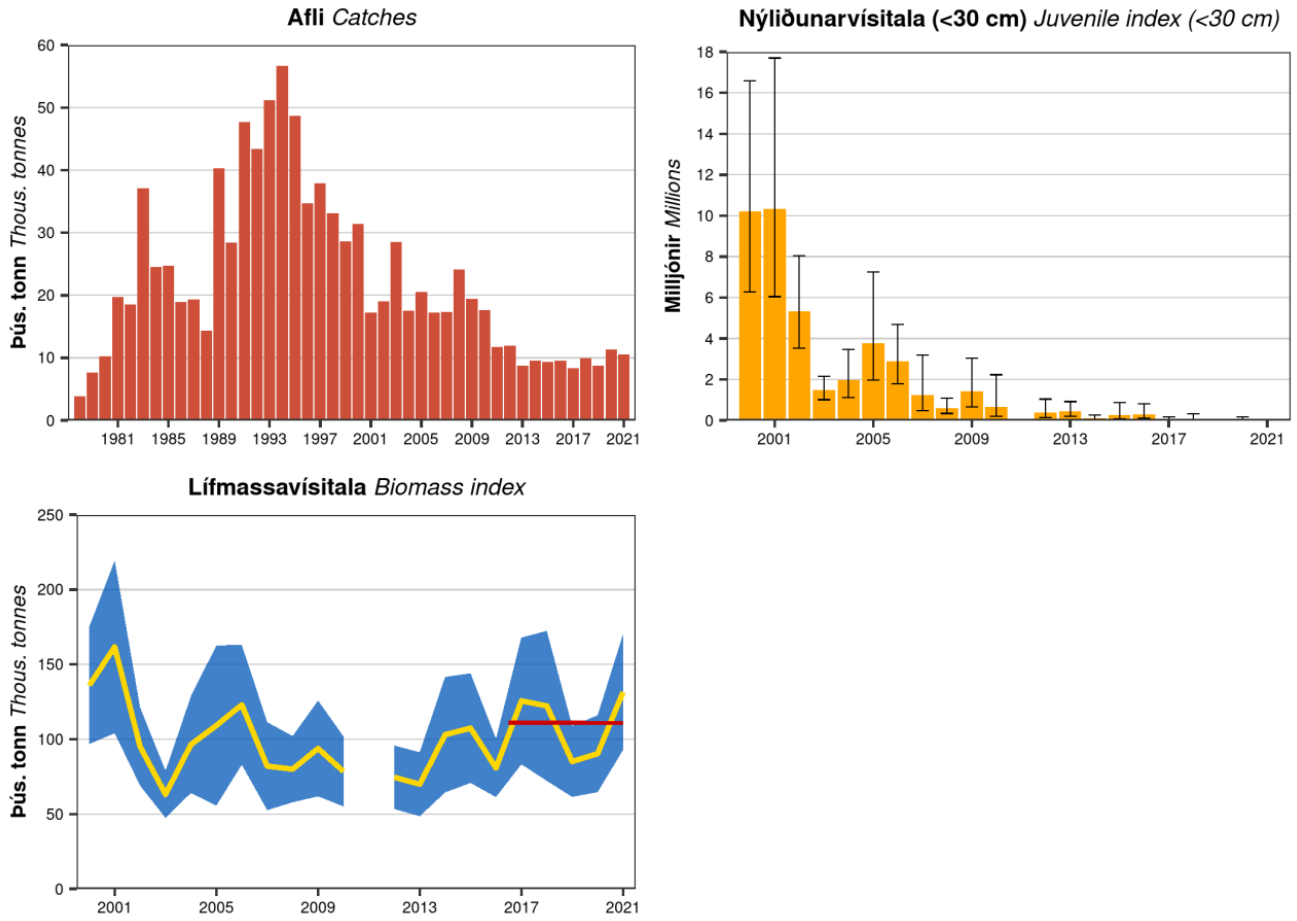


Figure 16. Demersal beaked redfish. Catches, and IS-SMH juvenile (≤30 cm) and biomass indices. Shaded area and error bars represent 95% CI. Red horizontal lines indicate average biomass indices for 2017–2019 and for 2020–2021 used in the advice calculations.

GRÁLÚÐA – GREENLAND HALIBUT *(Reinhardtius hippoglossoides)*[73]

MFRI and ICES advise that when the MSY approach is applied, catches in the 2022/2023 fishing year in the East Greenland/ Iceland/Faroe Islands area should be no more than 26 710 tonnes. Fishing pressure on the stock is below FMSY and Flim; spawning stock size is above MSY Btrigger and Blim.

[73] https://www.hafogvatn.is/static/extras/images/08-greenlandhalibut1325988.pdf

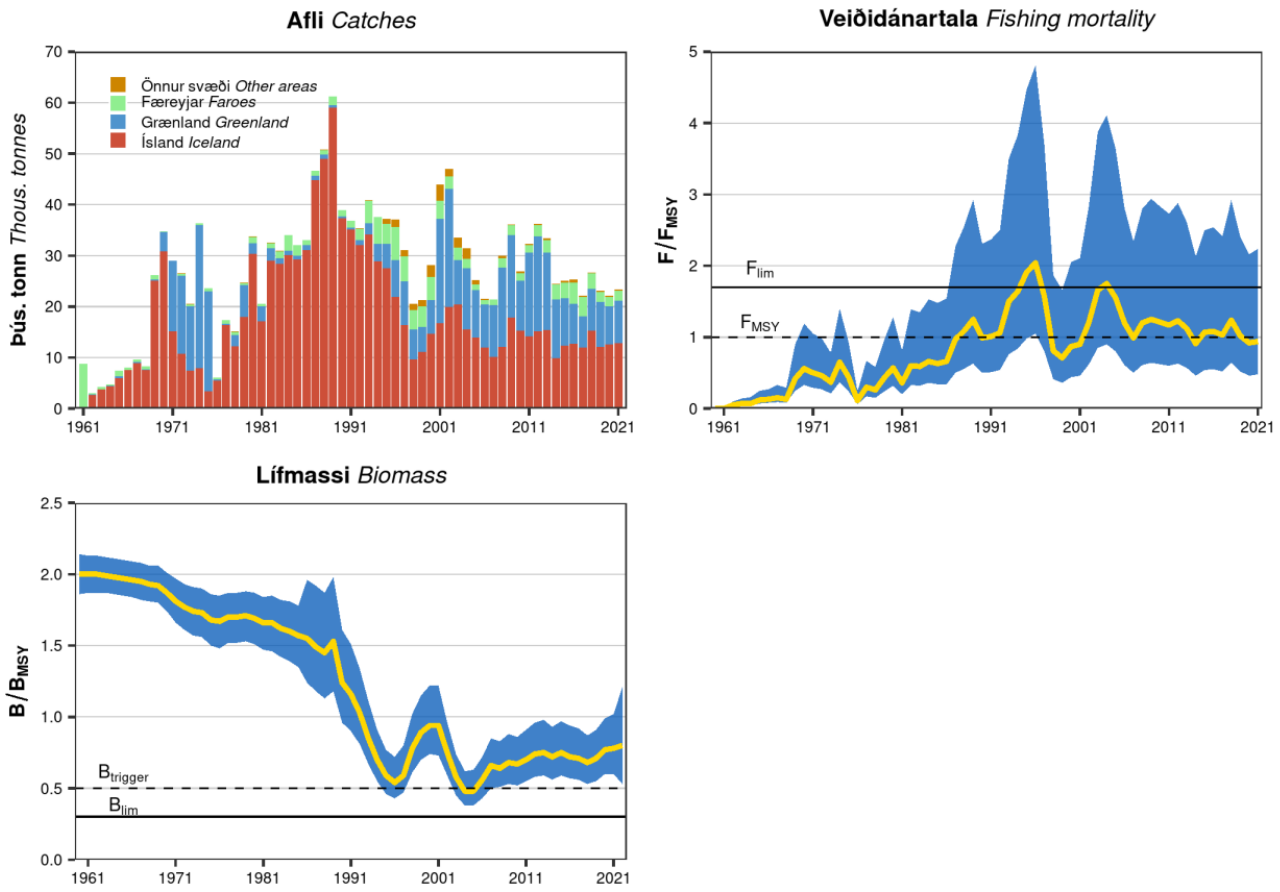


Figure 17. Greenland halibut harvest rate and biomass.

LANGA – LING (*Molva molva*)[74]

MFRI and ICES advises that when the Icelandic management plan is applied, catches in the fishing year 2022/2023 should be no more than 6 098 tonnes. Fishing pressure on the stock is above FMGT but below Fpa and Flim; spawning-stock size is above MGT Btrigger, Bpa and Blim.

[74] https://www.hafogvatn.is/static/extras/images/17-ling1326026.pdf

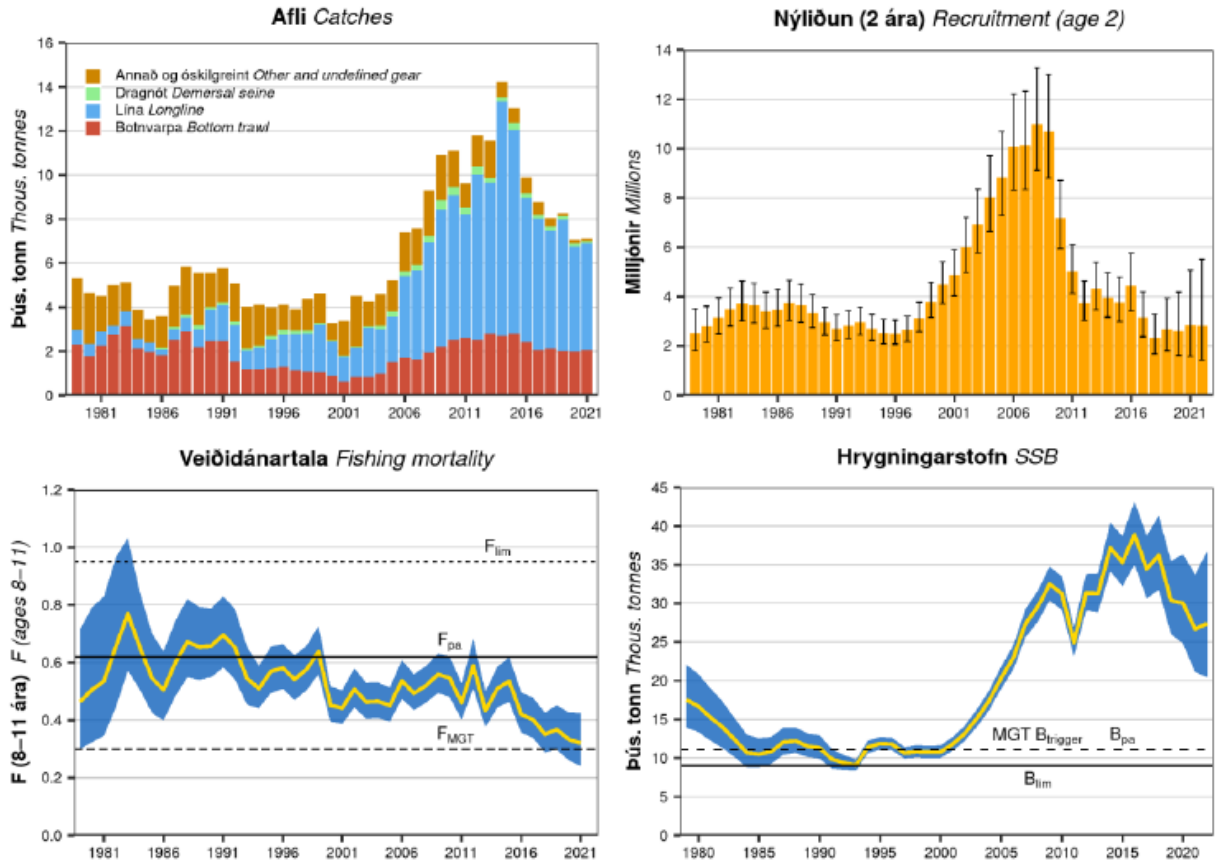


Figure 18. Ling harvest rate and biomass.

TINDASKATA – STARRY RAY (*Amblyraja radiata*)[75]

The MFRI advises that when the precautionary approach is applied, catches in the fishing year 2022/2023 should be no more than 1105 tonnes. The MFRI cannot assess the stock and exploitation status relative to maximum sustainable yield (MSY) and precautionary approach (PA) reference points, because the reference points are undefined. The stock has declined in recent years, but recruitment is stable. Prospects regarding the size of the stock are, therefore, uncertain.

[75] https://www.hafogvatn.is/static/extras/images/24-starryray1326054.pdf

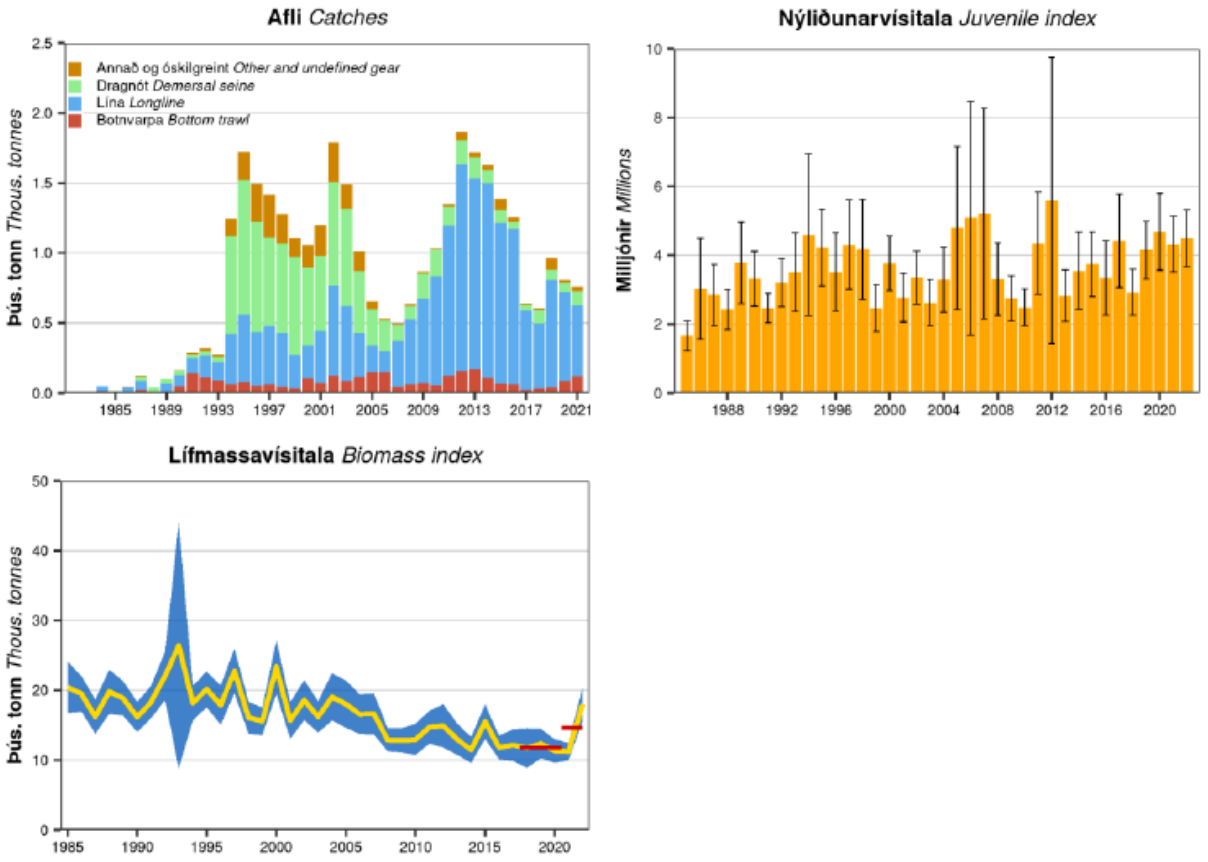


Figure 19. Starry skate harvest rate and biomass.

STEINBÍTUR–ATLANTIC WOLFFISH (*Anarhichas lupus*)[76]

Fishing pressure on the stock is above FMGT, and Fpa but below Flim; spawning-stock size is above MGT Btrigger, Bpa and Blim.

[76] https://www.hafogvatn.is/static/extras/images/15-atlanticwolffish1326018.pdf

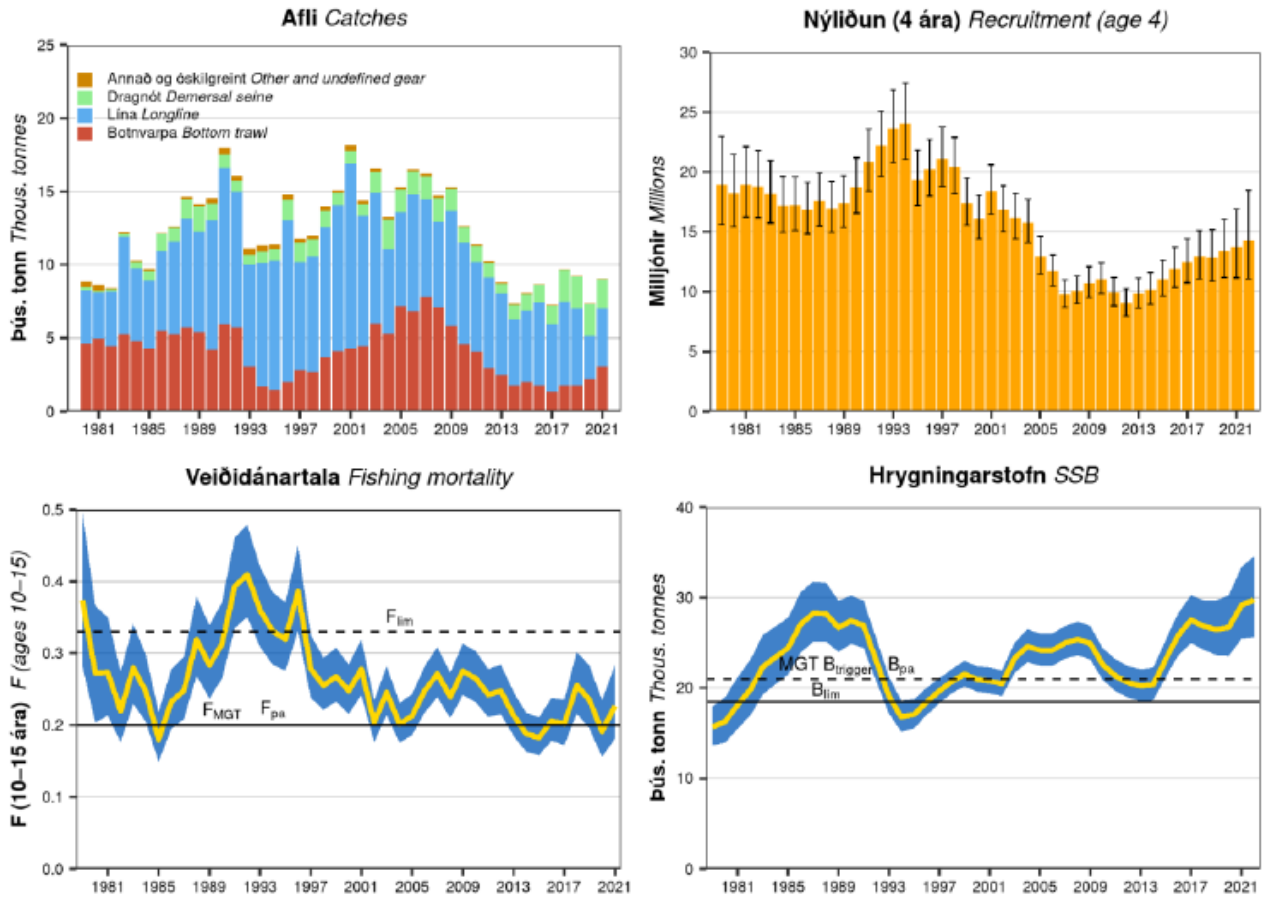


Figure 20. Atlantic wolffish harvest rate and biomass.

HLÝRI – SPOTTED WOLFFISH (*Anarhichas minor*)[77]

In the re-assessment for this fishery in 2019[78] a small percentage (i.e. 0.86%) of spotted wolffish was associated to the longline catches of golden redfish (2.5% of total catches by all gears). The stock is at a critical stage as the biomass and juvenile indices have decreased year on year and are now at historical low levels. The stock is considered to be below any candidate biomass reference points. Therefore, the advised catch levels are expected to decline in the proceeding years, or potentially a landing ban of spotted wolffish could be advised if the level of fishing mortality is not reduced to values sufficient to reverse the downward trend. As spotted wolffish are mainly caught as bycatch, catches have been above recommendations, and biomass indices are now at historically low levels, fishermen are now allowed (since 2021) to release spotted wolffish caught beyond set TAC, due to its high post capture survival.

[77] https://www.hafogvatn.is/static/extras/images/16-spottedwolffish1326022.pdf
[78] https://www.responsiblefisheries.is/media/1/form-9e-irf-icelandic-redfish-re-assessment-final-certification-report-july-2019.pdf

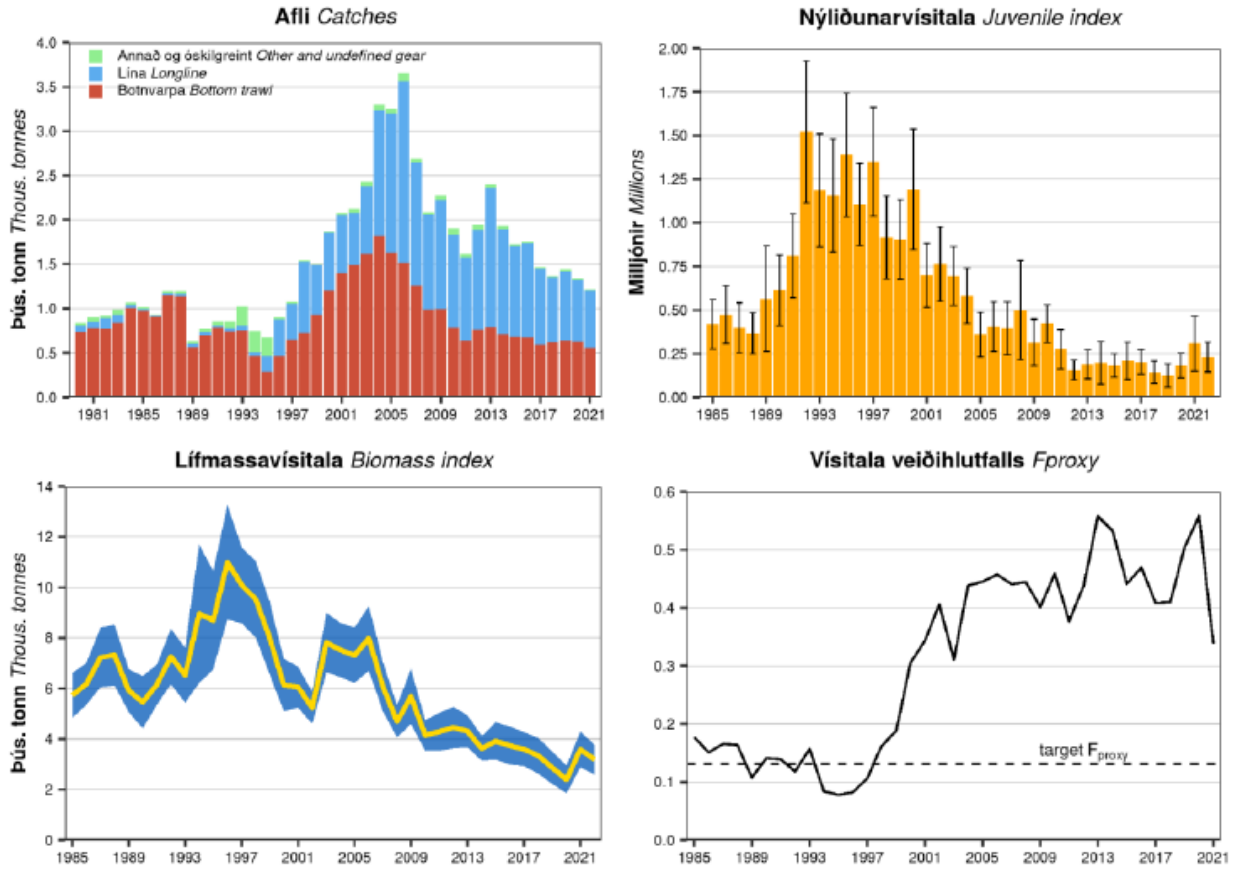


Figure 21. Spotted wolffish catches, juveniles index, harvest rate and biomass.

Additional management measures have been implemented for this stock in 2020. During the remote site visit the MFRI communicated that there is a strong need to protect the stock. Studies in Canada show that wolffish is generally fairly robust and can survive capture by trawls. For example, Grant and Hiscock (2014)[79] showed a 92-100% post capture survival for spotted wolffish following net entrainment in commercial bottom otter trawl tows up to 2.5 h, haul back through a thermocline (range, 5.8 °C), and exposure to 5–13 °C air temperatures for up to 2 h. In last autumn survey the MFRI investigated this, and preliminary results suggest that spotted wolffish can survive up to two hours in fishing ramp and conveyor belts after catch. In autumn survey in 2020 the MFRI investigated this, and preliminary results suggest that spotted wolffish can survive up to two hours in fishing ramp and conveyor belts after catch. Last year MFRI also did research on survival of released spotted wolffish after catch in longline. Preliminary results suggested that the survival rate was high.

As a result of this, the MFRI gave a landings advice for the 2020/21 season and suggested that fishers would be allowed to discard spotted wolffish as per Regulation 1256/2020[80] which now allows fishers (starting December 2020) to discard viable (living) spotted wolffish, as opposed to landing it dead, taking advantage of the high post capture survival of this

[79] Grant, S.M., and Hiscock, W. 2014. Post-capture survival of Atlantic Wolfish (Anarhichas lupus) captured by bottom otter trawl: Can live release programs contribute to the recovery of species at risk? Fish. Res. 151: 169-176. https://www.sciencedirect.com/science/article/abs/pii/S0165783613002816

[80] Reglugerð um (2.) breytingu á reglugerð nr. 468/2013, um nýtingu afla og aukaafurða.

fish. The regulation continues in the 2021/2022 fishing season[81]. As per article 1 of this regulation, if spotted wolffish is released, the type and estimated quantity in kilograms released shall be recorded in an electronic catch logbook or the smart device program. Hence the amount caught and landed and the amount caught and released is now supposed to be recorded. However, the current logbook system is not properly set up with space to recorded both landed and released spotted wolffish and for now, captains are recording (some portion) of the released part in the comment section of the logbook, which may not make it into formal records.

There is also work in progress by Trackwell to modify the electronic logbooks to allow for separate recording of landed and released catches. In addition, the MFRI is in the process of measuring the survival of spotted wolffish in Icelandic waters and, in addition to age reading, they hope to potentially develop a recovery plan for the stock. It is expected that the allowance to release live individuals (as opposed to having to land them) will contribute to bringing the catches within TAC as a first step towards stock rebuilding. However, for now, the figures reported on the Fiskistofa website represent landed values excluding releases, as it has proven difficult to record the released numbers. Halfway through the 20121/2022 fishing year, the catch of spotted wolffish was already at more than 500 t against a TAC of 377 tonnes[82]. The total landed catch for the 2021/22 season logged on the Fiskistofa website as of December 2022 was 931 t., close to three times the allowed TAC[83]. The 2021/22 season was the first full fishing season where the full effect of this regulation was recorded. According to the above, it is not clear if this new regulation is being observed in the fleet.

More specifically, however, we also note that the 3 fisheries which can be said to be mostly responsible for these catches are the cod, haddock and saith fisheries for which a non-conformance is currently being addressed.

GULLLAX – GREATER SILVER SMELT (*Argentina silus*)[84]

Fishing pressure on the stock is below FMSY and spawning-stock size is above MSY Btrigger, Bpa, and Blim.

[81] https://www.hafogvatn.is/static/extras/images/16-spottedwolffish1259438.pdf

[82] Fiskistofa. 2022. Important to release live spotted wolffish. March 16th 2022. https://island.is/frett/mikilvaegt-ad-sleppa-lifvaenlegum-hlyra

[83] https://gamli.fiskistofa.is/veidar/aflaupplysingar/afliallartegundir/

[84] https://www.hafogvatn.is/static/extras/images/23-greatersilversmelt1326050.pdf

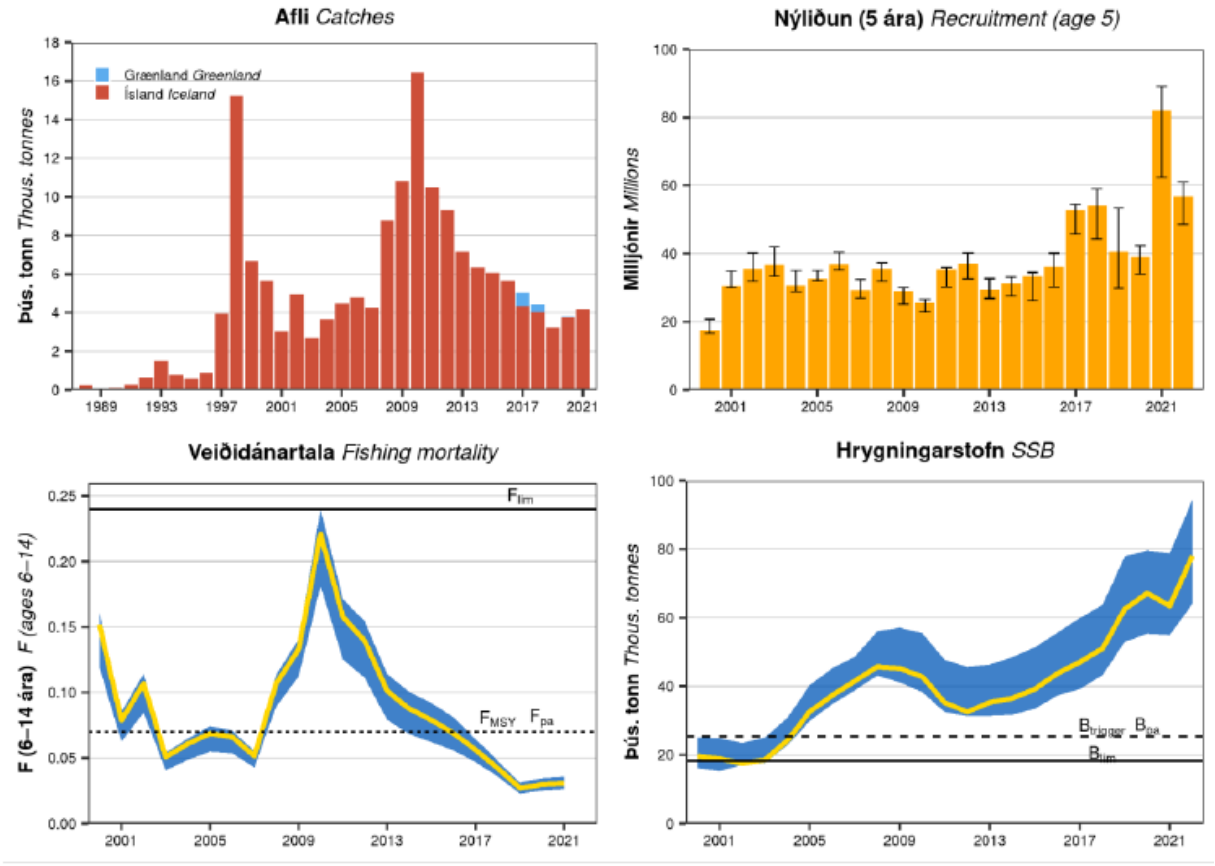


Figure 22. Greater silver smelt harvest rate and biomass.

SKARKOLI – PLAICE (*Pleuronectes platessa*)[85]

Fishing pressure on the stock is above FMGT but below Fpa and Flim; spawning-stock is above MGT Btrigger and Blim.

[85] https://www.hafogvatn.is/static/extras/images/09-plaice1325992.pdf

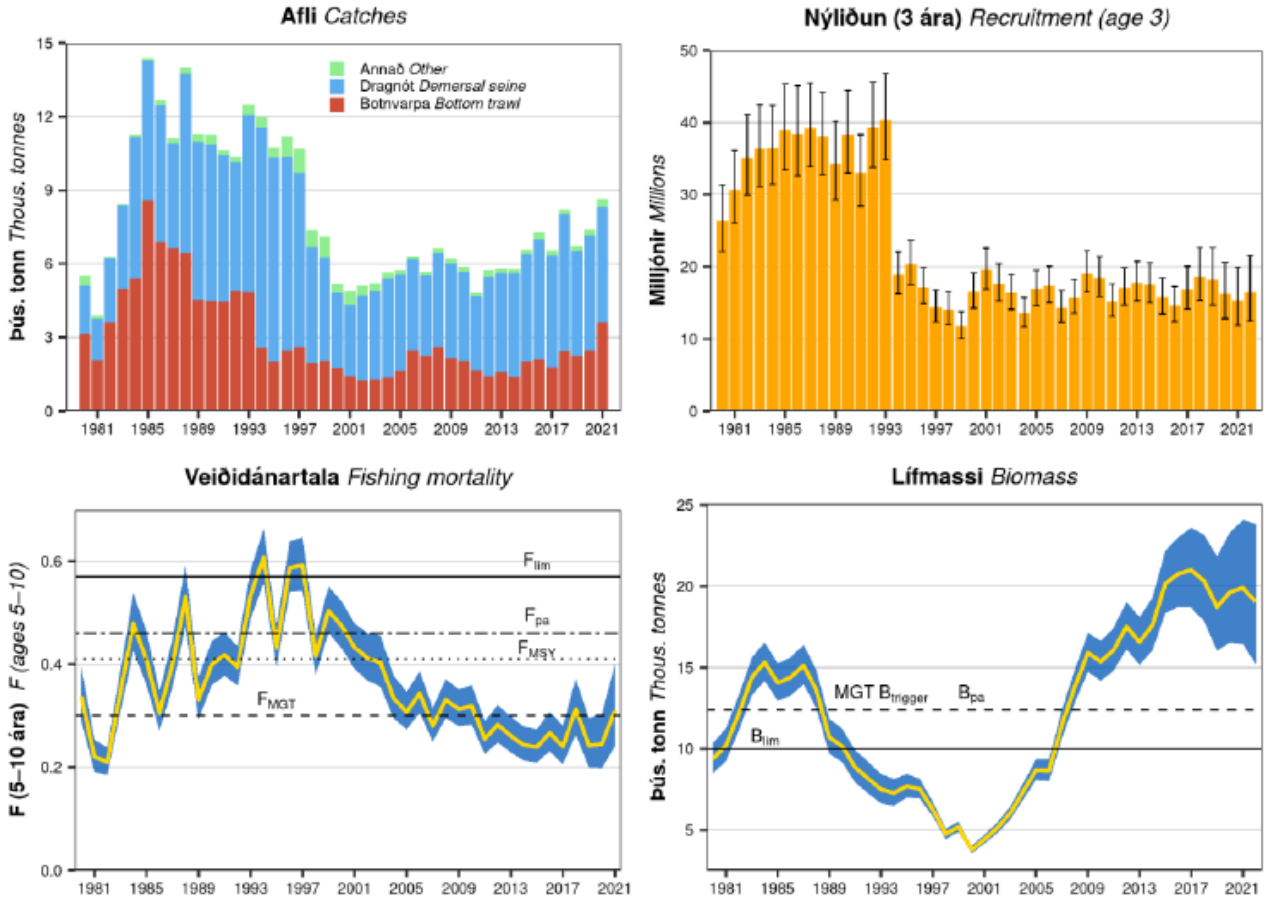


Figure 23. Plaice harvest rate and biomass.

HUMAR – NORWAY LOBSTER (*Nephrops norvegicus*)[86]

MFRI advised in 2019-2021 that effort on the Norway lobster should be decreased substantially because of the poor state of the stock. MFRI also advised that monitoring of the fishery should be allowed if the abundance index (number of burrows) was above half of the value at the beginning of the time series (in 2016) or 300 million burrows. Monitoring fishery was allowed for sampling and mapping the distribution of the stock. However, even though effort has decreased substantially in recent years, current data indicates that the state of the stock has declined and there is little or no incoming recruitment. The abundance index has decreased by 27% from 2016-2021 and is now at its lowest level. Burrow density in 2021 was estimated to be 0.066 burrows/m2 which is one of the lowest values reported for other functional units of Norway lobster assessed by ICES. Data from catches and surveys indicate that there is very little incoming recruitment. At the same time the harvest rate has declined from 1.9% in 2016 to 0.2% in 2021 and CPUE in 2021 is the lowest value since 1970. For these reasons, the basis for the advice is changed and the recommendation now is that there should be zero catches in 2022 and 2023. Since 2014/15 catches have been within advice and within the National TAC. The harvest rate is now nominal (i.e. 0.2%). In 2019-2021, MFRI advised several closures for Norway lobster fishing and bottom trawling for fish on three Norway lobster grounds. MFRI advises that the same closures should be in effect in 2022 and 2023.

[86] https://www.hafogvatn.is/static/extras/images/040-humar_desember_20211292276.pdf

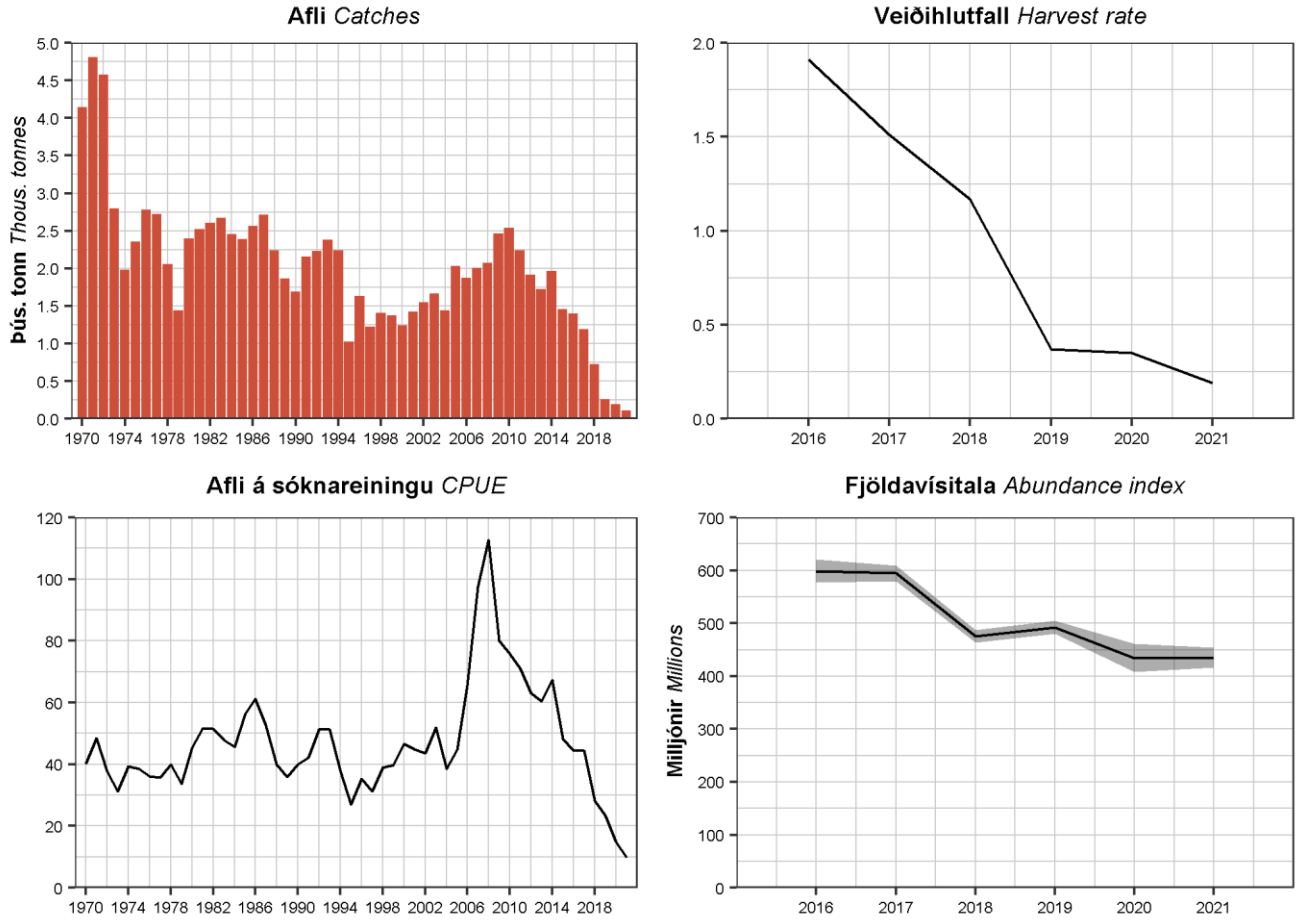


Figure 24. Norway lobster harvest rate and biomass.

ÞYKKVALÚRA – LEMON SOLE (*Microstomus kitt*)[87]

Biomass reference points are undefined at the moment, however the IS-SMB recruitment index is, as last year, is above average and is now measured near highest observed value in recent years. F is fluctuating around the Fproxy point.

[87] https://www.hafogvatn.is/static/extras/images/10-lemonsole1325996.pdf

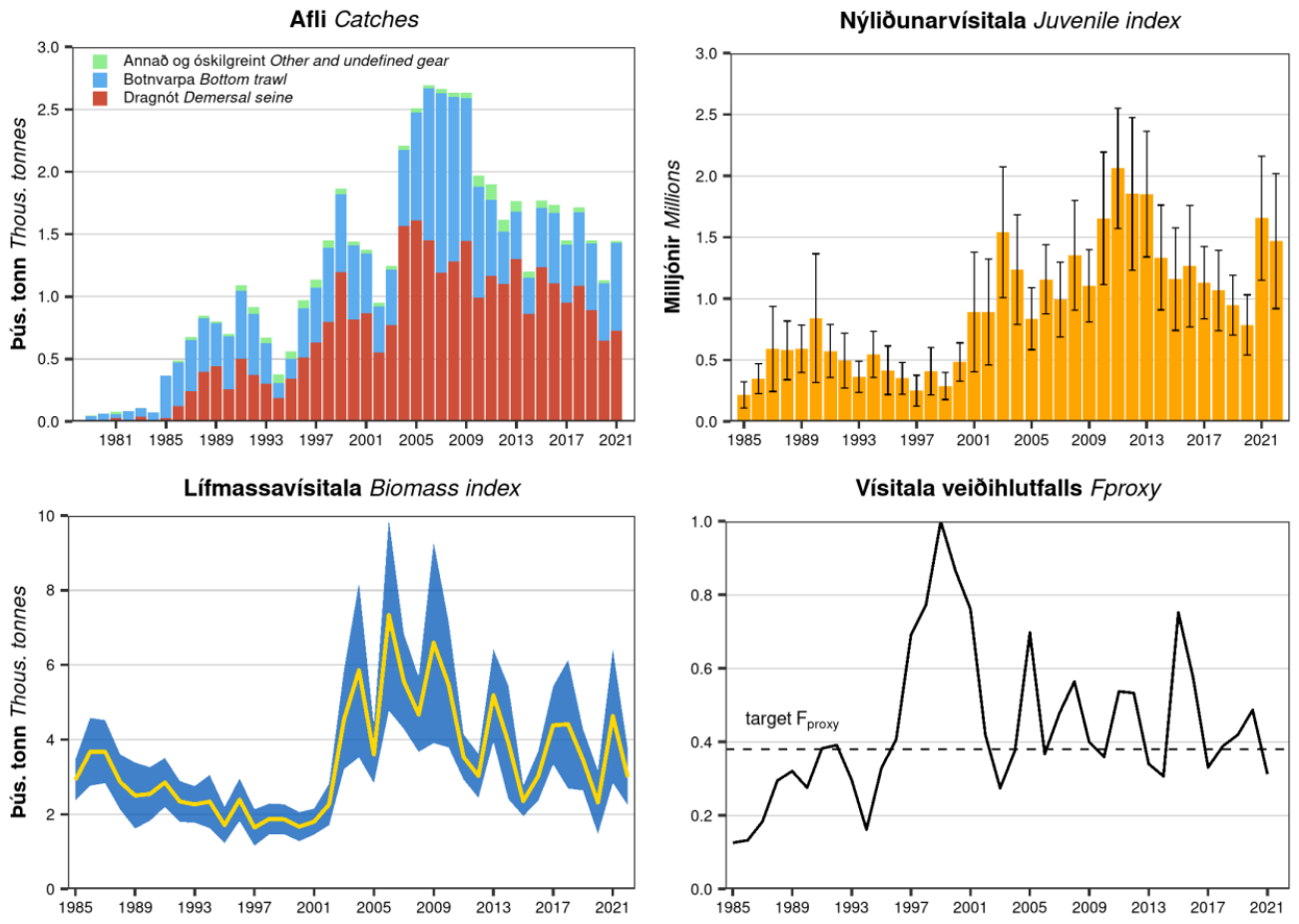


Figure 25. Lemon sole harvest rate and biomass.

LANGLÚRA – *WITCH (Glyptocephalus cynoglossus)*[88]

MFRI cannot assess the stock and exploitation status relative to maximum sustainable yield (MSY) and precautionary approach (PA) reference points because the reference points are undefined. The IS-SMB covers main fishing grounds of witch. Year-to-year fluctuations in the survey biomass index can be high, but indices have been stable in recent years.

[88] https://www.hafogvatn.is/static/extras/images/11-witch1326076.pdf

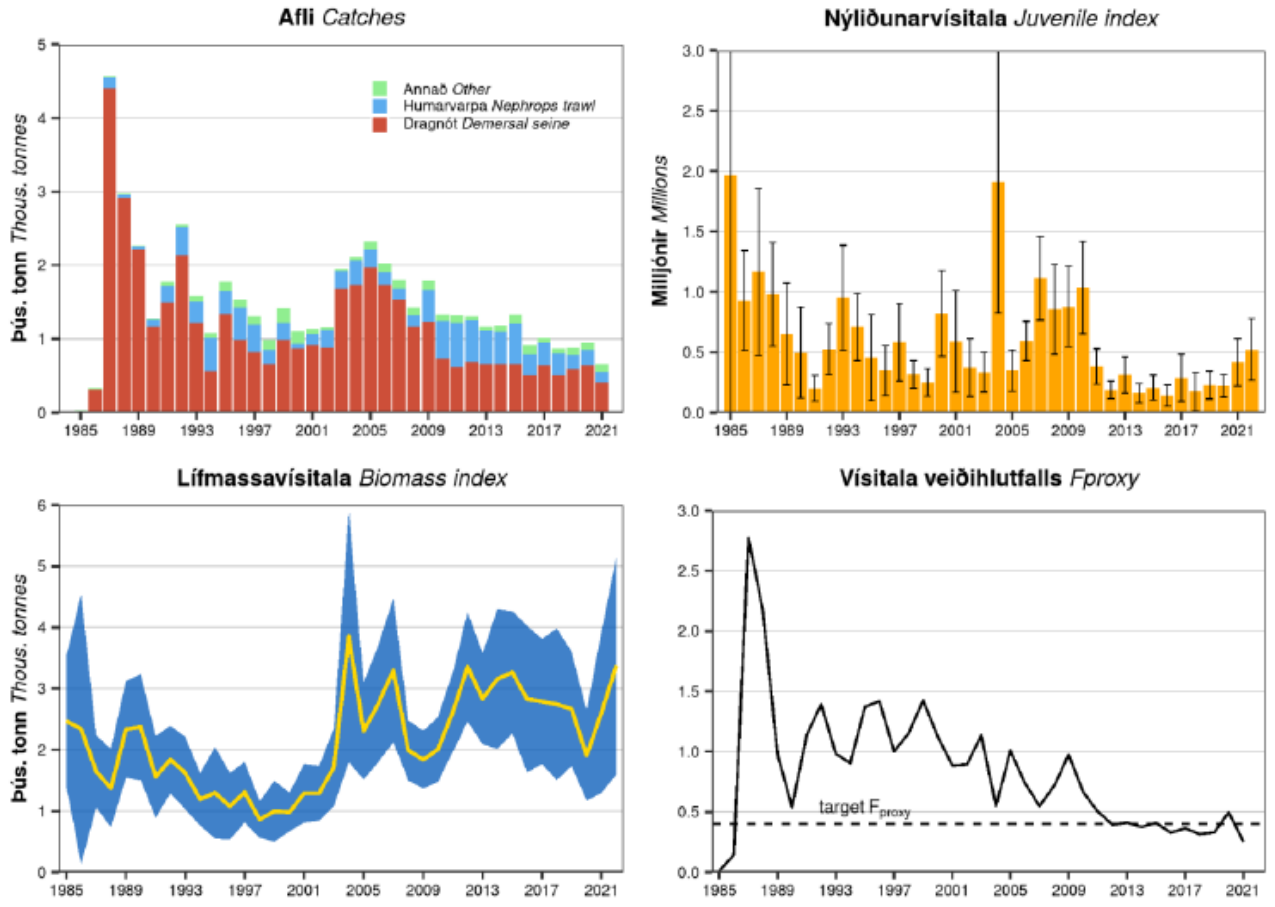


Figure 26. Witch harvest rate and biomass.

KEILA – TUSK (*Brosme brosme*)[89]

Fishing pressure on the stock is above FMGT, but below Flim,; spawning-stock size is above MGT Btrigger, Bpa and Blim.

[89] https://www.hafogvatn.is/static/extras/images/19-tusk1326034.pdf

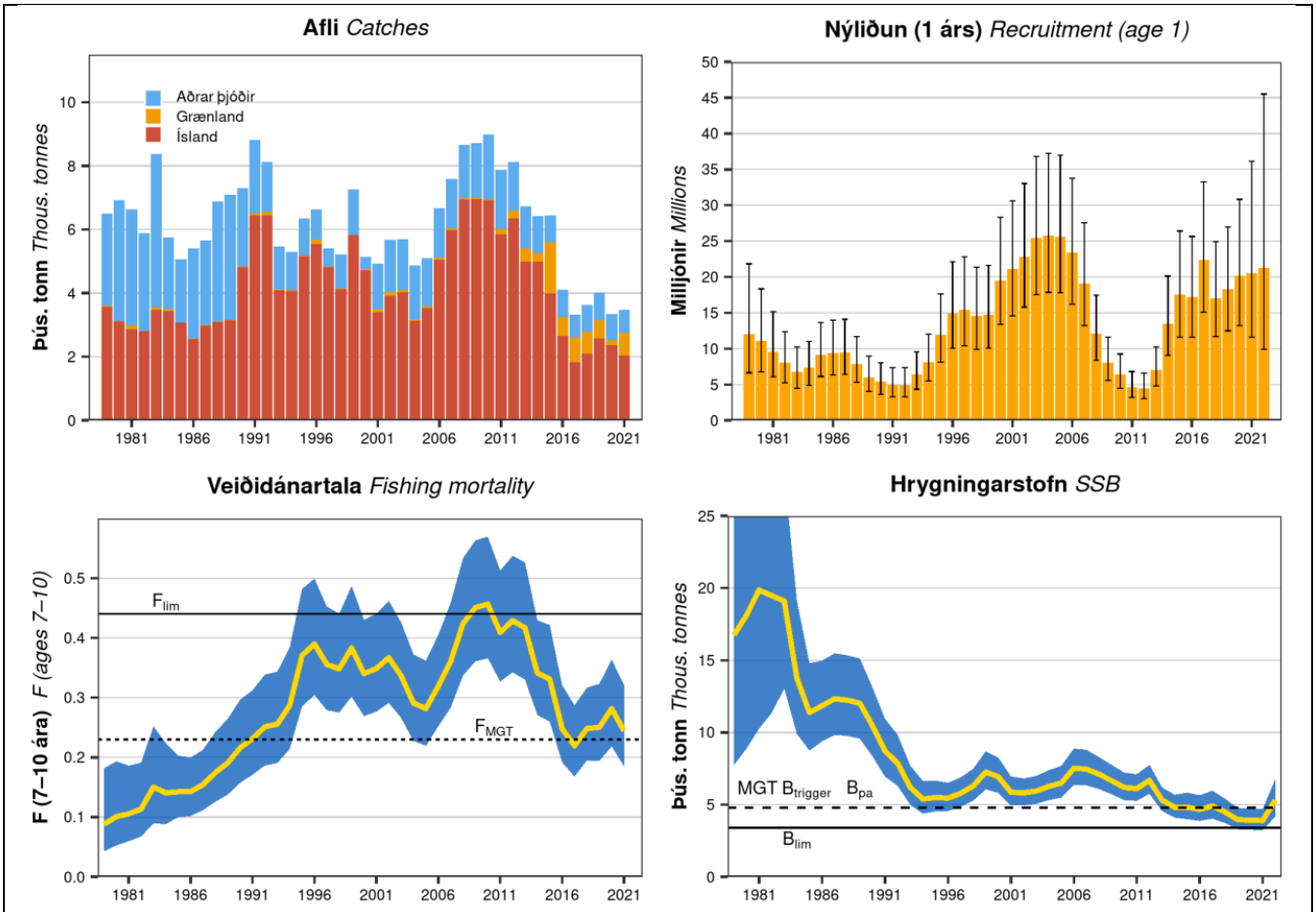


Figure 27. Tusk harvest rate and biomass.

SKÖTUSELUR – ANGLERFISH (*Lophius piscatorius*)[90]

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 after this period. Fproxy was stable when the stock peaked but has decreased in recent years. Catches since 2013/14 have been on average within advice and National TAC.

[90] https://www.hafogvatn.is/static/extras/images/20-anglerfish1326038.pdf

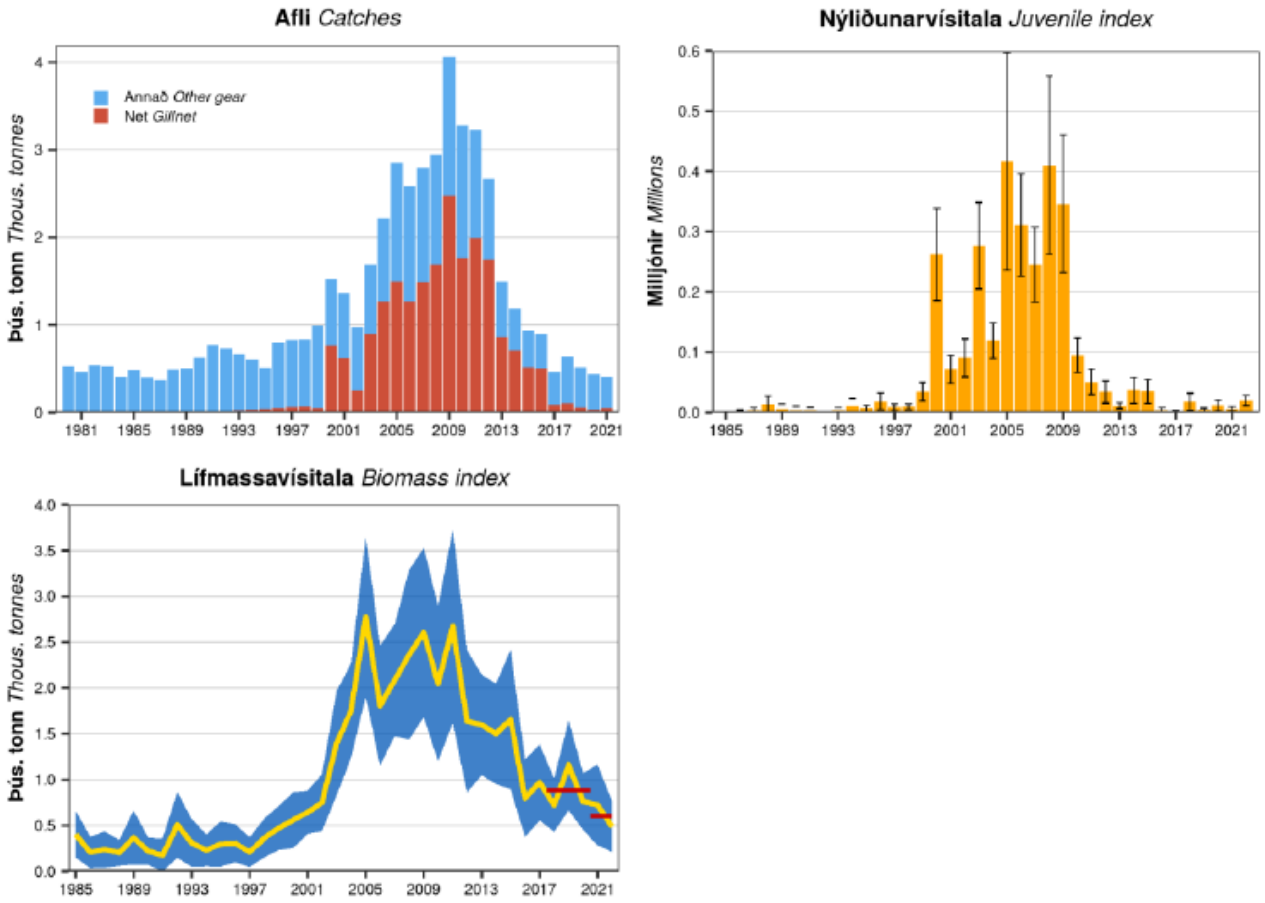


Figure 28. Anglerfish harvest rate and biomass.

STÓRKJAFTA –MEGRIM (*Lepidorhombus whiffiagonis*)[91]

IS-SMB juvenile index declined rapidly between 1989 and 1994. It stayed low until 1999, after which it increased and remained high until 2012. Since 2013 the juvenile index has remained very low. The biomass index has for the most part followed the fluctuations in the recruitment index. It remained stable in 2006-2018 but in the past two years the biomass index has declined and has not been lower since 2001. Megrim is only caught as a bycatch and usually in small quantities (average of around 400 tonnes a year in the past decade). In 2020, approximately 52% of landed megrim was fished in Nephrops trawl with the rest caught in other gears. In 2021, approximately 70% of landed megrim was fished in bottom trawl and 25% in Nephrops trawl. To ensure stock conservation, the MFRI has recommended a TAC for megrim starting 2021/2022 fishing year. The TAC for 2022/2023 is 132 tonnes.

[91] https://www.hafogvatn.is/static/extras/images/12-megrim1326006.pdf

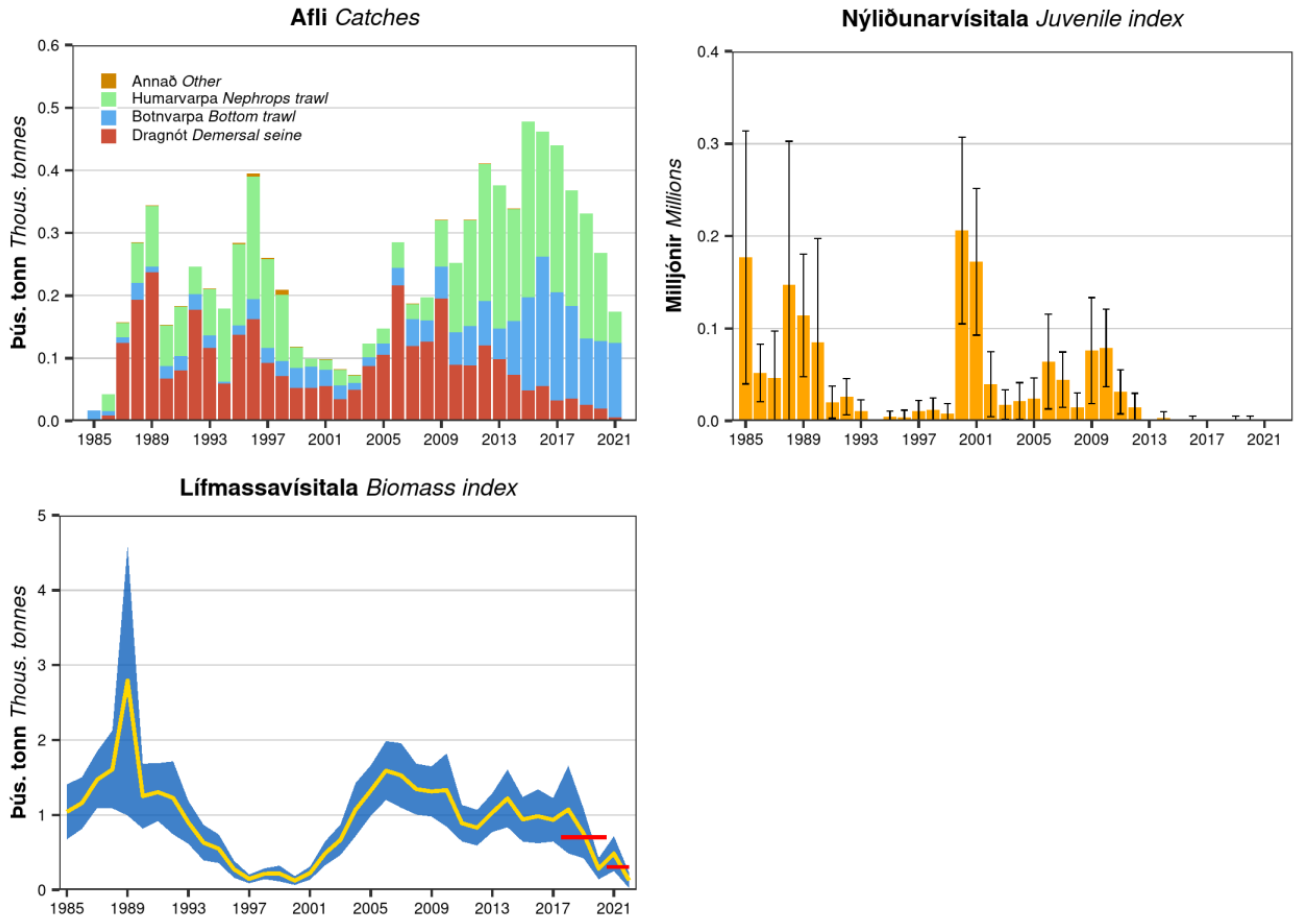


Figure 29. Catches by gear type, IS-SMB juvenile (≤20 cm) and biomass (≥30 cm) indices. Shaded areas and error bars represent 95% confidence intervals. The red horizontal lines indicate the average biomass indices for 2018–2020 and for 2021–2022 used in the advice calculations.

LÝSA – WHITING (*Merlangius merlangus*)[92]

The biomass index was low in 2012–2015 followed by an increase since 2016. The recruitment index was low in 2009-2014 but has increased in recent years.

[92] https://www.hafogvatn.is/static/extras/images/21-whiting1326042.pdf

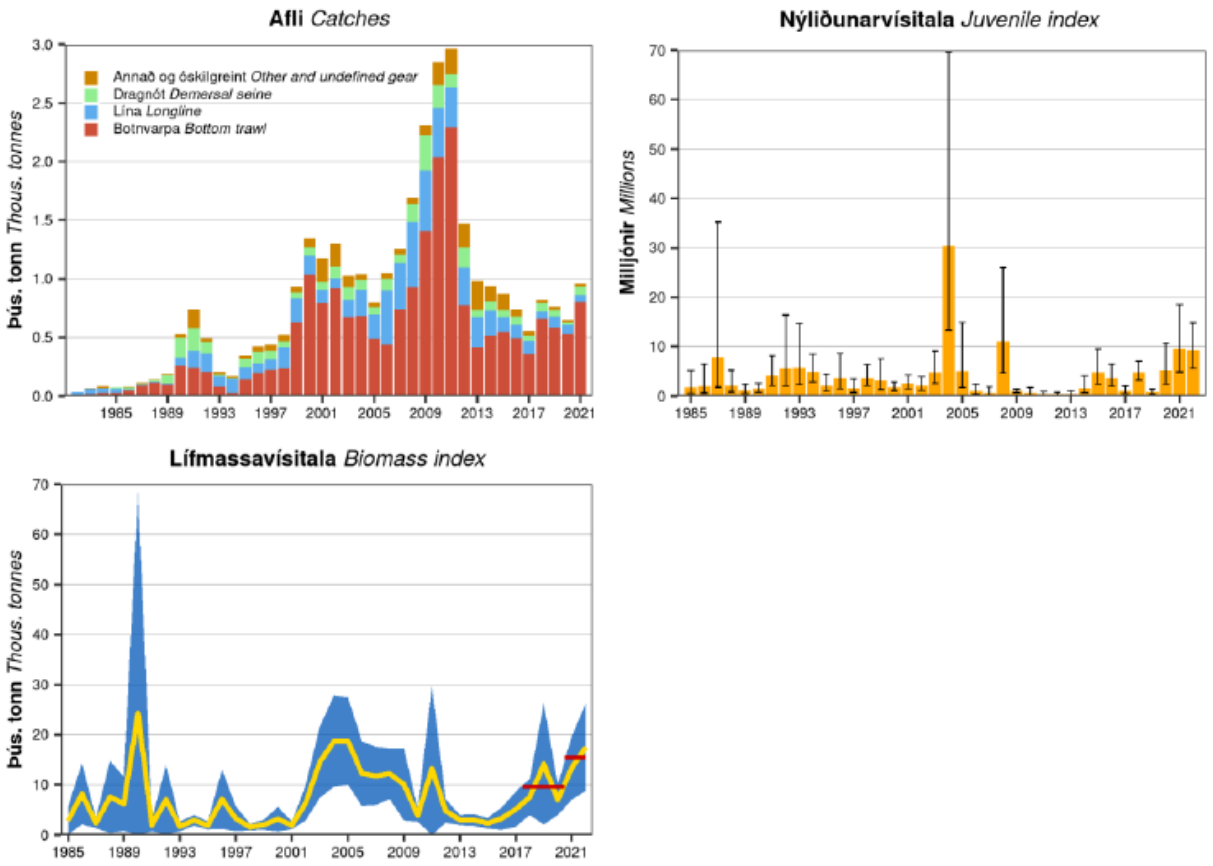


Figure 30. Catches by gear type, IS-SMB juvenile (≤20 cm) and biomass (≥40 cm) indices. Shaded area and bars represent 95% CI. Red horizontal lines indicate average biomass indices for 2018–2020 and 2021–2022 used to calculate the advice.

BLÁLANGA – BLUE LING (*Molva dipterygia*)[93]

The biomass index peaked in 2009 but has declined since then. The juvenile index was at a historic low in 2010–2016 but has increased slightly since then. Fproxy has been at a low level for the last 4 years. Stock size is above MSY Btrigger proxy (Itrigger) and the fishing pressure is above the FMSY proxy.

[93] https://www.hafogvatn.is/static/extras/images/18-blueling1326030.pdf

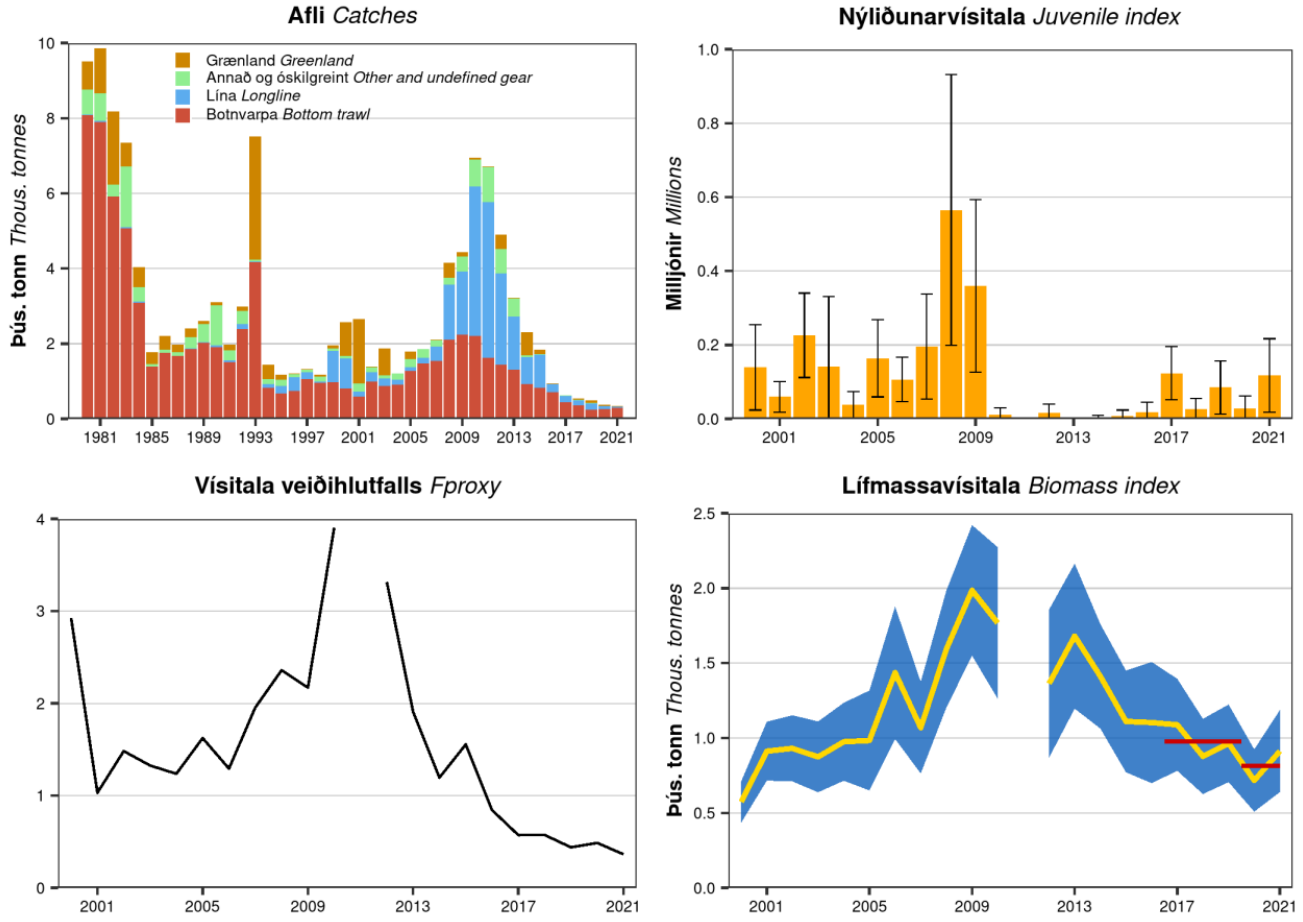


Figure 31. Catches in Icelandic waters by gear type and catches in Greenlandic waters, IS-SMH juvenile (≤40 cm), Fproxy based on catch/survey biomass and biomass (≥40 cm) indices. Shaded areas and error bars indicate 95% confidence intervals. Red horizontal lines indicate average biomass indices for 2017–2019 and for 2020–2021 used in the advice calculations.

Endangered, Threatened and Protected (ETP) and vulnerable species interactions

Context to the Golden redfish fishery. The golden redfish fishery catches most of its target with bottom trawl gear (>92%), with smaller catches from longline gear (2.5%), nephrops trawl (3.5%) and other gears collectively catching between 1 and 2% of the total catches. The update below mainly refer to gillnet gear and longline gear, both of which are responsible for small to negligible catches of redfish, and therefore bycatch of vulnerable species such as marine mammals and seabirds.

The MFRI has not provided any further bycatch estimates for marine mammals and seabirds. The latest data from 2016 to 2019 was provided at the previous surveillance. However, observed bycatch by onboard inspectors and in surveys in 2020 was reported in the 2021 ICES Working Group on Bycatch (WGBYC) report[94]. From the ICES

[94] ICES (2021): Working Group on Bycatch of Protected Species (WGBYC). ICES Scientific Reports. Report. https://doi.org/10.17895/ices.pub.9256 https://ices-library.figshare.com/articles/report/Working_Group_on_Bycatch_of_protected_Species/18621773

2021 WGBYC report the authors reported:" In 2020 highest bycatch levels were reported for common eider (105), black guillemots (82) and common guillemots (39). Harbour porpoise was the largest proportion of cetacean bycatches in 2019 and 2020 (21 and 23 respectively).".

As part of the 2022 ICES WGBYC report[95] the authors reported:" In the Iceland Sea Ecoregion in 2021, 134 days at sea were monitored in nets and 480 days in bottom trawls. All monitoring was performed by at-sea observers. Ten bird species were recorded in nets, including 3 black guillemots (*Cepphus grille*), 1 long-tailed duck (*Clangula hyemalis*), 4 northern fulmars (*Fulmarus glacialis*), 1 red-throated diver (*Gavia stellata*), 1 northern gannet (*Morus bassanus*), 2 European shags (*Phalacrocorax aristotelis*), 2 cormorants (*Phalacrocorax carbo*), 3 common eiders (*Somateria mollissima*), 277 guillemots (*Uria aalge*) and 1 Brünnich's guillemot (*Uria lomvia*). 36 harbour porpoises, 2 grey seals , 2 harp seals (*Pagophilus groenlandicus*), 2 white-beaked dolphins (*Lagenorhynchus albirostris*) and 7 harbour seals were reported in nets. For bottom trawlers bycatch was reported for one bird species, with 2 *Uria aalge* bycaught. Additional monitoring data with at-sea observers with no bycatch incidence was reported for dredges (9 days), longlines (2 days), surrounding nets (11 days) and traps (6 days). Bycatch of several species of fish were reported in the ecoregion from 4 different taxa, including *Etmopterus spinax* and *Chimaera monstrosa* captured in bottom trawls.

Relevant updates for species for which data is available is provided below. All the species below were identified and analyzed as vulnerable or ETP species in the full assessment that resulted in the current certificate for this fishery (see relevant audit report at https://www.responsiblefisheries.is/certification/certified-fisheries).

Harbour Porpoises (*Phocoena phocoena*)

Harbour porpoises are classified as Least Concern in the IUCN Red List[96] (population trend unknown, last assessed in 2020). They are also classified as Least Concern in the Icelandic National Redlist (based on a 2016 assessment)[97]. Annual estimates of harbour porpoise by-catch have decreased in recent years as gillnet effort has decreased, from a high of 7,300 animals in 2003 to about 1600 animals in 2009–2013[98] and down to about 750 animals in 2014-2015.

Results based on close kin mark recapture genetics indicates that the population has increased substantially in recent years.[99]

The 2019 Report of the NAMMCO Scientific Committee Working Group on Harbour Porpoise (19-22 March 2019)[100] reported the following about the Icelandic harbour porpoise population. After reviewing the assessment and noting the recent decline in bycatch, the WG agreed that there was no specific cause for concern for harbour porpoises in Iceland. However, they also concluded that the lack of time and expertise meant they were not in a position to provide management advice on sustainable removals.

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[95] ICES (2022): Working Group on Bycatch of Protected Species (WGBYC). ICES Scientific Reports. Report. https://doi.org/10.17895/ices.pub.21602322.v1

[96] https://www.iucnredlist.org/species/17027/50369903

[97] https://www.ni.is/node/27406

[98] 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

[99] North Atlantic Marine Mammal Commission and the Norwegian Institute of Marine Research. (2019). Report of Joint IMR/NAMMCO International Workshop on the Status of Harbour Porpoises in the North Atlantic. Tromsø, Norway. https://nammco.no/wp-content/uploads/2020/03/final-report_hpws_2018_rev2020.pdf

[100] NAMMCO (2019). Report of the NAMMCO Scientific Committee Working Group on Harbour Porpoise, 19-22 March, Copenhagen, Denmark. https://nammco.no/wp-content/uploads/2019/02/final-report_hpwg-2019.pdf

In 2022 the same group provided the following update[101]:" Sigurdsson indicated that a population estimate of harbour porpoise in Iceland waters was available from an aerial survey conducted in 2007, but noted that the survey was incomplete and the abundance estimate obtained then was probably an underestimate. Sigurdsson informed the WG about plans to conduct an aerial survey in July 2023 to obtain updated abundance estimates for harbour porpoise in Iceland. The group commanded the planning of such a survey. Given that abundance estimates from the NASS surveys may not be usable for harbour porpoise in Iceland, the group agreed that the 2023 abundance estimate be the one used in the future Icelandic assessment.
Sigurdsson indicated that previous work using close kin Mark-Recapture genetics and presented at the 2018 NAMMCO/IMR International Workshop on harbour porpoise indicated that the Icelandic population was increasing. Sigurdsson informed the WG that around 500 animals were by-caught annually in the Icelandic lumpsucker fishery and 1500-2000 in the cod fishery, noting that by-catch levels were much higher in the past. Sigurdsson informed the WG that Iceland was also conducting isotopic work and investigating the diet of harbour porpoise using samples from by-caught and stranded animals. Life history parameters and age distribution histograms are possible to infer from these samples. The group recommended that an assessment for Iceland be made when the new abundance estimate becomes available.
Sigurdsson informed the WG of the by-catch time series available in Iceland, including some back calculated by-catch estimates, and presented at the international harbour porpoise workshop in 2018. As in the case of Norway, the group recommended Iceland to generate the best back-calculated bycatch estimates (i.e., generate a time series going back to the beginning of the fishery) for the upcoming Icelandic assessment, planned for 2024."

Harbour seals

The MFRI 2021 advice for harbour seals[102] indicates that the 2020 harbour seal census resulted in a population estimated of 10,319 animals (95% confidence intervals: 6,733-13,906). The current population estimate is 69% lower than the first abundance estimate from 1980 and the estimate is 14% under the management objective of 12 thous. Animals (Hafrannsóknastofnun 2021). In 2019, new regulation regarding seal hunting in Iceland was enacted (Atvinnuvega- og nýsköpunarráðuneytið 2019). All seal hunting is banned, but it is possible to obtain an exemption for traditional hunt. It is also forbidden to sell Icelandic seal products. Bycatch in gillnets is probably the highest mortality risk for harbour seals in Iceland currently. Limited data are available on seal bycatch, but data collected by on-board observers of the Directorate of Fisheries, and in the MFRI gillnet survey, indicate that on average, 1389 (coefficient of variation, CV=35) harbour seals have been bycaught annually in the lumpfish fishery between 2014 and 2018. Bycatch in cod gillnet fishery and bottom trawls is less common and more uncertainty associated with the bycatch estimates in those fisheries. Between 2014 and 2018, it has been estimated that annually, 15 harbour seals were bycaught in cod gillnet fisheries (CV=102) and 17 harbour seals in bottom trawls (CV=100) (Hafrannsóknastofnun, 2019). Negative effects from the cod gillnet fisheries (and associated fisheries that land fish in those nets) are considered to be very limited.

Other marine mammals

Other marine mammals
The MFRI confirmed that no interaction with Blue whales and Northern right whales recorded in recent years.

[101] NAMMCO-North Atlantic Marine Mammal Commission (2022). Report of the Scientific Committee Working Group on Harbour Porpoise. November 2022, Oslo, Norway. https://nammco.no/wp-content/uploads/2023/01/final-report-hpwg-2022_with-exsum.pdf
[102] https://www.hafogvatn.is/static/extras/images/radgjof-landselur20201286028.pdf

There are no further updates from NAMMCO or the MFRI in relation to other marine mammal species (i.e. seals), aside from what we reported in the previous surveillance report.

Pingers testing

After unsuccessful trials with banana pingers and PALs in 2016-2018, PALs with a modified signal were tested in the Icelandic cod gillnet fishery in 2020. These PALs had a signal developed to emulate the signal of an out of production pinger, the Dukane 1000. The random wide-band sweep characteristic of the original PAL was maintained. Signal peaks are at 10, 50, 70 and 130kHz with a source level of 157dB. This signal is aimed at deterring porpoise rather than communicating with them as in the original PALs. The device was tested over two weeks, where over 3000 50m nets were hauled. Half of the net sets were equipped with the devices, while the other half acted as control. A total of 15 marine mammals were caught in the trial, 14 harbour porpoises and one harbour seal. Significant difference in the number of harbour porpoises was observed between the two treatments ($t = 3.78$, $p = 0.00017$), as all 14 of the harbour porpoises were caught in the control sets, while none were caught in the PAL equipped sets. The single harbour seal bycaught was caught in a PAL equipped set. These results suggest that this configuration of the PAL might be effective in reducing harbour porpoise bycatch in Icelandic waters. There have been no further updates since then.

Gulper sharks

Some catch of leaf scale gulper sharks has been recorded, last in 2016. Survey trends are presented below from MFRI data.

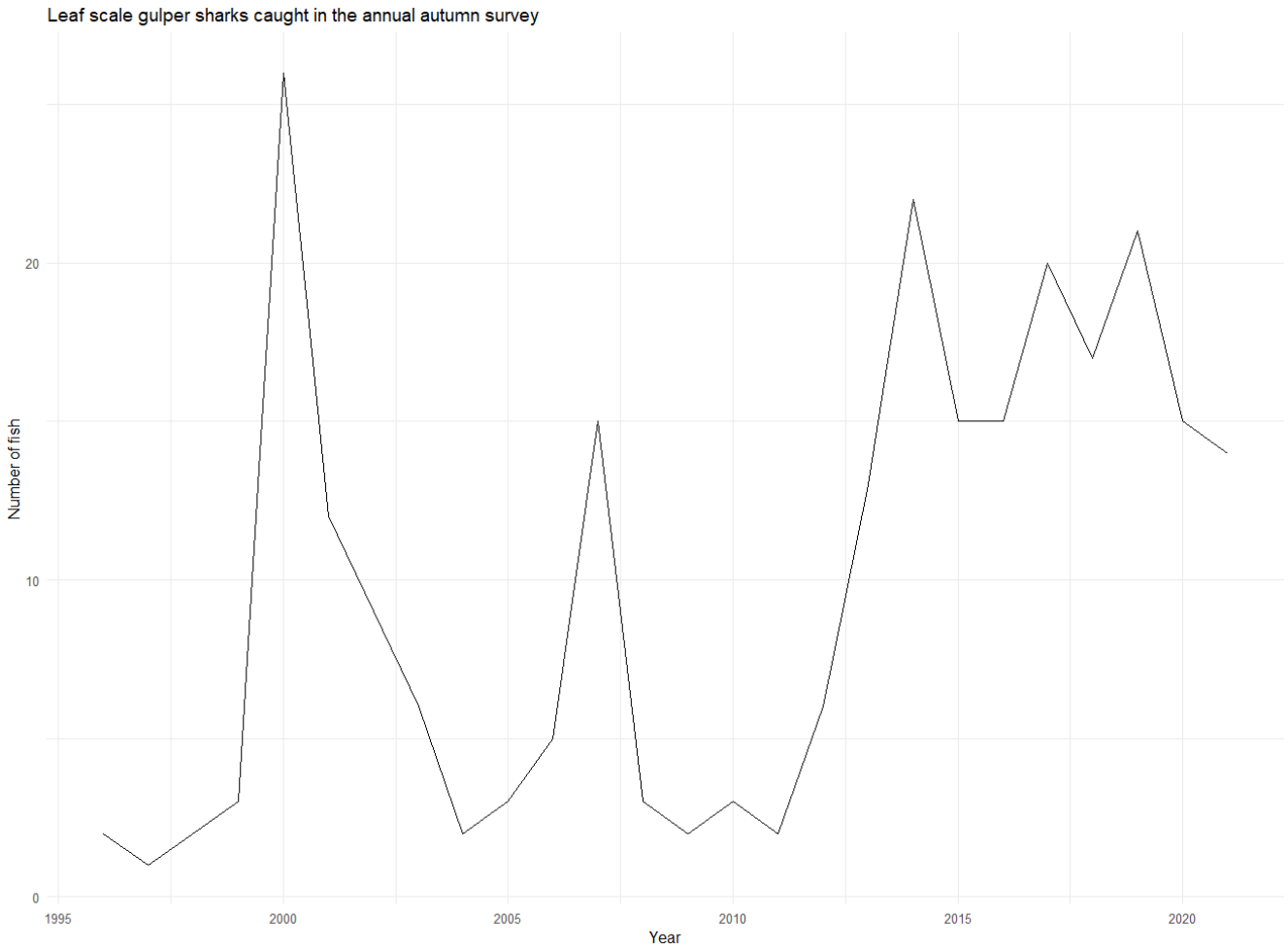


Figure 32. Leaf scale gulper shark caught in the annual autumn survey, from 1996 to 2022.

Grey skate (*Dipturus flossada / batis*) survey abundance is variable but has been on average relatively stable in recent years. The MFRI spring survey caught 56 t in 2019, 43 t in 2020, 32 t in 2021 and 69 t in 2022. Fishery landed catch of Grey skate was 160 t in 2020 and 158 t in 2021.

Landed catch of dogfish (*Squalus acanthias*) was 1 t in 2019 and 3 t in 2020, and 0.9 t in 2021. Survey trends are very sporadic.

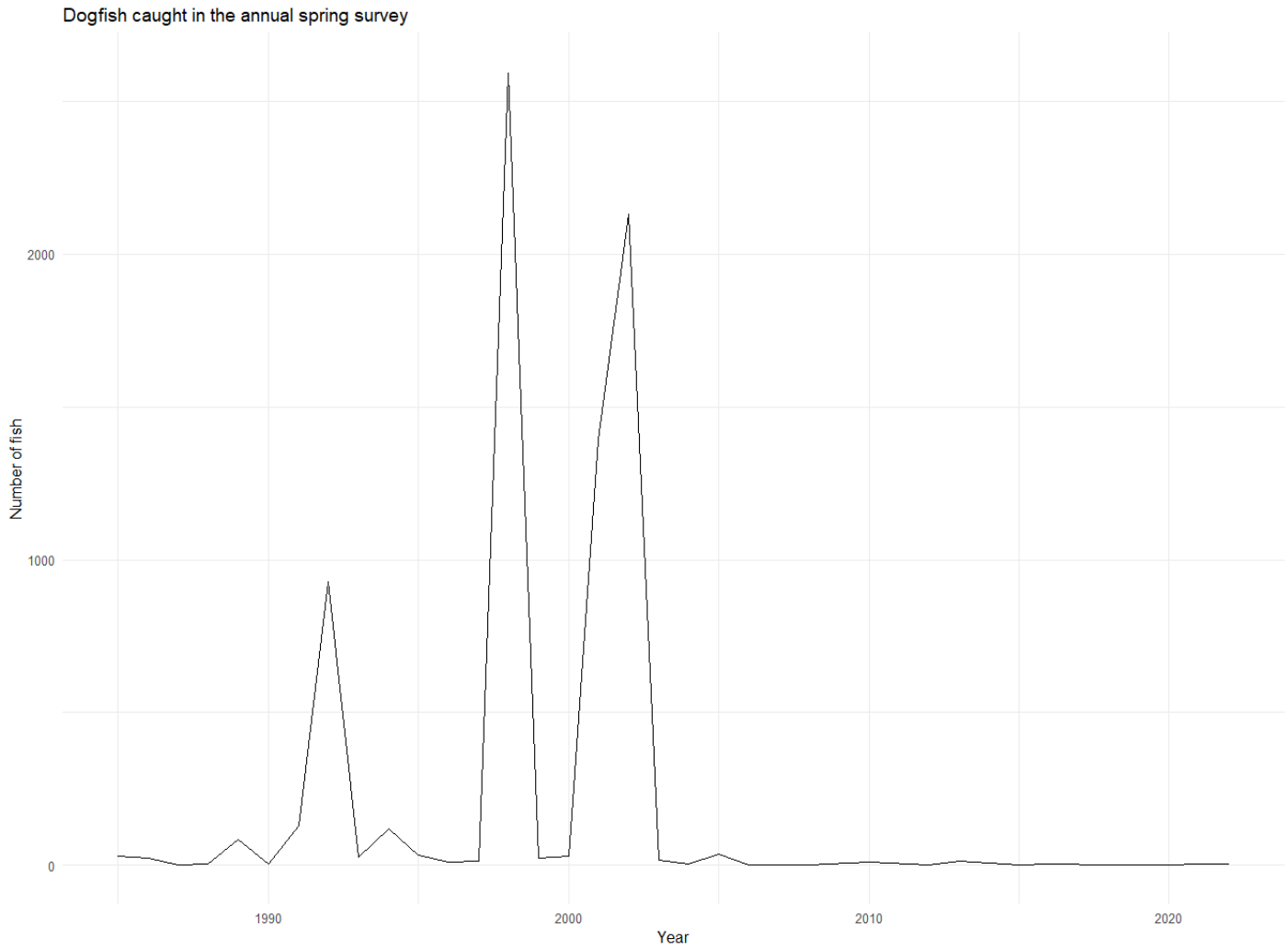


Figure 33. Dogfish caught in the annual spring survey, 1985 to 2022.

No Greenland sharks (*Somniosus microcephalus*) were caught in the 2020-2022 surveys. Around 16 tonnes of them were landed in both 2020 and 2021.

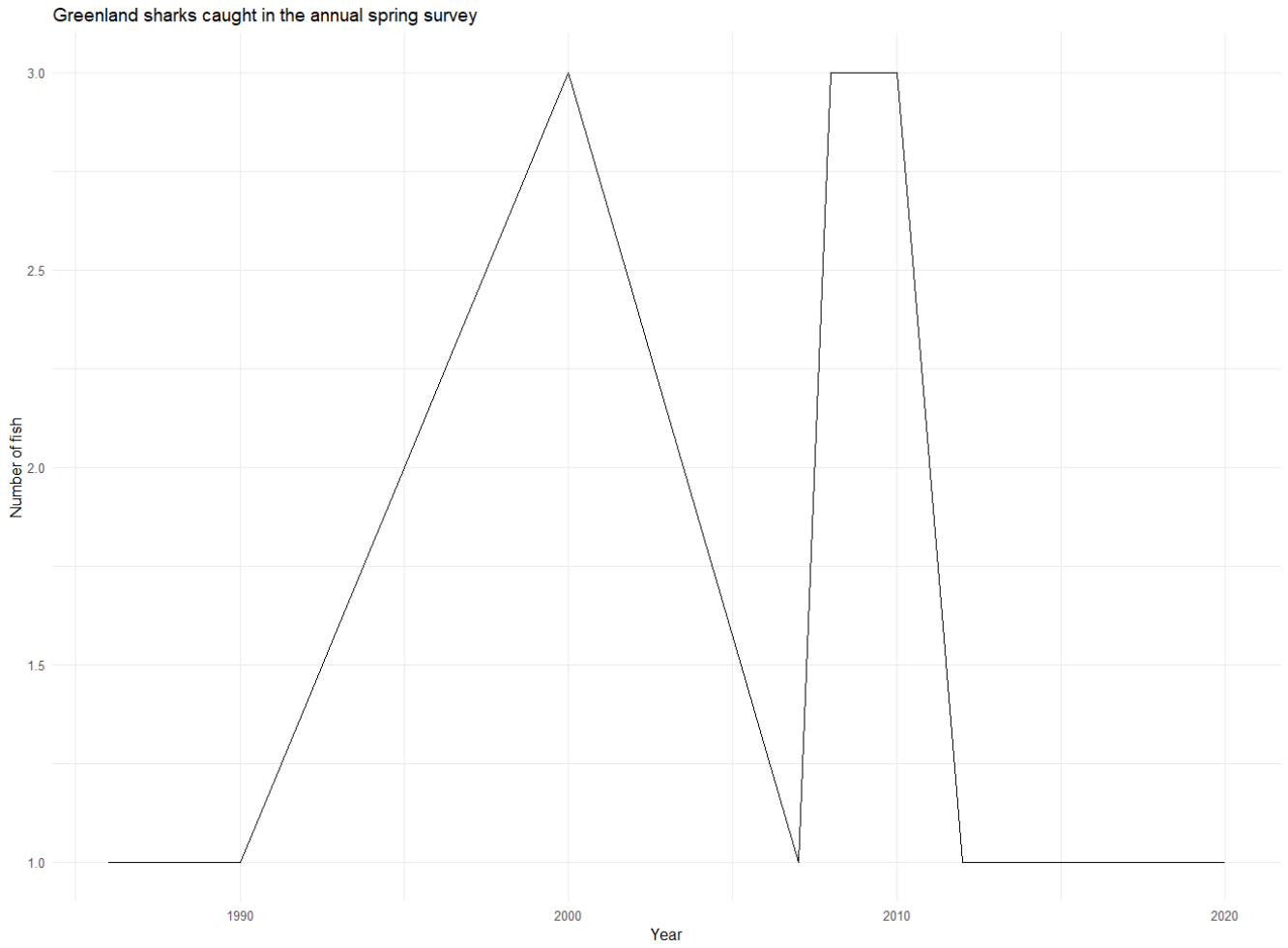


Figure 34. Greenland shark caught in the annual spring survey.

Around 3.6t of porbeagle (*Lamna nasus*) were landed in 2020 and 2.3t in 2021. Porbeagles are rarely caught in surveys, but two were caught in the autumn survey in 2021.

No records of basking sharks are available in catch or surveys. Few have been recorded by onboard inspectors, last one in 2005.

7.5.1.1 Habitat

The ICES 2022 Icelandic ecosystem overview report[103] indicates that the main abrasive pressure in the Icelandic Waters ecoregion is caused by mobile bottom-fishing gears (targeting fish, shrimp, and Norway lobster *Nephrops norvegicus*). 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

[103] ICES. 2022. Icelandic Waters ecoregion –Ecosystem overview. In Report of the ICES Advisory Committee, 2022. ICES Advice 2022, Section 11.1, https://doi.org/10.17895/ices.advice.21731663

have been shown to be minor. Other impacts involve overturning boulders, scouring the seabed, and direct removal of and/or damage to epifaunal organisms.
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. The decrease in fishing effort varied locally, with decreases mainly being noted on the southern shelf (Subarea 1) and at typical shrimp trawling grounds on the northern shelf (Figure 35, Figure 36). Based on analysis of electronic logbook data an area of about 79000 km^2 in total was fished with towed bottom-fishing gears in 2013, composing 10% of the ecoregion.
Using vessel monitoring system (VMS) and logbook data ICES estimates that mobile bottom trawls used by commercial fisheries in the 12 m+ vessel category have been deployed over approximately 132 485 km^2 of the ecoregion in 2018, corresponding to ca. 17.5 % of the ecoregion's spatial extent (Figure 36). The latter figure (132.485 km^2) refers to numbers based on ais/vms data delivered to ICES (different from the previous approach used). It is in conformity with what is reported in mynd 29A (add fish, nephrops and shrimp).[104]

The overall bottom trawl fishing effort has been decreasing since the early 2000s and is now at the lowest level.

The Icelandic bottom trawl fleet consists of about 50 vessels (30–80 m length) fishing mainly for cod, haddock, saithe, redfish, and Greenland halibut.

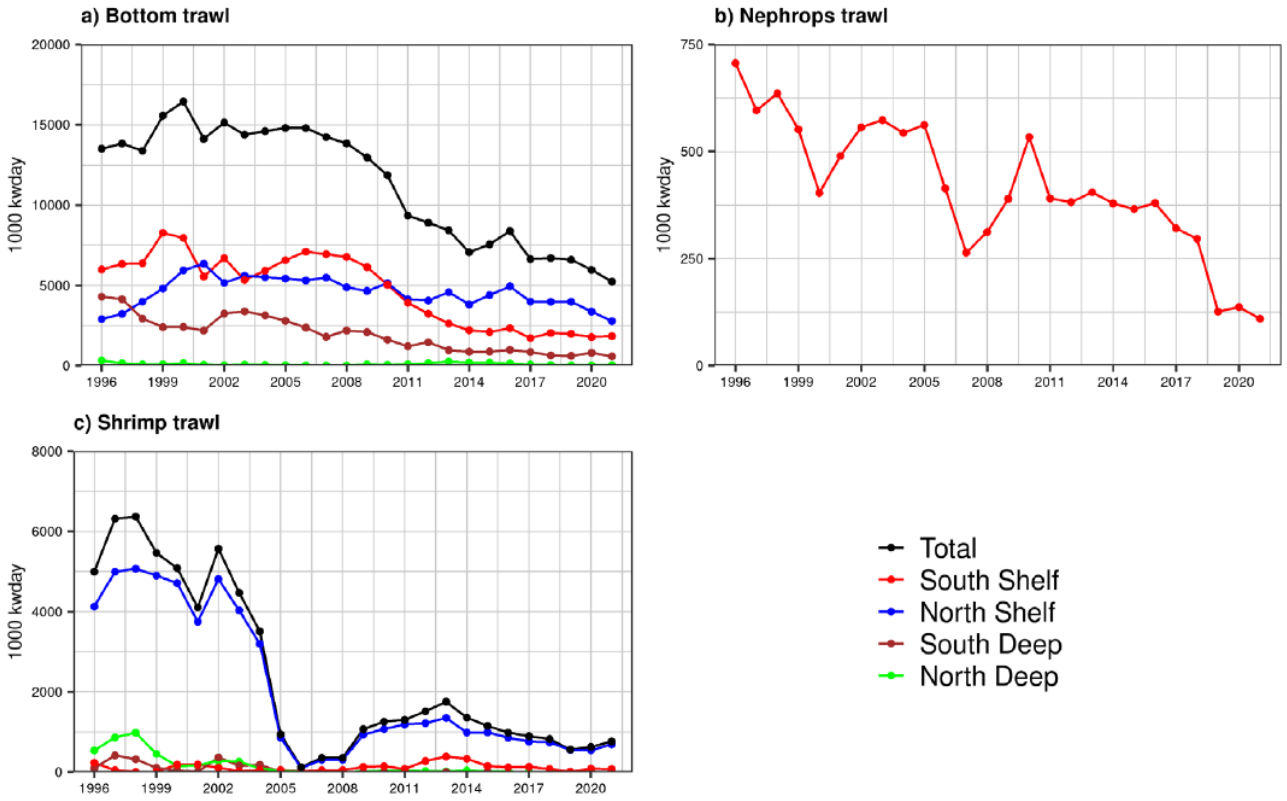


Figure 35. Annual total bottom-trawl fishing effort (1000 kW day) based on logbooks from trawl fishery targeting (a) fish, (b) Norway lobster, and (c) shrimp in the whole Icelandic Waters ecoregion between 1996 and 2021.

[104] https://www.hafogvatn.is/static/research/files/hv2021-50.pdf

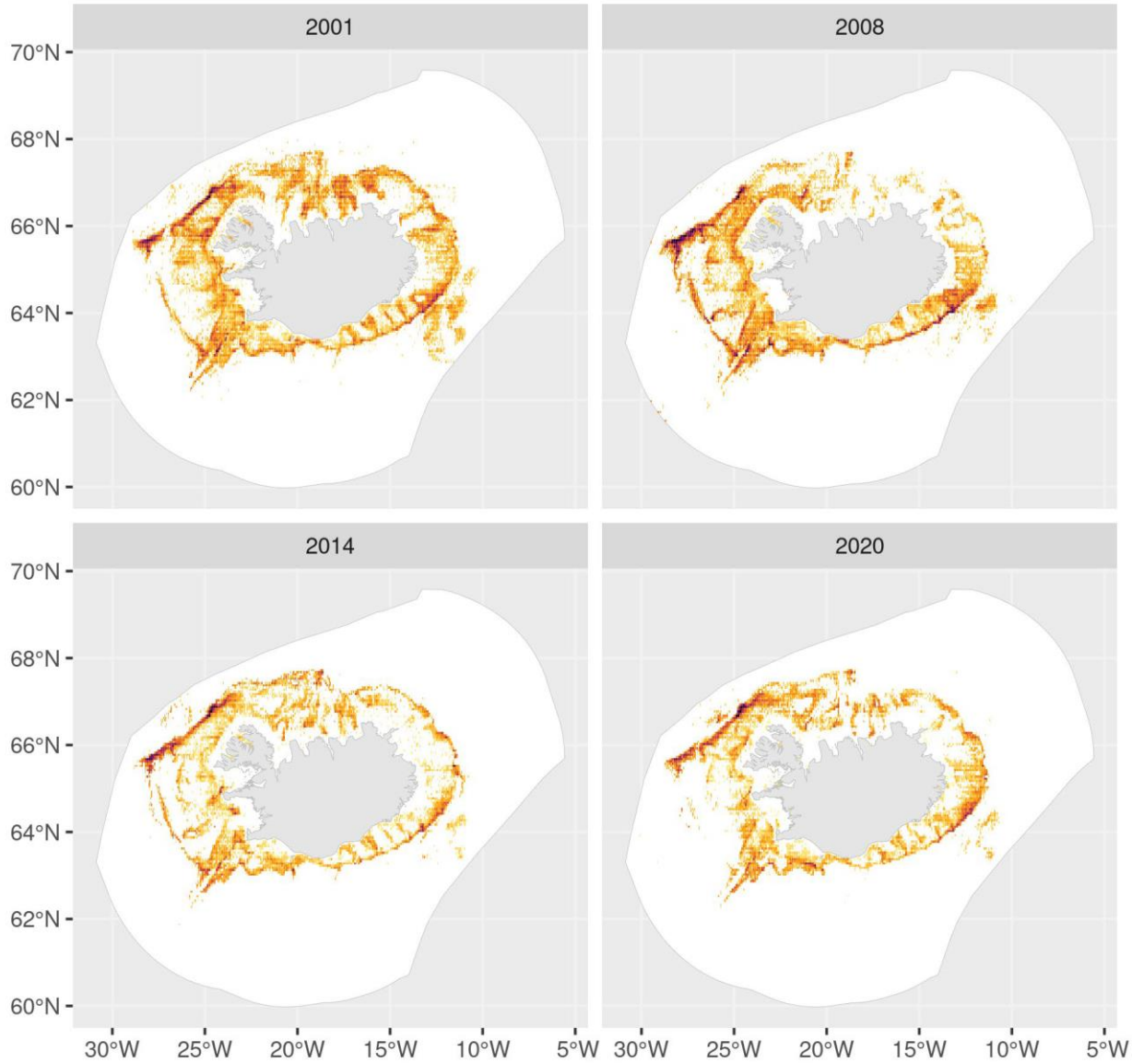


Figure 36. Spatial distribution of bottom-trawl effort (1000 kW hr) based on logbooks from trawl fishery targeting demersal fish, shrimp, and Norway lobster in 2000, 2008, 2014, and 2020.

Habitat mapping

Seabed mapping is one of the Marine and Freshwater Research Institute´s projects which started with the launching of the research vessel, Arni Fridriksson RE 200, in the year 2000. The vessel is equipped with a multibeam echo sounder which enables a detailed mapping of the seabed. Until spring 2017 the multibeam echo sounder was of the type Kongsberg EM 300 (30 kHz, 135 beams, 2°x2°) but was then updated to Kongsberg EM 302 (30 kHz, 432 beams, 1°x2°, water column data) and a subbottom profiler, Kongsberg TOPAS PS18.

From the year 2017 the seabed mapping project is one of MFRI´s major initiatives for the next 12 years. The main emphasis is to gain information within the economic zone which is useful for multifaceted purpose and is a prerequisite for scientific approach for sustainable utilization, protection and research of resources in the ocean,

on, in and under the seabed. The detailed mapping has been valuable for the research of the marine environment, the physical properties of the ocean and the marine geology. Mapping fishing grounds and vulnerable areas, i.e. benthic communities and habitats, has played a significant role. About 44.3% of the economic zone has been mapped, or approximately 333,700 square kilometers of the country's total 754,000 square kilometer economic zone A figure of the mapping work completed has been shown below.

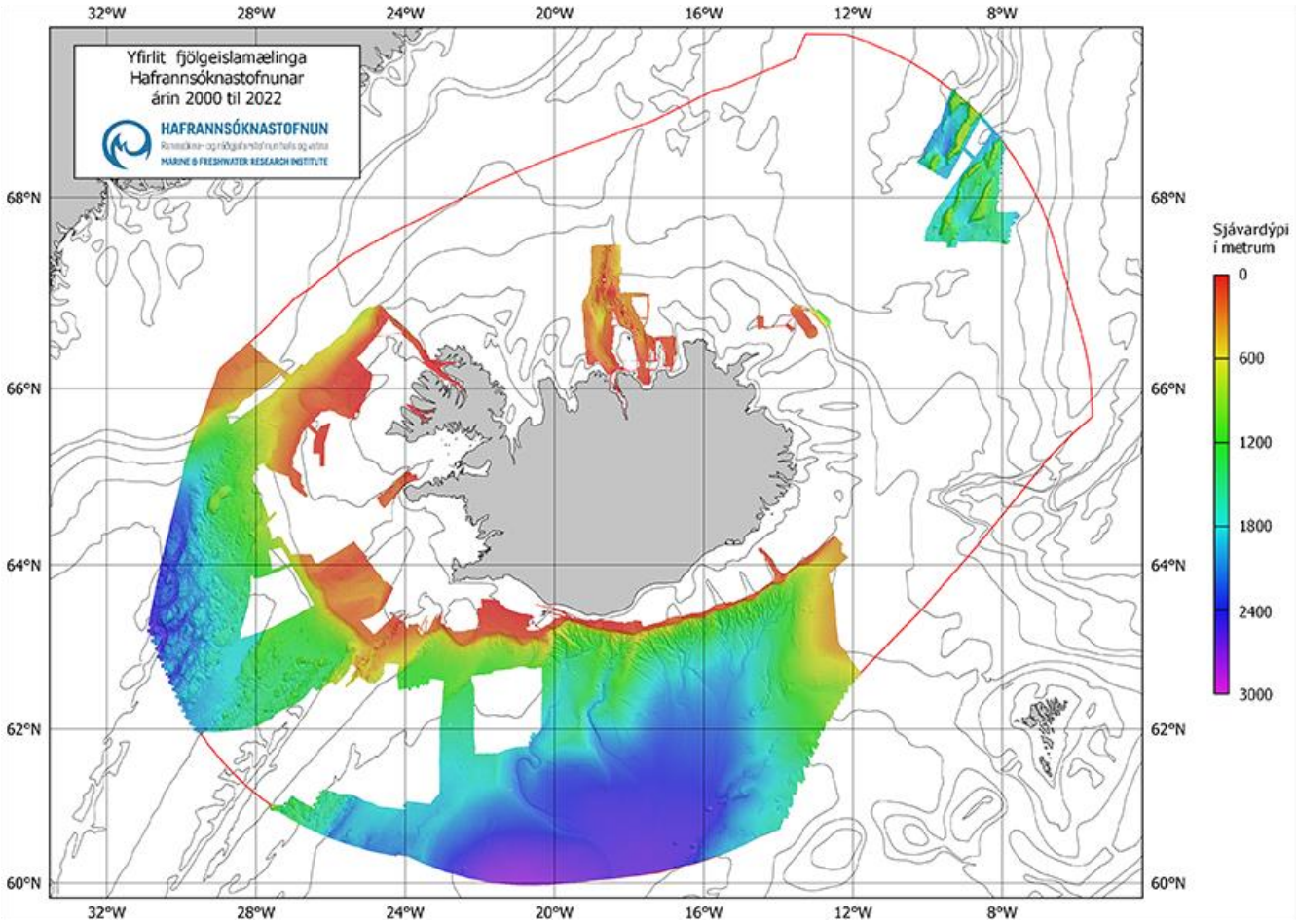


Figure 37. MFRI overview of seabed mapping in Icelandic waters between 2000 and 2022. Source: https://www.hafogvatn.is/en/research/seabed-mapping.

NovasArc project

Records of sensitive benthic species were used in the project NovasArc – a Nordic project on vulnerable marine ecosystems and anthropogenic activities in arctic and sub - arctic waters (https://novasarc.hafogvatn.is). In the NovasArc project, distribution forecast maps were prepared for sensitive species off the Faroe Islands, eastern Greenland, Iceland and Norway. The forecast maps indicate areas that could be suitable for these species based on available information on known distribution and environmental factors related to them (Buhl - Mortensen et al. 2019)[105]. These maps were also compared to the footprint of bottom fishing and the collision between them discussed. The project was a collaborative project of the Marine Research Institute with Havstovan in the Faroe Islands and the Institute of Marine Research in Bergen, supported by the Nordic Council of Ministers NORDEN.

[105] http://norden.diva-portal.org/smash/get/diva2:1304079/FULLTEXT02.pdf

The 2019 NovasArc report highlighted through a risk assessment method that within the Icelandic EEZ, overlap between the fishing effort and the optimal predicted habitat was high for several VMEs, including sublittoral sea pen communities (54.8% of their optimal habitat), hard bottom sponge aggregations (51.2%), stylasterid corals (50.5%), cold-water coral reefs (50.4%), soft bottom sponge aggregations (41.6%), and hard bottom gorgonians (42.3%). However, the authors also note that historical trawl disturbance may have decreased the amount of suitable habitat for these benthic groups.
Also, based on the findings of the Novasarc work a paper on the distribution of indicator VME taxa was published by Burgos et. al (2020)[106]. The group that produced this publication has received an additional funding to develop this work further including managemental aspects in 2021. The MFRI highlighted during the November 2021 site visits that Novasarc II is now ongoing and will concentrate on updating predictive models and discuss the output for managemental purposes.

In October 2022 the MFRI highlighted that the NovasArc II project had a stakeholder meeting last September and the final report will be submitted to TemaNord this autumn. Updated models have been prepared including confidence estimation. Such models are increasingly considered in managemental purposes. This work has been introduced to the Ministry of Fisheries although the best use of this work has not been discussed in detail.

Benthos recorded in the MFRI survey

Recording of benthic animals as a bycatch in the autumn MFRI trawl took place for the fifth time in 2020 ((Jakobsdóttir et al. 2020[107]) (Figure 38). Benthic animals were collected at 105 stations. Benthic animals are classified into species as far as possible, counted and weighed. Amount of benthic animals in tows ranged from 0.028 kg to 97.5 kg and the number of individuals counted in tow ranged from 1 to 1,213. The largest number of individuals were fungi. Maximum number of identified species or groups in tow there were 71 species at a station west of Kolbeinseyjarhrygg and the fewest species, a total of 3, occurred two stations in the continental shelf south of the country. At one point west of Reykjanes was the total weight of benthic animals in a tow was 97.5 kg and a total of 50 species, most of which contained 80 kg of coral. Sponges weighed the most at other stations. Six benthic species were identified at the Faroe Islands ridge that have not occurred in previous surveys. A total of over 700 species have been identified from the five autumn surveys since benthos bycatch has been recorded.

[106] https://www.frontiersin.org/articles/10.3389/fmars.2020.00131/full
[107] Klara Björg Jakobsdóttir, Höskuldur Björnsson, Jón Sólmundsson, Kristján Kristinsson, Steinunn Hilma Ólafsdóttir og Valur Bogason. 2020. Protected areas within Iceland's territorial waters and fragile ecosystems. Summary for the Ministry of Industry and Innovation of the available data from areas in the sea around Iceland that have been closed for over 10 years and fishing with demersal gear has been restricted or banned. HV 2021-49 https://www.hafogvatn.is/static/research/files/hv2020-54.pdf

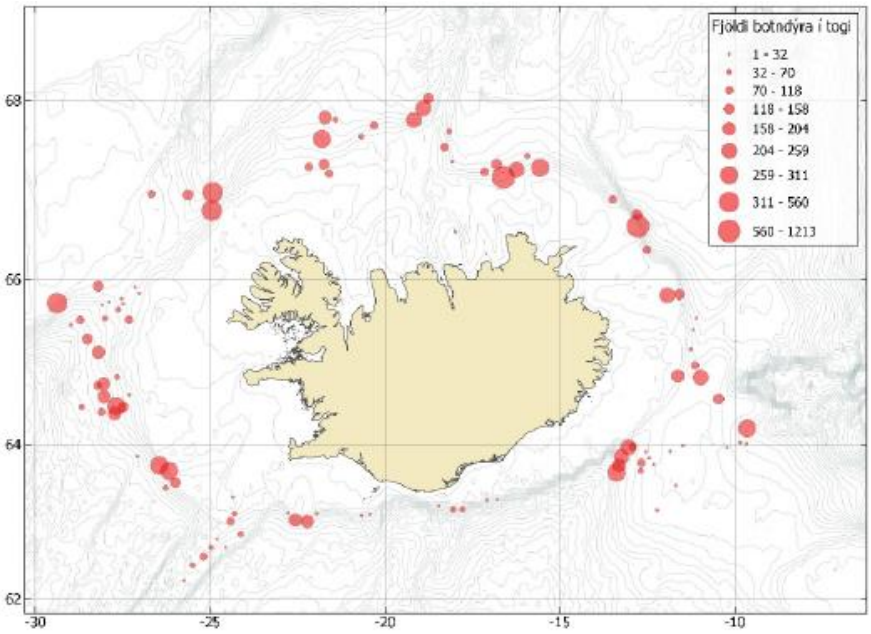


Figure 38. Benthos recorded in the autumn Icelandic autumn groundfish survey in 2020. Number (kg) per tow.

The Ministry of Industry and Innovation has begun work on formulating a protection policy for vulnerable bottom ecosystems (or vulnerable marine ecosystems) within the Icelandic economic zone to shape procedures for the protection of fragile benthic ecosystems based on international standards criteria that Iceland is signatory to. This includes defined demersal fishing areas and protected areas. Therefore, the Ministry requested that the Marine Research Institute compile information in addition to evaluating five aspects of fragile benthic ecosystems, reported on by Ólafsdóttir et al. 2021[108]. These five aspects are:

1. An assessment of which species in Icelandic waters are considered fragile ecosystems in Iceland. At the same time, an overview of the state of knowledge is compiled the distribution and density of the species. The summary will take into account FAO guidelines as well as the work of ICES, NAFO and NEAFC.
2. Define for each species or groups that can be considered as characteristic species ecosystems, when their density is considered so high that an area is considered to be a fragile ecosystem.
3. Perform an analysis of any of the areas that have been closed for a long time to evaluate if it meets the criteria for being considered a vulnerable bottom ecosystem.
4. Propose a definition of what can be considered a significant negative effect from bottom fishing gear on fragile bottom ecosystems.
5. Define demersal fishing areas where fishing has taken place for the past 20 years (or other years if this describes fishing in recent decades better), with bottom fishing gear (bottom trawls, seines, nets, lines, dredges).

[108] Steinunn Hilma Ólafsdóttir, Stefán Á. Ragnarsson, Julian M. Burgos, Einar Hjörleifsson, Klara Jakobsdóttir og Guðmundur Þórðarson. 2021. Protection of fragile benthic ecosystems. Summary of information and evaluation of five factors is concern sensitive bottom ecosystems for the Ministry of Industry and Innovation. HV 2021-50 https://www.hafogvatn.is/static/research/files/hv2021-50.pdf

One of the outputs of the report is shown below. The map below shows details of closed areas (in grey), and in yellow or red the distribution of areas where bottom trawling has taken place for 4 years or less and 5 years or more between 2009-2019. Light yellow surfaces show shrimp and lobster trawl fishing grounds.

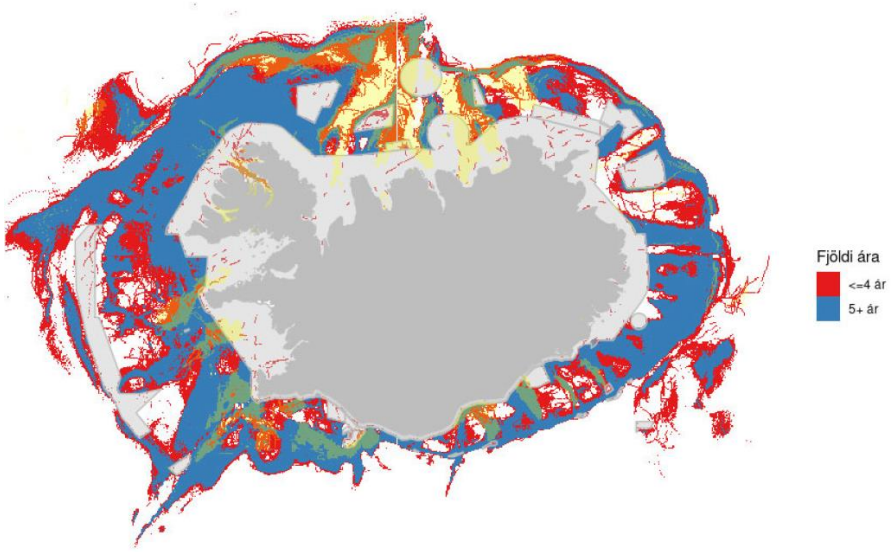


Figure 39. Long term closures and selected fishing distribution around Iceland between 2009-2019.

The closures that MFRI proposed are being processed at present time (October 2022) by the Ministry of Fisheries. The closures include Hydrothermal vents, Sponge Aggregations mixed with Cauliflower coral ground and Sponge Aggregations on underwater mountains.

Long term area closures

Fiskistofa has created a new GIS platform where all spatial data relevant to Icelandic fisheries management has been integrated. The figure below for example contains information on long term spatial closures in Iceland.

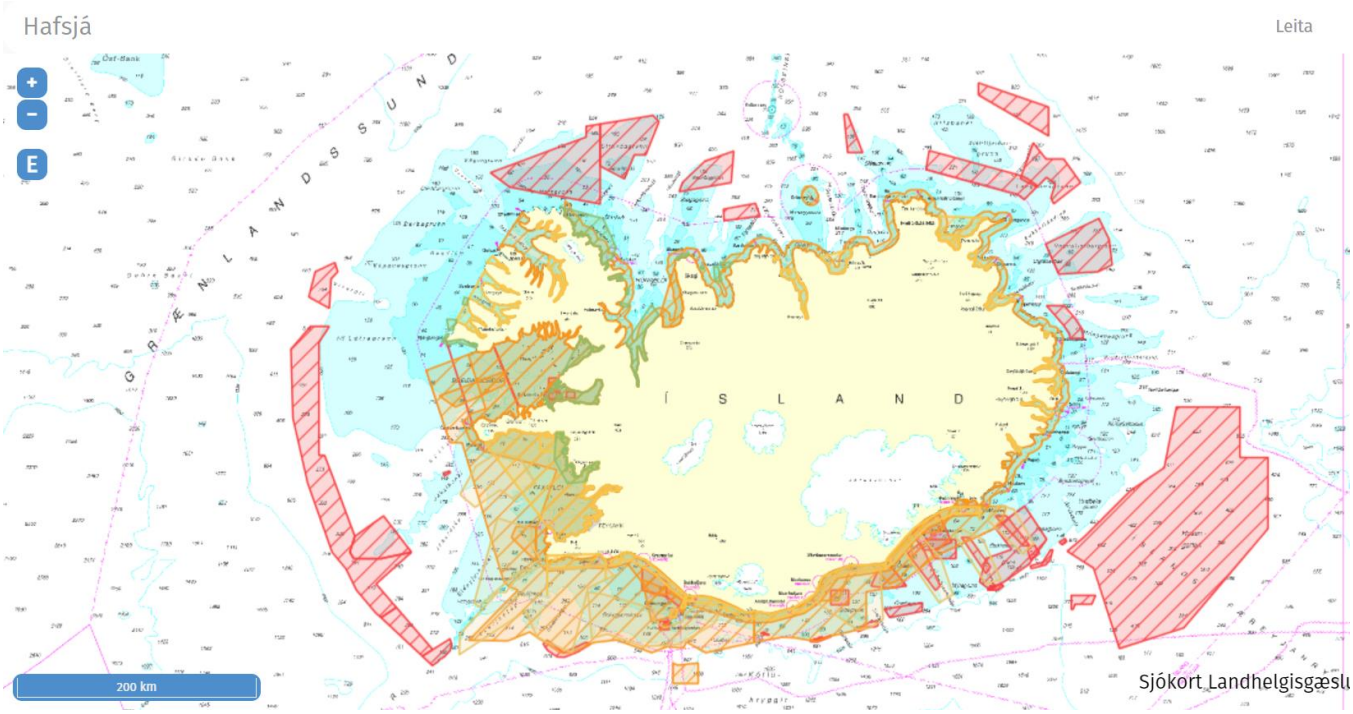


Figure 40. Regulatory long-term closures in Iceland, all gear types. Red closures tend to be bottom trawl and sometime all gear closures. Yellow/orange boxes with internal lines near the coast (East, West and North West) are longline closures. Open yellow/orange boxes south and southeast of Iceland are lobster trawl restricted areas. For details on each closure including dates and gear restrictions please click on each red box in the Atlas/GIS website managed by Fiskistofa at http://atlas.lmi.is/mapview/?application=haf .

7.5.1.2 Foodweb considerations

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. Icelandic capelin's status was assessed by the MFRI again in 2022[109]. According to the this, SSB is currently around 2.5 time the biomass limit, so the stock is considered in good shape.

Fishbase reports[110] 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[111]. 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[112].

[109] https://www.hafogvatn.is/static/extras/images/lodnavetur2022_final1303548.pdf
[110] http://www.fishbase.se/summary/Sebastes-norvegicus.html
[111] https://academic.oup.com/icesjms/article/63/9/1682/699283
[112] http://www.fishbase.se/Ecology/FishEcologySummary.php?StockCode=517&GenusName=Sebastes&SpeciesName=norvegicus

Aside from the Sturludottir *et. al.* 2018 [113]publication showing that 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, there are no further updates on this topic.

[113] https://www.sciencedirect.com/science/article/pii/S0165783618301620

7.6 Update on consistency to the fundamental clauses of the RFM Fishery Standard

This section includes a brief update on changes in the fishery relevant to the fundamental clauses of the IRF Fishery Standard and a statement of continuing consistency (or not) to those fundamental clauses.

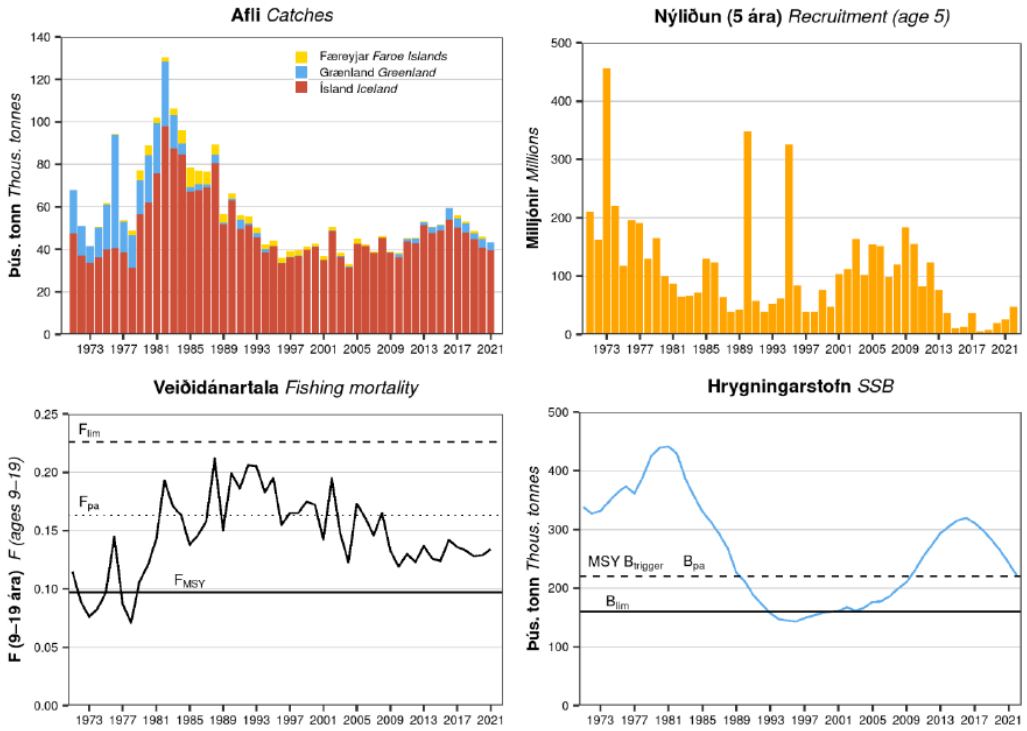
Section 1. Fisheries Management

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

1.1	Fisheries Management System and Plan for Stock Assessment, Research, Advice and Harvest Controls including: – The fisheries management system – The fisheries management plan
Summary of relevant changes:	The fisheries management consists of a network of organisations and agencies with a legal basis in terms of a suite of laws and regulations. The Ministry of Food, Agriculture and Fishery has the ultimate responsibility, the Directorate of Fisheries is the executive body, the Coast Guard does control and surveillance and the MFRI is the scientific institution that provides advice to the Ministry. Internationally, ICES organizes and approves assessment and management plan evaluation. The legal basis for the management is a suite of laws and regulations. Laws are given by the Parliament (Althingi), regulations are given by the Ministry. The main regulations are quota regulations of the catches in an ITQ system, technical regulations (gear standards, mesh sizes etc), area closures (permanent and temporary, including short term closures), landing obligations in authorized ports where the catches have to be weighed by authorized staff and a discard ban. There are rules for minimum landing size – smaller fish has to be landed but the fisher gets only a fraction of the payment. There are a range of special regulations for small coastal boats and regulation of tourist fishery (which also has quotas). Logbooks are compulsory, and recently, only electronic logbooks (or mobile phone apps) are accepted. The fishing year in Iceland runs from 1st September - 31st August. All catches have to be accounted against quotas, and there is an active marked or selling and buying quotas as needed. For most stocks, including golden redfish, quotas can be transferred between years and between species, within certain bounds. The management plan includes the measures noted above. It has a harvest rule for deriving the total quota from a stock assessment. The plan includes reference points for biomass and exploitation rate. Such plans are generally developed by Iceland, mostly by the MFRI, and evaluated and endorsed by ICES.
References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

7.6.2 Clause 1.2 Research and Assessment

1.2	Research and Assessment
Summary of relevant changes:	Golden redfish is a shared stock between Iceland, the Faroes and Greenland. The data that go into the assessment are commercial landings from all nations, length distributions in the catches mostly form Iceland and age-length data from Iceland. In addition, survey data from Iceland (bottom trawl survey in the spring supplemented with xx from the autumn bottom trawl survey) are used as well as indices from a German survey in East Greenland.

1.2	Research and Assessment
	The assessment is done with a forward projecting length and age disaggregated stock model fitted to catch and survey data. The software (Gadget) is public available and is used for several Icelandic stocks. The assessment method was established and approved for Golden redfish by ICES in a benchmark process in 2014. Generally it has worked well, although fitting the model to some of the length distributions may be problematic. The main results of the 2022 MFRI assessment[114] are shown in the figure below. Since about 2012, the recruitment has been poor, and a further decline in the adult stock abundance is expected.  **Figure 41.** Golden redfish. Catches by area, recruitment, fishing mortality (ages 9-19), and spawning stock biomass (SSB). There have not been any changes to the methods and procedures for assessment for golden redfish in recent year. A new benchmark process was postponed due to the Covid 19 epidemic and is now planned for 2023.
References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

114 https://www.hafogvatn.is/static/extras/images/05-goldenredfish1328557.pdf

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

1.3	Stock under Consideration, Harvesting Policy and the Precautionary Approach including: 1.3.1 The precautionary approach 1.3.2 Management targets and limits 1.3.2.1 Harvesting rate and fishing mortality 1.3.2.2 Stock biomass 1.3.2.3 Stock biology and life-cycle (structure and resilience)
Summary of relevant changes:	The precautionary approach is implemented by applying a target fishing mortality of 0.097, and a trigger biomass at 220 000 tonnes below which the fishing mortality shall be reduced, both compatible with the range defined by precautionary reference points. The reference points, that are tabulated below (Table 10) , were established by ICES at the benchmark process in 2014 The lowest observed SSB (160000 tones estimated in 2012) was taken as Blim, and Bpa was set by multiplying with a safety margin of 1.4, corresponding to an assessment CV of 0.2. The limit fishing mortality (Flim) was calculated as that leading below Blim with 50% probability, and the precautionary fishing mortality was set as Flim/1.4, again assuming an assessment CV of 0.2. **Table 10.** Golden redfish reference points.

Nálgun *Framework*	Viðmiðunarmörk *Reference point*	Gildi *Value*	Grundvöllur *Basis*
MSY *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. *Average of ages 9–19. 80% of F_{MAX} in the 2012 Gadget run.*
Varúðarnálgun *Precautionary approach*	B_{lim}	160 000 t	Lægsta sögulega gildi hrygningarstofns í úttekt árið 2012. *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. *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).

FMSY was the proposed management target when the management plan was evaluated in 2014. It was accepted as an MSY target as it was (and still is) slightly below Fmax.

The management plan that was approved in 2014 has been applied since then. The management plan states that:
If SSBY ≥ SSBMGT: the catch for year Y+1 corresponds to the fishing mortality F (Y+1) = FMGT
If SSBY < SSBMGT: the catch for year Y+1 corresponds to F (Y+1) = FMGT × SSBY/SSBMGT
where SSBY is the spawning-stock biomass in year Y, FMGT = 0.097, and SSBMGT = 220 000 tonnes.
The expected range of realized fishing mortality (F) following the management plan (FMGT) is between 0.07 and 0.16.

The golden redfish in Icelandic and Faroese waters is generally adult, while the nursery area in East Greenland. In Iceland, there is a closed area on the western shelf break to protect small redfish (Figure 2 in Section 7.1.). Other protective measures include mesh size regulations, rules for landing of undersized fish, discard ban and sorting grids in shrimp fisheries.

References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

7.6.4 Clause 1.4 External Scientific Review

1.4 External Scientific Review	
Summary of relevant changes:	ICES is regarded as the relevant institution that provides external scientific review. Both the assessment method and the harvest rule (including reference points) were approved by ICES in a benchmark process in 2014. A new benchmark process was postponed due to the Covid 19 epidemic and is now planned for 2023. Normally, the assessment is conducted by the ICES North-Western Working Group (NWWG), where stakeholder nations participate. In 2020, because of the ongoing Covid 19 epidemic, MFRI made its own assessment and the advice was made by MFRI . In 2021, the normal procedure was resumed. Iceland has broad international scientific cooperation through organisations such as the Northeast Atlantic Fisheries Commission (NEAFC)[115], the Northwest Atlantic Fisheries Organization (NAFO)[116], and the North Atlantic Marine Mammal Commission (NAMMCO)[117]. Icelandic scientists have been involved in many international projects arranged by these organizations and in co-operative projects with research institutes and universities.
References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

7.6.5 Clause 1.5 Advice and Decisions on TAC

1.5 Advice and Decisions on TAC	
Summary of relevant changes:	Stock assessment and advice, including advice on harvest rules, TACs and reference points is provided by ICES. The process involves all relevant nations and the advice is for all areas. The advice is published on the MFRI website once it is ready [118]. Normally, the MFRI advice follows the ICES advice. The Minister of Fisheries and Agriculture decides on the TAC of the redfish stock for each fishing year (Sept –Aug) in accordance to law (Fisheries Management Act 116), based on HCR and the advice mentioned above. Formally, the minister has the authority to deviate from the advice, does not happen in practice. Golden redfish is a shared stock between Iceland, Greenland and the Faroes. The majority (~90%) of the fishery takes place in Icelandic waters. Data from all these areas are included in the assessment and the harvest rule covers them all. There is an agreement between Iceland and Greenland, where a certain amount of the quota is set aside for Greenland. Formally, this rule expired in 2018, but it is still followed in practice There is no similar agreement with the Faroes.
References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

115 http://www.neafc.org/
116 http://www.nafo.int/
117 http://www.nammco.no/
118 https://www.hafogvatn.is/static/extras/images/05-goldenredfish1328557.pdf

Section 2. Compliance and Monitoring

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

2.1 Implementation, Compliance, Monitoring, Surveillance and Control	
Summary of relevant changes:	The Icelandic Directorate of Fisheries, or Fiskistofa[119], is an independent administrative body responsible to the Fisheries Minister, in charge of 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. The Icelandic Coast Guard[120] is responsible for control at sea, both of the catches and the quality of the vessels. It 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 Coast Guard operates the Icelandic Maritime Traffic Service within its operations centre which has a key role in ensuring safety at sea, but can also take action if the behaviour of a fishing vessels is unusual. 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[121]). Provisions of the Act on a Special Fee for Illegal Marine Catch[122] are also applied as appropriate. Penalties range from the issue of reprimands by the Directorate of Fisheries and the 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). **Summary of relevant updates in 2022** Temporary/sudden closures (generally 2 weeks triggered by high juvenile abundance on fishing grounds) are announced by the Coastguard on VHF radio on a specified wavelength and on the radio before the news and weather. They are also published on the MFRI website. The short-term closure monitoring (and issuing of) was transferred to Fiskistofa in the fall of 2020. Some regulation regarding the short-term closures was also changed in 2020, whereby the trigger size limit was increased for cod, which led to significant decrease in the number of closures. An updated table as provided by the management authorities (MFRI and Fiskistofa) is shown below. **Table 11.** Short term closures in Iceland for the years 2018-2022.

Year	Species	Number of closures
2018	Cod	90
2018	Saithe	4
2018	Shrimp	2
2018	Haddock	1
2019	Cod	50
2019	Haddock	1
2020	Cod	9

[119] https://www.fiskistofa.is/umfiskistofu/
120 http://www.lhg.is/english
[121] https://www.althingi.is/lagas/149a/1996057.html
[122] https://www.althingi.is/lagas/149a/1992037.html

2020	Haddock	1
2020	Greenland halibut	1
2021	Sea cucumber	2
2021	Cod	3
2021	Haddock	1
2022	Cod	2
2022	Haddock	2
2022	Sea cucumber (quota finished)	1

Directorate Inspections at Sea

Days spent by Fisheries Directorate inspectors at sea inspecting vessels is shown in Table 7. The number has remained consistent with previous years.

Enforcement by Fiskistofa

The Directorate of Fisheries monitors compliance with laws and regulations which apply to fishing, handling of commercial stocks and treatment catch. In many cases, the Directorate of Fisheries is intended to respond to violations of laws and regulations through the application of administrative sanctions. Sanctions are intended to have a protective effect to reduce or prevent further violations. The main resources available to the Directorate of Fisheries for violations are reprimands and revocation of a fishing license. Alleged violations can also be prosecuted by the police and in some cases it is the only available remedy to respond to violations. Then the Directorate of Fisheries can in individual cases, deprive individuals of a fishing license to enforce law enforcement and rules. The most recent violations detected by Fiskistofa are shown below.

Table 12. Fiskistofa suspected violations in 2020 and 2021. Source: Fiskistofa 2020[123] and 2021 Annual Report[124]. Note, the information between 2020 and 2021 is not directly comparable, and offenses of a similar nature may have been combined into one case.

Suspected violation	2020 No.	2021
Veiðar án leyfis / Fishing without a permit	14	
Brottkast / offences	11	
Vigtun afla / weighing of catch	24	
þar af vigtun vigtarleyfishafa / of which the weighing by the weighing licensee	9	
Framhjálöndun / landing	6	
Afladagbók / logbook	40	
Vanskil afladagbókar / submitting logbook late	470	
Veiðar án aflaheimilda / Fishing with insufficient catch quotas	6	
Mál vegna umframafla / Cases due to excess catch * mostly daily allowance in coastal vessels	1321	
Lax og silungsveiði / salmon and trout fishing	24	
Undirmálsfiskur / bottom fish fishing	4	

[123] https://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2020.pdf
[124] https://www.fiskistofa.is/media/arsskyrslur/arsskyrsla-2021.pdf

2.1	Implementation, Compliance, Monitoring, Surveillance and Control

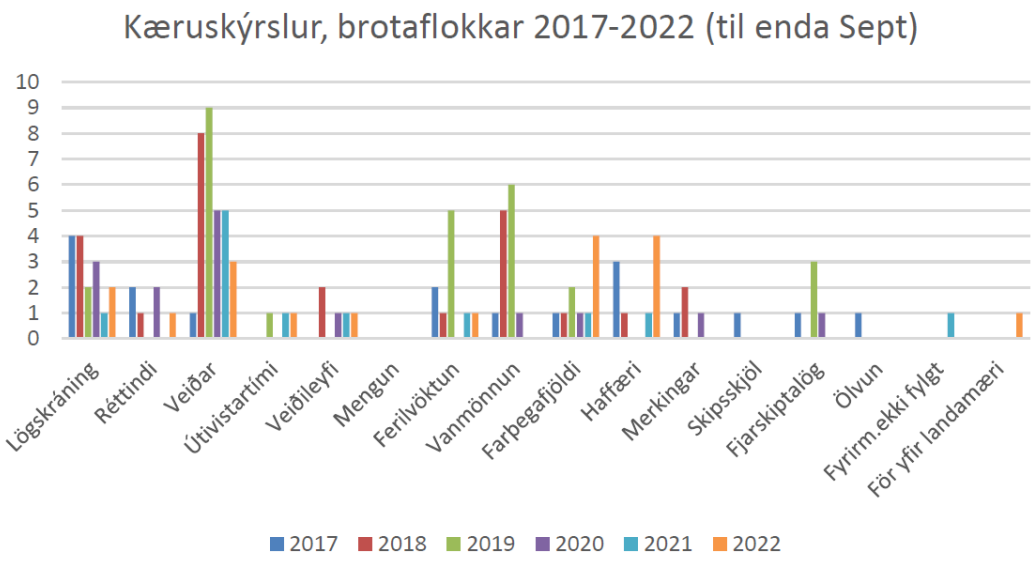
Röng tilgreining tegunda / Incorrect identification of species	3		3
Grásleppuveiðar / Lumpsucker fishing	13		2
Strandveiðar / coastal fishing	42		2
Annað s.s. tilkynningarskylda, löggilding vigtarmanns, vigtun án löggilts vigtarmanns, ónákvæmni við áætlun afla og hindrun eftirlits. / Other s.s. notification obligation, certification of the weigher, weighing without a certified weigher, inaccuracy in the catch plan and obstruction of control.	14		16

Enforcement by the Icelandic Coast Guard

During the remote audit in October 2022 the ICG reported that surveillance in 2020 and 2021 and 2022 was challenging due to the COVID 19 pandemic. By beginning of March 2020, severe restrictions on direct interactions between people were imposed. This restricted surveillance possibilities on board vessels for Maritime Surveillance and Control agency such as the Icelandic Coast Guard. All restrictions were lifted by February 25th 2022.

In spite of the Coast Guard efforts the pandemic has had its impact. Fewer inspections and boardings of vessels resulted in less measuring of fish, which was reflected in fewer Short Time Closures in 2020 and 2021 and 2022 (see Table 7) and none based on Fisheries inspections by ICG. Instead of regular boardings the ICS used more surveillance drones, in partnership with Fiskistofa. Trials with a bigger drone from EMSA (type Schiebel S 100 Camcopter, Figure below) proved to be a lesson for future use of larger drones operating from a vessel. The trials with the EMSA drone tied up, in part, the activities of the vessels which can in part explain fewer boardings. However, the drones are an extension of the vessel and information is used to inspect vessels more selectively than doing random checks. In the summer of 2022 the ICG recorded several incidents of inspections after anomalies were spotted by the drone crews.

In terms of overall infringements, 11 reports of apparent infringements were reported in 2022, noting however that not all reports are due to fishing infringements and one report can include more than one type of Apparent Infringement. The types of apparent infringement in 2022, included: Lögskráningar /Crew registry, Réttindi /License, Veiðar /Fisheries, Veiðileyfi /Fishing permit, Ferilvöktun /Vessel monitoring, Farþegafjöldi /Passengers, Haffæri /Sea worthiness and a new addition För yfir landamæri /Border Control. These are shown below (until the 1st September 2022) compared to historical data up to 2017.

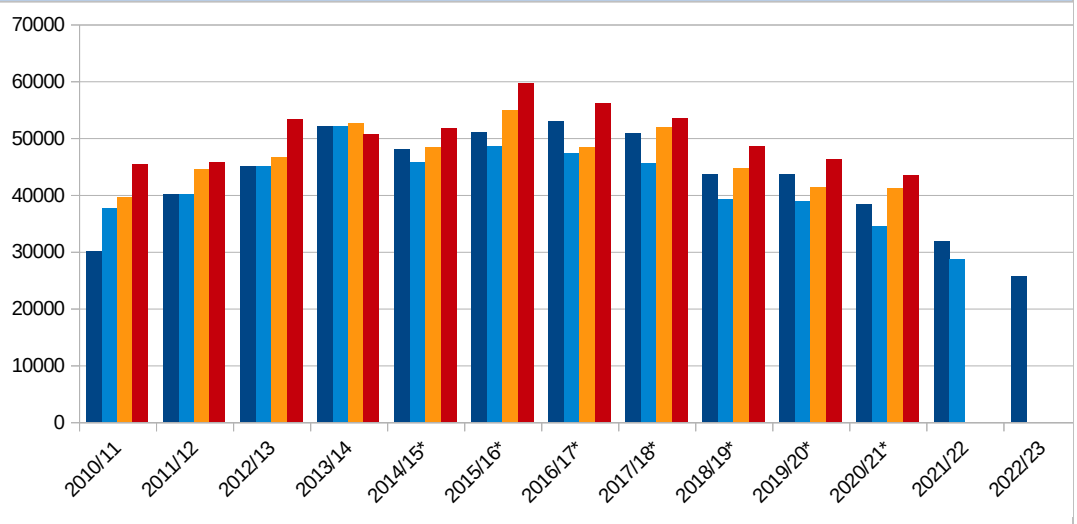
2.1	Implementation, Compliance, Monitoring, Surveillance and Control
	 **Figure 42.** Overview of ICG infringement reports in 2017- (1st September) 2022. Source: provided by the ICG on the 8th of November 2022. For 2022, infringements on Passenger and Sea Worthiness are most common 4 each, Fishing is next with 3 Apparent Infringements. No apparent infringement were reported in 2022 in the following categories; Mengun /Pollution, Vanmönnun /Manning, Merkingar /Markings, Skipsskjöl /Ships documents, Fjarskiptalög /Communications, Fyrirm.ekki fylgt /Instructions not obeyed or Ölvun /intoxication.
References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

7.6.7 Clause 2.2 Concordance between actual Catch and allowable Catch

2.2	Concordance between actual Catch and allowable Catch
Summary of relevant changes:	**Context** 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[125]. These must be electronic (e-logs). Small vessels used to use paper logbooks until late 2020 when regulation 298/2020[126] implemented the use of an electronic app. The App also called Afladagbókina or catch diary[127] [128] automatically records the location of the boat during fishing and the captains

[125] https://www.stjornartidindi.is/Advert.aspx?RecordID=42a16a67-60a7-4ae7-ad7c-0f53fc254654
[126] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887
[127] http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla
[128] https://www.mbl.is/200milur/frettir/2020/08/31/oll_aflaskraning_rafraen_fra_og_med_morgundeginum/

2.2	Concordance between actual Catch and allowable Catch
	then records the catch, its condition and bycatch. 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. 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). In Iceland, 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)[53]. **2022 updates** Since 2014, when the management plan was introduced, the fishing mortality has been slightly above the target. The highest value according to the most recent assessment was 0,129 in 2016. The total catch has consistently been above the recommended TAC (Figure below). There seems to be several reasons for that: the gap between the Icelandic TAC and the advice is not sufficient to cover the catches by the other nations and the Icelandic TAC has been overfished. There has also been some retrospective bias in the assessment, leading to higher recommended TACs than justified in later estimates of the fishing mortality.

2.2	Concordance between actual Catch and allowable Catch
	 **Figure 43.** TAC and landings of golden redfish.
References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

7.6.8 Clause 2.3 Monitoring and Control

2.3	Monitoring and Control including: 2.3.1 Vessel registration and catch quotas 2.3.2 Fishing vessel monitoring and control systems 2.3.3 Catches are subtracted from relevant quotas 2.3.4 Rules are enforced 2.3.5 Analysis is carried out
Summary of relevant changes:	**Context** 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. 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[129]. The official weight of the catch is subtracted from that vessels individual

[129] http://www.fiskistofa.is/veidar/aflaheimildir/aflahlutdeildalisti/

2.3	Monitoring and Control including: 2.3.1 Vessel registration and catch quotas 2.3.2 Fishing vessel monitoring and control systems 2.3.3 Catches are subtracted from relevant quotas 2.3.4 Rules are enforced 2.3.5 Analysis is carried out	
		quota share for a particular species. 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 (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 Specific data on each Icelandic quota species, its allocation to ITQ holders, transfer information, balances and catches to date is available at http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/aflastodulisti.jsp?lang=en. 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. 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. 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, using VMS for all Icelandic vessels and for all foreign vessels. 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. 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. 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 Identification System (AIS), and more recently drones.

2.3	Monitoring and Control including: 2.3.1 Vessel registration and catch quotas 2.3.2 Fishing vessel monitoring and control systems 2.3.3 Catches are subtracted from relevant quotas 2.3.4 Rules are enforced 2.3.5 Analysis is carried out	
		Deviations and flexibility measures 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. 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, or by purchase of additional quota if possible). Excess catches which are not corrected using these flexibility measures can result in a revocation of fishing licenses and fines[130]. 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 and Fiskistofa can send inspectors to verify for issues. **Updates for 2022** In late 2021 Fiskistofa reported that a new data department has been created to allow for further data analysis relating to catch recording and day to day implementation of management measures, ultimately to improve the ability to detect discrepancies and enforce regulations. Aside from the above, the monitoring and control systems remain largely unchanged since the previous surveillance. The only other update for 2022 relates to the progress to address the minor non-conformance raised against Clause 2.3.2.4 . **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.** One important development in terms of corrective action is the development and use of an app to facilitate catch and bycatch recording in smaller vessels. Fiskistofa, the MFRI and the Client group representative confirmed that starting in September 2020, smaller Icelandic vessels are required to log their catches in a phone/tablet app (essentially an e-logbook) which contains information on

[130] http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Vidurlog

2.3	Monitoring and Control including: 2.3.1 Vessel registration and catch quotas 2.3.2 Fishing vessel monitoring and control systems 2.3.3 Catches are subtracted from relevant quotas 2.3.4 Rules are enforced 2.3.5 Analysis is carried out	
		catch and bycatch, including that of marine mammals and seabirds. This follows regulation 298/2020[131]. The App also called Afladagbókina or catch diary[132] [133] automatically records the location of the boat during fishing and the captains then records the catch, its condition and by-catch, in a very simple way. The app replaces paper logbooks in the small boat sector, with an electronic catch recording system. Updates from 2021 (previous surveillance audit) and 2022 (current surveillance audit are provided below for full context: **2021 Updates.** In November 2021, the system continued to be used in the small vessel sector and catch with bycatch data being collected by Fiskistofa and sent to MFRI for management purposes. MFRI staff reported that data from the App is in the process of being made available to the MFRI through MFRI/Firskistofa IT staff collaboration. Fiskistofa also reported as part of the 2nd surveillance audit that since the beginning of the App's implementation it has been mandatory to register all catch and bycatch according to regulation 298/2020 and the data is being received by the authorities. Their inspectors have been busy training fishermen and captains at the quaysides during landing, and their helpline was quite busy in the beginning of the coastal fleet season. Also, one physical meeting was held in Akranes with coastal fishermen. A tutorial video on the use of the App was also published on the Fiskistofa website https://www.fiskistofa.is/ymsaruppl/tilkynningar/afladagbokarapp-myndband and on the Fiskistofa Facebook site[134]. Furthermore, a traceability component to the App has been implemented in April 2021 which is been used to further help with the detection of discrepancies in catch records and to allow better traceability across the supply chain. This traceability component is currently subject to further development. **2022 Updates.** The App is no longer operated/managed by Fiskistofa. The companies Aflarinn, Trackwell and Fontos are now operating the small vessels App. Fiskistofa noted during the October 2022 on site meeting that this data is being sent to the MFRI. However, the MFRI stated that although work is ongoing to getting access to that data stream, staff in charge of bycatch analysis (i.e. Dr Guðjón Már Sigurðsson) does not yet have access to the data from the App. All in all, since implementation of the App it is not clear if bycatch information a) is being collected and b) received by the relevant science authorities in charge of data analysis. **Status:** Open, Corrective Actions in place to be reviewed annually in subsequent audits. **Progress is deemed to be behind schedule and a revised corrective action has been requested from the Client.** 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 on the non-conformance, the corrective action plan and the corrective evidence supplied during this audit.
References:		Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.

[131] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887
[132] http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla
[133] https://www.mbl.is/200milur/frettir/2020/08/31/oll_aflaskraning_rafraen_fra_og_med_morgundeginum/
[134] https://www.facebook.com/Fiskistofa-1151844504903713/videos/304666984614930/

2.3	Monitoring and Control including: 2.3.1 Vessel registration and catch quotas 2.3.2 Fishing vessel monitoring and control systems 2.3.3 Catches are subtracted from relevant quotas 2.3.4 Rules are enforced 2.3.5 Analysis is carried out	
Statement of continuing consistency to the IRF Fishery Standard		The fishery continues to remain consistent with the standard.

Section 3. Ecosystem considerations

7.6.9 Clause 3.1 Guiding Principle

3.1 Guiding Principle	
Summary of relevant changes:	**Associated species catch and bycatch to the fishery** 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. The species listed below are those that were identified during the Golden Redfish re-assessment in 2019[135]. A status update on each of these species is provided in **Table 9**. **Endangered, Threatened and Protected (ETP) and vulnerable species interactions** **Context to the Golden redfish fishery.** The golden redfish fishery catches most of its target with bottom trawl gear (>92%), with smaller catches from longline gear (2.5%), nephrops trawl (3.5%) and other gears collectively catching between 1 and 2% of the total catches. The update below mainly refer to gillnet gear and longline gear, both of which are responsible for small to negligible catches of redfish, and therefore bycatch of vulnerable species such as marine mammals and seabirds. The MFRI has not provided any further bycatch data for marine mammals and seabirds. The latest data from 2016 to 2019 was provided at the previous surveillance. However, observed bycatch by onboard inspectors and in surveys in 2020 was reported in the 2021 ICES Working Group on Bycatch (WGBYC) report[136]. From the ICES 2021 WGBYC report the authors reported:" In 2020 highest bycatch levels were reported for common eider (105), black guillemots (82) and common guillemots (39). Harbour porpoise was the largest proportion of cetacean bycatches in 2019 and 2020 (21 and 23 respectively).". As part of the 2022 ICES WGBYC report[137] the authors reported:" In the Iceland Sea Ecoregion in 2021, 134 days at sea were monitored in nets and 480 days in bottom trawls. All monitoring was performed by at-sea observers. Ten bird species were recorded in nets, including 3 black guillemots (*Cepphus grille*), 1 long-tailed duck (*Clangula hyemalis*), 4 northern fulmars (*Fulmarus glacialis*), 1 red-throated diver (*Gavia stellata*), 1 northern gannet (*Morus bassanus*), 2 European shags (*Phalacrocorax aristotelis*), 2 cormorants (*Phalacrocorax carbo*), 3 common eiders (*Somateria mollissima*), 277 guillemots (*Uria aalge*) and 1 Brünnich's guillemot (*Uria lomvia*). 36 harbour porpoises, 2 grey seals , 2 harp seals (*Pagophilus groenlandicus*), 2 white-beaked dolphins (*Lagenorhynchus albirostris*) and 7 harbour seals were reported in nets. For bottom trawlers bycatch was reported for one bird species, with 2 *Uria aalge* bycaught. Additional monitoring data with at-sea observers with no bycatch incidence was reported for dredges (9 days), longlines (2 days), surrounding nets (11 days) and traps (6 days). Bycatch of several species of fish were reported in the ecoregion from 4 different taxa, including *Etmopterus spinax* and *Chimaera monstrosa* captured in bottom trawls. Relevant updates for species for which data is available is provided below. All the species below were identified and analyzed as vulnerable or ETP species in the full assessment that resulted in the current

[135] https://www.responsiblefisheries.is/media/1/form-9e-irf-icelandic-redfish-re-assessment-final-certification-report-july-2019.pdf

[136] ICES (2021): Working Group on Bycatch of Protected Species (WGBYC). ICES Scientific Reports. Report. https://doi.org/10.17895/ices.pub.9256 https://ices-library.figshare.com/articles/report/Working_Group_on_Bycatch_of_protected_Species/18621773

[137] ICES (2022): Working Group on Bycatch of Protected Species (WGBYC). ICES Scientific Reports. Report. https://doi.org/10.17895/ices.pub.21602322.v1

3.1	Guiding Principle	
		certificate for this fishery (see relevant audit report at https://www.responsiblefisheries.is/certification/certified-fisheries). **Harbour Porpoises (*Phocoena phocoena*)** Harbour porpoises are classified as Least Concern in the IUCN Red List[138] (population trend unknown, last assessed in 2020). They are also classified as Least Concern in the Icelandic National Redlist (based on a 2016 assessment)[139]. Annual estimates of harbour porpoise by-catch have decreased in recent years as gillnet effort has decreased, from a high of 7,300 animals in 2003 to about 1600 animals in 2009–2013[140] and down to about 750 animals in 2014-2015. Results based on close kin mark recapture genetics indicates that the population has increased substantially in recent years.[141] The 2019 Report of the NAMMCO Scientific Committee Working Group on Harbour Porpoise (19-22 March 2019)[142] reported the following about the Icelandic harbour porpoise population. After reviewing the assessment and noting the recent decline in bycatch, the WG agreed that there was no specific cause for concern for harbour porpoises in Iceland. However, they also concluded that the lack of time and expertise meant they were not in a position to provide management advice on sustainable removals. In 2022 the same group provided the following update[143]:" Sigurdsson indicated that a population estimate of harbour porpoise in Iceland waters was available from an aerial survey conducted in 2007, but noted that the survey was incomplete and the abundance estimate obtained then was probably an underestimate. Sigurdsson informed the WG about plans to conduct an aerial survey in July 2023 to obtain updated abundance estimates for harbour porpoise in Iceland. The group commanded the planning of such a survey. Given that abundance estimates from the NASS surveys may not be usable for harbour porpoise in Iceland, the group agreed that the 2023 abundance estimate be the one used in the future Icelandic assessment. Sigurdsson indicated that previous work using close kin Mark-Recapture genetics and presented at the 2018 NAMMCO/IMR International Workshop on harbour porpoise indicated that the Icelandic population was increasing. Sigurdsson informed the WG that around 500 animals were by-caught annually in the Icelandic lumpsucker fishery and 1500-2000 in the cod fishery, noting that by-catch levels were much higher in the past. Sigurdsson informed the WG that Iceland was also conducting isotopic work and investigating the diet of harbour porpoise using samples from by-caught and stranded animals. Life history parameters and age distribution histograms are possible to infer from these samples. The group recommended that an assessment for Iceland be made when the new abundance estimate becomes available.

[138] https://www.iucnredlist.org/species/17027/50369903
[139] https://www.ni.is/node/27406
[140] 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
[141] North Atlantic Marine Mammal Commission and the Norwegian Institute of Marine Research. (2019). Report of Joint IMR/NAMMCO International Workshop on the Status of Harbour Porpoises in the North Atlantic. Tromsø, Norway. https://nammco.no/wp-content/uploads/2020/03/final-report_hpws_2018_rev2020.pdf
[142] NAMMCO (2019). Report of the NAMMCO Scientific Committee Working Group on Harbour Porpoise, 19-22 March, Copenhagen, Denmark. https://nammco.no/wp-content/uploads/2019/02/final-report_hpwg-2019.pdf
[143] NAMMCO-North Atlantic Marine Mammal Commission (2022). Report of the Scientific Committee Working Group on Harbour Porpoise. November 2022, Oslo, Norway. https://nammco.no/wp-content/uploads/2023/01/final-report-hpwg-2022_with-exsum.pdf

3.1	Guiding Principle	
		Sigurdsson informed the WG of the by-catch time series available in Iceland, including some back calculated by-catch estimates, and presented at the international harbour porpoise workshop in 2018. As in the case of Norway, the group recommended Iceland to generate the best back-calculated bycatch estimates (i.e., generate a time series going back to the beginning of the fishery) for the upcoming Icelandic assessment, planned for 2024." **Harbour seals** The MFRI 2021 advice for harbour seals[144] indicates that the 2020 harbour seal census resulted in a population estimated of 10,319 animals (95% confidence intervals: 6,733-13,906). The current population estimate is 69% lower than the first abundance estimate from 1980 and the estimate is 14% under the management objective of 12 thous. Animals (Hafrannsóknastofnun 2021). In 2019, new regulation regarding seal hunting in Iceland was enacted (Atvinnuvega- og nýsköpunarráðuneytið 2019). All seal hunting is banned, but it is possible to obtain an exemption for traditional hunt. It is also forbidden to sell Icelandic seal products. Bycatch in gillnets is probably the highest mortality risk for harbour seals in Iceland currently. Limited data are available on seal bycatch, but data collected by on-board observers of the Directorate of Fisheries, and in the MFRI gillnet survey, indicate that on average, 1389 (coefficient of variation, CV=35) harbour seals have been bycaught annually in the lumpfish fishery between 2014 and 2018. Bycatch in cod gillnet fishery and bottom trawls is less common and more uncertainty associated with the bycatch estimates in those fisheries. Between 2014 and 2018, it has been estimated that annually, 15 harbour seals were bycaught in cod gillnet fisheries (CV=102) and 17 harbour seals in bottom trawls (CV=100) (Hafrannsóknastofnun, 2019). Negative effects from the cod gillnet fisheries (and associated fisheries that land fish in those nets) are considered to be very limited. **Other marine mammals** The MFRI confirmed that no interaction with Blue whales and Northern right whales recorded in recent years. There are no further updates from NAMMCO or the MFRI in relation to other marine mammal species (i.e. seals), aside from what we reported in the previous surveillance report. **Pingers testing** After unsuccessful trials with banana pingers and PALs in 2016-2018, PALs with a modified signal were tested in the Icelandic cod gillnet fishery in 2020. These PALs had a signal developed to emulate the signal of an out of production pinger, the Dukane 1000. The random wide-band sweep characteristic of the original PAL was maintained. Signal peaks are at 10, 50, 70 and 130kHz with a source level of 157dB. This signal is aimed at deterring porpoise rather than communicating with them as in the original PALs. The device was tested over two weeks, where over 3000 50m nets were hauled. Half of the net sets were equipped with the devices, while the other half acted as control. A total of 15 marine mammals were caught in the trial, 14 harbour porpoises and one harbour seal. Significant difference in the number of harbour porpoises was observed between the two treatments ($t = 3.78$, $p = 0.00017$), as all 14 of the harbour porpoises were caught in the control sets, while none were caught in the PAL equipped sets. The single harbour seal bycaught was caught in a PAL equipped set. These results suggest that this configuration of the PAL might be effective in reducing harbour porpoise bycatch in Icelandic waters. There have been no further updates since then. **Sharks**

[144] https://www.hafogvatn.is/static/extras/images/radgjof-landselur20201286028.pdf

3.1	Guiding Principle
	Generally speaking, landed catches of sharks remain quite small. Some catch of leaf scale gulper sharks has been recorded, last in 2016. Survey trends are presented below from MFRI data. Grey skate (*Dipturus flossada / batis*) survey abundance is variable but has been on average relatively stable in recent years. The MFRI spring survey caught 56 t in 2019, 43 t in 2020, 32 t in 2021 and 69 t in 2022. Fishery landed catch of Grey skate was 160 t in 2020 and 158 t in 2021. Landed catch of dogfish (*Squalus acanthias*) was 1 t in 2019 and 3 t in 2020, and 0.9 t in 2021. Survey trends are very sporadic. No Greenland sharks (*Somniosus microcephalus*) were caught in the 2020-2022 surveys. Around 16 tonnes of them were landed in both 2020 and 2021. Around 3.6t of porbeagle (*Lamna nasus*) were landed in 2020 and 2.3t in 2021. Porbeagles are rarely caught in surveys, but two were caught in the autumn survey in 2021. No records of basking sharks are available in catch or surveys. Few have been recorded by onboard inspectors, last one in 2005. **Trawl effort spatial extent** The ICES 2022 Icelandic ecosystem overview report[145] indicates that the main abrasive pressure in the Icelandic Waters ecoregion is caused by mobile bottom-fishing gears (targeting fish, shrimp, and Norway lobster *Nephrops norvegicus*). 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. 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. The decrease in fishing effort varied locally, with decreases mainly being noted on the southern shelf (Subarea 1) and at typical shrimp trawling grounds on the northern shelf (Figure 35, Figure 36). Based on analysis of electronic logbook data an area of about 79000 km^2 in total was fished with towed bottom-fishing gears in 2013, composing 10% of the ecoregion. Using vessel monitoring system (VMS) and logbook data ICES estimates that mobile bottom trawls used by commercial fisheries in the 12 m+ vessel category have been deployed over approximately 132 485 km^2 of the ecoregion in 2018, corresponding to ca. 17.5 % of the ecoregion's spatial extent (Figure 36). The latter figure (132.485 km^2) refers to numbers based on ais/vms data delivered to ICES (different from the previous approach used). it is in conformity with what is reported in mynd 29A (add fish, nephrops and shrimp).[146] The overall bottom trawl fishing effort has been decreasing since the early 2000s and is now at the lowest level. **Habitat mapping, NovasArc project** Records of sensitive benthic species were used in the project NovasArc – a Nordic project on vulnerable marine ecosystems and anthropogenic activities in arctic and sub - arctic waters (https://novasarc.hafogvatn.is). In the NovasArc project, distribution forecast maps were prepared for sensitive species off the Faroe Islands, eastern Greenland, Iceland and Norway. The forecast maps indicate areas that could be suitable for these species based on available information on known

[145] ICES. 2022. Icelandic Waters ecoregion –Ecosystem overview. In Report of the ICES Advisory Committee, 2022. ICES Advice 2022, Section 11.1, https://doi.org/10.17895/ices.advice.21731663

[146] https://www.hafogvatn.is/static/research/files/hv2021-50.pdf

3.1	Guiding Principle
	distribution and environmental factors related to them (Buhl - Mortensen et al. 2019)[147]. These maps were also compared to the footprint of bottom fishing and the collision between them discussed. The project was a collaborative project of the Marine Research Institute with Havstovan in the Faroe Islands and the Institute of Marine Research in Bergen, supported by the Nordic Council of Ministers NORDEN. The 2019 NovasArc report highlighted through a risk assessment method that within the Icelandic EEZ, overlap between the fishing effort and the optimal predicted habitat was high for several VMEs, including sublittoral sea pen communities (54.8% of their optimal habitat), hard bottom sponge aggregations (51.2%), stylasterid corals (50.5%), cold-water coral reefs (50.4%), soft bottom sponge aggregations (41.6%), and hard bottom gorgonians (42.3%). However, the authors also note that historical trawl disturbance may have decreased the amount of suitable habitat for these benthic groups. Also, a paper was published by Burgos et. al (2020)[148] based on the findings of the Novasarc work. The group that produced this publication has received an additional funding to develop this work further including managemental aspects in 2021. The MFRI highlighted during the November 2021 site visits that Novasarc II is now ongoing and will concentrate on updating predictive models and discuss the output for managemental purposes. In October 2022 the MFRI highlighted that the NovasArc II project had a stakeholder meeting last September and the final report will be submitted to TemaNord this autumn. Updated models have been prepared including confidence estimation. Such models are increasingly considered in managemental purposes. This work has been introduced to the Ministry of Fisheries although the best use of this work has not been discussed in detail. **Benthos recorded in the MFRI survey** Recording of benthic animals as a bycatch in the autumn MFRI trawl took place for the fifth time in 2020 (Jakobsdóttir et al. 2020[149]) (Figure 38). Benthic animals were collected at 105 stations. Benthic animals are classified into species as far as possible, counted and weighed. The amount of benthic animals in tows ranged from 0.028 kg to 97.5 kg and the number of individuals counted in tow ranged from 1 to 1,213 (Fig. 21). The largest number of individuals were fungi. Maximum number of identified species or groups in tow there were 71 species at a station west of Kolbeinseyjarhrygg and the fewest species, a total of 3, occurred two stations in the continental shelf south of the country. At one point west of Reykjanes was the total weight of benthic animals in a tow was 97.5 kg and a total of 50 species, most of which contained 80 kg of coral. Sponges weighed the most at other stations. Six benthic species were identified at the Faroe Islands ridge that have not occurred in previous surveys. A total of over 700 species have been identified from the five autumn surveys since benthos bycatch has been recorded (Figure 38).

[147] http://norden.diva-portal.org/smash/get/diva2:1304079/FULLTEXT02.pdf
[148] https://www.frontiersin.org/articles/10.3389/fmars.2020.00131/full
[149] Klara Björg Jakobsdóttir, Höskuldur Björnsson, Jón Sólmundsson, Kristján Kristinsson, Steinunn Hilma Ólafsdóttir og Valur Bogason. 2020. Protected areas within Iceland's territorial waters and fragile ecosystems. Summary for the Ministry of Industry and Innovation of the available data from areas in the sea around Iceland that have been closed for over 10 years and fishing with demersal gear has been restricted or banned. HV 2021-49 https://www.hafogvatn.is/static/research/files/hv2020-54.pdf

3.1	Guiding Principle	
		The closures that MFRI proposed are being processed at present time (October 2022) by the Ministry of Fisheries. The closures include Hydrothermal vents, Sponge Aggregations mixed with Cauliflower coral ground and Sponge Aggregations on underwater mountains. **7.6.9.1 Foodweb considerations** 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. Icelandic capelin's status was assessed by the MFRI again in 2022[150]. According to the this, SSB is currently around 2.5 time the biomass limit, so the stock is considered in good shape. Fishbase reports[151] 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[152]. 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[153]. Aside from the Sturludottir *et. al.* 2018 [154]publication showing that 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, there are no further updates on this topic.
References:		Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard		The fishery continues to remain consistent with the standard.

7.6.10 Clause 3.2 Specific Criteria

3.2	Specific Criteria including: 3.2.1 Information gathering and advice 3.2.2 By-catch and discards 3.2.3 Habitat Considerations 3.2.4 Foodweb Considerations 3.2.5 Precautionary Considerations	
Summary of relevant changes:		**Context and updates** 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(i.e. 2022), which include results

[150] https://www.hafogvatn.is/static/extras/images/lodnavetur2022_final1303548.pdf
[151] http://www.fishbase.se/summary/Sebastes-norvegicus.html
[152] https://academic.oup.com/icesjms/article/63/9/1682/699283
[153] http://www.fishbase.se/Ecology/FishEcologySummary.php?StockCode=517&GenusName=Sebastes&SpeciesName=norvegicus
[154] https://www.sciencedirect.com/science/article/pii/S0165783618301620

3.2	Specific Criteria including: 3.2.1 Information gathering and advice 3.2.2 By-catch and discards 3.2.3 Habitat Considerations 3.2.4 Foodweb Considerations 3.2.5 Precautionary Considerations	
		of routine monitoring and assessment efforts is available online at https://www.hafogvatn.is/en/harvesting-advice. 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… Catch records for over 50 species can be retrieved on their website.[155] There have been no changes in the gear used in Icelandic waters. Fiskistofa and the Client group confirmed that longliners use night settings and lasers of sounds cannons to keep birds off the longlines, while trawlers use semi-pelagic trawl doors and rock hoppers to decrease drag on the seabed to save fuel and decrease gear habitat contact. Gillnetters are mainly restricted through area closures. The status of bycatch and associated species has been detailed in the previous clause. Spotted wolffish is depleted and subject to corrective actions to reverse the trend. Vulnerable species effects are considered generally limited and not significantly affecting any of the species listed by OSPAR, or the marine mammals and seabirds regularly caught in the gillnet fisheries (mostly in lumpfish). 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, hence the very vast majority if not all catches are landed. Actual discards are illegal and considered relatively small in Icelandic waters. Discarding violations are subject to penalty ranging from ISK 400K to 8M. 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). 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. Key habitat considerations are listed in the yearly ICES ecosystem report for the Icelandic waters, the last of which was published in 2022[156]. Key findings summarised in the report highlight that using vessel monitoring system (VMS) and logbook data ICES estimates that mobile bottom trawls used by commercial fisheries in the 12 m+ vessel category have been deployed over approximately 132,485 km^2 of the Icelandic ecoregion in 2018, corresponding to ca. 17.5 % of the ecoregion's spatial extent. Extensive spatial closures are also shown in the region. Aside from the Sturludottir *et. al.* 2018 [157]publication showing that 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, there are no further updates on this topic.

[155] http://www.fiskistofa.is/veidar/aflastada/aflastodulisti/

[156] ICES. 2022. Icelandic Waters ecoregion –Ecosystem overview. In Report of the ICES Advisory Committee, 2022. ICES Advice 2022, Section 11.1, https://doi.org/10.17895/ices.advice.21731663

[157] https://www.sciencedirect.com/science/article/pii/S0165783618301620

3.2	Specific Criteria including: 3.2.1 Information gathering and advice 3.2.2 By-catch and discards 3.2.3 Habitat Considerations 3.2.4 Foodweb Considerations 3.2.5 Precautionary Considerations	
		Precautionary considerations are integrated in the management of associated and non- target species.
References:		Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard		The fishery continues to remain consistent with the standard.

8 Update on compliance and progress with non-conformances and agreed action plans

This section details compliance and progress with non-conformances and agreed action plans including:

a) A review of the performance of the Client specific to agreed corrective action plans to address non-conformances raised in the most recent assessment or re-assessment or at subsequent surveillance audits including a summary of progress toward resolution.
b) A list of pre-existing non-conformances that remain unresolved, new nonconformances raised during this surveillance, and non-conformances that have been closed during this surveillance.
c) Details of any new or revised corrective action plans including the Client's signed acceptance of those plans.
d) An update of proposed future surveillance activities.

During the 4th surveillance[158] and re-assessment[159] audit of this fishery in 2019 (first certification cycle), all clauses but one was 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. Progress against the NC for this 3rd Surveillance is specified below, but has been found to be behind target. No new non-conformances were identified during this 3rd Surveillance.

Non-conformance 1 (of 1)	
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
Non-conformance level:	Minor Non-conformance
Non-conformance:	Although required by legislation, there is evidence of extensive non-reporting/under-reporting of seabirds and marine mammals bycatch such that the Assessment Team cannot be confident that catch amounts by species and fishing area (of marine mammals and seabirds) are estimated and continually recorded in fishing logbooks.
Rationale:	The recording of marine mammals and seabirds by number and species is required by Icelandic regulation[160]. 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 Pallson *et al.* 2015[161] and the March 2018 MFRI report titled: "Bycatch of Seabirds and Marine Mammals in lumpsucker gillnets 2014-2017". Pallson *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.

[158] https://www.responsiblefisheries.is/media/1/form-9h-irf-icelandic-golden-redfish-4th-surveillance-2018final.pdf
[159] https://www.responsiblefisheries.is/media/1/form-9e-irf-icelandic-redfish-re-assessment-final-certification-report-july-2019.pdf
[160] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967
[161] https://www.hafogvatn.is/static/research/files/fjolrit-178.pdf

	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 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[162]. 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"*. 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.
Corrective Action Plan	In accordance with rules of the IRF Programme, the Client is required to submit a Corrective Action Plan (CAP) within 28 days. **The Client submitted the following CAP in February 2019**

[162] https://www.hafogvatn.is/static/files/skjol/techreport-bycatch-of-birds-and-marine-mammals-lumpsucker-en-final-draft.pdf

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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.

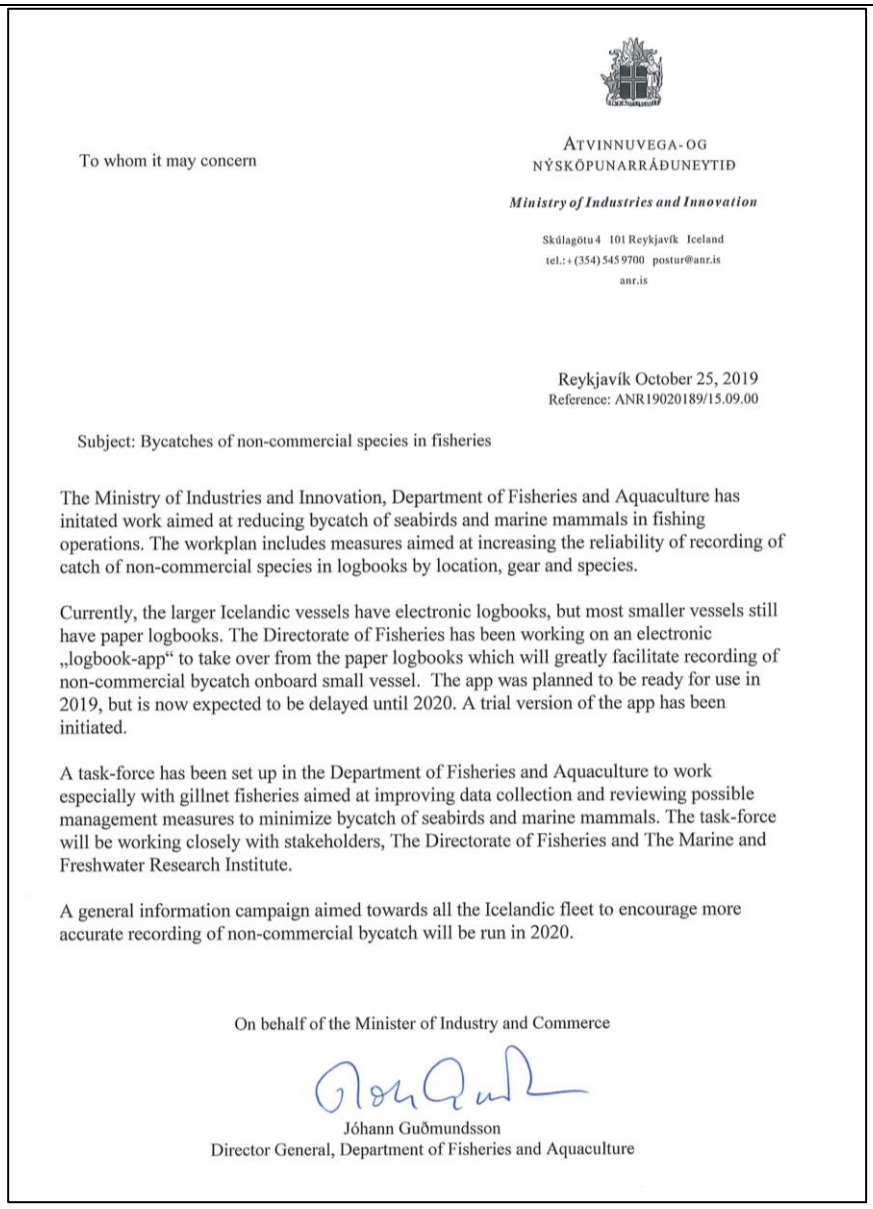
On behalf of the Minister of Fisheries and Agriculture

Brynhildur Benediktsdóttir

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.
Assessment Team CAP response	**The Assessment Team has accepted the Corrective Action Plan provided by the Client for the fishery under assessment.**
Year 1 progress (Re-assessment 2019-2020)	**The Client Group submitted the following corrective action evidence in October 2019**



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Reykjavík October 25, 2019
Reference: ANR19020189/15.09.00

Subject: Bycatches of non-commercial species in fisheries

The Ministry of Industries and Innovation, Department of Fisheries and Aquaculture has initated work aimed at reducing bycatch of seabirds and marine mammals in fishing operations. The workplan includes measures aimed at increasing the reliability of recording of catch of non-commercial species in logbooks by location, gear and species.

Currently, the larger Icelandic vessels have electronic logbooks, but most smaller vessels still have paper logbooks. The Directorate of Fisheries has been working on an electronic „logbook-app" to take over from the paper logbooks which will greatly facilitate recording of non-commercial bycatch onboard small vessel. The app was planned to be ready for use in 2019, but is now expected to be delayed until 2020. A trial version of the app has been initiated.

A task-force has been set up in the Department of Fisheries and Aquaculture to work especially with gillnet fisheries aimed at improving data collection and reviewing possible management measures to minimize bycatch of seabirds and marine mammals. The task-force will be working closely with stakeholders, The Directorate of Fisheries and The Marine and Freshwater Research Institute.

A general information campaign aimed towards all the Icelandic fleet to encourage more accurate recording of non-commercial bycatch will be run in 2020.

On behalf of the Minister of Industry and Commerce

Jóhann Guðmundsson
Director General, Department of Fisheries and Aquaculture

Following the letter supplied by the Ministry on October 25th 2019 to update on progress towards closure of Minor Non Conformance #1, the Client Group spoke in a conference call with the audit team lead and clarified the following information:

The Task Force group has just been set up and it is different and independent from the Committee for Consultation on Responsible Management of Living Marine Resources, reformed in its most current form (and remit) in Nov. 2018. The head of the Task Force is a high-level official in Iceland, the former Permanent Secretary for Fisheries.

The appointed Chair of the Committee for Consultation on Responsible Management of Living Marine Resources brings industry and management stakeholders together to gather information, explore options and seek consensus on what can be done and agreed in a practical sense, thus assisting in the official decision-making process. The Task Force is set to

	continue to collaborate directly with various stakeholders and to explore multiple options and solutions. The Chairs of the Committee and the newly formed Task Force have been in contact to report on recent issues, developments and general updates and to discuss future options. The Client Group communicated that there is a proposed regulation on the table aiming to prohibit all deliberate killing of seals in Iceland (with only minor exception subject to strict conditions and requiring permit from the Directorate of Fisheries) which, if adopted, would contribute to a reduction in overall mortality and assist seal populations growth. Furthermore, an important first step has been recognised as the need to improve social recognition and acceptance of the issues across the gillnet fisheries (for lumpfish and cod), currently considered at high risk. The Client Group further communicated, on behalf of the head of the Task Force, that the small vessels bycatch recording App should be ready for the end of the year, prior to trial by a select group of fishermen. However, the full recording of seabird and marine mammal bycatch in the App may extend beyond the next (2020) fishing season. Meetings have been scheduled in late 2019 to further discuss the App with the Directorate. Another action that is under consideration is the use of picture cards for gillnet fishermen to enable better identification of seals and seabirds and to investigate if additional forms to record bycatch are required in the small fleet. The Task Force is also planning to conduct meetings with small boat owners to reiterate the need to improve data collection. The Directorate is also considering to hold educational meetings around Iceland prior to the start of the next season to increase awareness of the issue and the need for improved catch recording.
Assessment Team Determination on Year-1 Corrective Evidence	**The Assessment Team has determined that the information supplied is sufficient to meet the original CAP deliverable for year 1. The non-conformance remains open and on track towards appropriate closure.** **The first surveillance activities will review evidence that the corrective actions highlighted above have been carried out.**
Year 2 progress (1st Surveillance, early 2021)	During the 2021 remote audit, Fiskistofa confirmed that starting in September 2020 smaller Icelandic vessels (including gillnetters that are responsible for most of the recognised bycatch of marine mammals and seabirds) are now required to log their catches in an app (essentially a e-logbook) which contains information on catch and bycatch, including that of marine mammals and seabirds. This follows regulation 298/2020[163]. The App was designed and trialled between 2018 and 2020. The App also called Afladagbókina or catch diary[164]

[163] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887
[164] http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla

[165]automatically records the location of the boat during fishing and the captains then records the catch, its condition and by-catch, in a very simple way. The app replaces paper logbooks in the small boat sector, with an electronic catch recording system. It is expected that this app will make the recording of bycatch easier for the fleet.

Additionally, the MFRI has provided the latest (available) reported bycatch from the fishing fleet by gear. They report that (as somewhat expected) logbook records were generally much lower than the estimated bycatch. As an example, the total bycatch of reported harbour porpoises in the gillnet fishery over the 4 years was 171 porpoises while the total observed by inspectors and in the MFRI cod gillnet survey (3.7% of total effort) was 119 porpoises (yearly).

Bycatch of marine mammals and seabirds by gear type in 2016-2019 as reported by the fishing fleet. Source MFRI, January 2021.

Cod and Greenland halibut gillnets					
Species	2016	2017	2018	2019	Total
Harbour porpoise	52	45	48	26	171
White beaked dolphin	1	0	0	1	2
Harbour seal	11	12	7	8	38
Grey seal	4	1	1	1	7
Harp seal	2	0	0	0	2
Ringed seal	0	0	0	1	1
Humpback whale	1	0	0	0	1
Northern bottlenose whale	0	0	1	0	1
Risso's dolphin	0	0	7	0	7
Total marine mammals	71	58	64	37	230
Common guillemot	32	40	35	38	145
Northern fulmar	0	2	0	0	2
Brünnich's guillemot	0	0	0	3	3
Black guillemot	0	2	0	26	28
Cormorants	0	1	2	4	7

[165] https://www.mbl.is/200milur/frettir/2020/08/31/oll_aflaskraning_rafraen_fra_og_med_morgundeginum/

	<table><tr><td>Total seabirds</td><td>32</td><td>45</td><td>37</td><td>71</td><td>185</td></tr><tr><td colspan="6">Demersal longline</td></tr><tr><td>Species</td><td>2016</td><td>2017</td><td>2018</td><td>2019</td><td>Total</td></tr><tr><td>Northern fulmar</td><td>61</td><td>303</td><td>539</td><td>195</td><td>1098</td></tr><tr><td>Northern gannet</td><td>0</td><td>27</td><td>3</td><td>0</td><td>30</td></tr><tr><td>Seagull species</td><td>25</td><td>8</td><td>3</td><td>0</td><td>36</td></tr><tr><td>Total seabirds</td><td>86</td><td>338</td><td>545</td><td>195</td><td>1164</td></tr></table><table><tr><td colspan="6">Demersal otter trawl</td></tr><tr><td>Species</td><td>2016</td><td>2017</td><td>2018</td><td>2019</td><td>Total</td></tr><tr><td>Harbour seal</td><td>0</td><td>0</td><td>3</td><td>1</td><td>4</td></tr><tr><td>Unidentified dolphin</td><td>0</td><td>0</td><td>1</td><td>0</td><td>1</td></tr><tr><td>Total marine mammals</td><td>0</td><td>0</td><td>4</td><td>1</td><td>5</td></tr><tr><td>Northern gannet</td><td>0</td><td>0</td><td>0</td><td>3</td><td>3</td></tr><tr><td>Total seabirds</td><td>0</td><td>0</td><td>0</td><td>3</td><td>3</td></tr></table> All in all, it is expected that the new App will facilitate more precise data collection from the (small boat) fleet. Further progress will be measured at each subsequent surveillance.
Assessment Team Determination on Year-2 Corrective Evidence	**The Assessment Team has determined that the information supplied is sufficient to meet the original CAP deliverable for year 2. The non-conformance remains open and on track towards appropriate closure.** **The 2nd surveillance activities will review evidence that the corrective actions highlighted above have been carried out.**
Year 3 progress (2nd Surveillance, late 2021)	As of November 2021, the App continues to be used in the small vessel sector and catch and bycatch data is being collected by Fiskistofa and the MFRI for management purposes. MFRI staff reported that data from the App is in the process of being made available to the MFRI through MFRI/Firskistofa IT staff collaboration, although timelines for completion are unclear as of November 2021. Fiskistofa has also reported as part of this 2nd surveillance audit that since the beginning of the App's implementation it has been mandatory to register all catch and bycatch according to regulation 298/2020 and the data is being received by the authorities. Their inspectors have been busy training fishermen and captains at the quaysides during landing, and their helpline was quite busy in the beginning of the coastal fleet season. Also, one physical meeting was held in Akranes with coastal fishermen.

	A tutorial video on the use of the App was also published on the Fiskistofa website https://www.fiskistofa.is/ymsaruppl/tilkynningar/afladagbokarapp-myndband and on the Fiskistofa Facebook site[166]. Furthermore, a traceability component to the App has been implemented in April 2021 which is been used to further help with the detection of discrepancies in catch records and to allow better traceability across the supply chain. This traceability component is currently subject to further development.
Assessment Team Determination on Year-3 Corrective Evidence	**The Assessment Team has determined that the information supplied is sufficient to meet the original CAP deliverable for year 3. The non-conformance remains open and on track towards appropriate closure.** **The 3rd surveillance activities will review evidence of continuous implementation of the App in the small vessel sector.**
Year 4 progress (3rd Surveillance, late 2022)	**2022 Updates.** The App is no longer operated/managed by Fiskistofa. The companies Aflarinn, Trackwell and Fontos are now operating the small vessels App. Fiskistofa noted during the October 2022 on site meeting that this data is being sent to the MFRI. However, the MFRI stated that although work is ongoing to getting access to that data stream, staff in charge of bycatch analysis (e.g. Dr Guðjón Már Sigurðsson) do not yet have access to the data from the App. All in all, since implementation of the App it is not clear if bycatch information a) is being collected in the fleet and b) received by the relevant science authorities in charge of data analysis.
Assessment Team Determination on Year-4 Corrective Evidence	**Status in late 2022. Progress is deemed to be behind schedule and a revised corrective action has been requested from the Client.**

8.1.1 New non-conformances

Not applicable. No new non-conformances have been identified.

8.1.2 New or revised corrective action plans

As detailed in the section above a revised Corrective Action Plan was requested by the Assessment Team to close the identified issue/s (and resulting non-conformance progress behind target) within a reasonable timeline. The client requested an extension to rectify this based on Covid 19 delays in the past two years, which the IRF Scheme Owner approved. Accordingly, GTC granted until the Client Review stage of the upcoming Re-Assessment period for the Client to close the non-conformance/s at hand. The extension allowed one extra year from the originally planned closure timeline (supposed to be end at the 4th surveillance audit in late 2023, now one year later in late 2024).

[166] https://www.facebook.com/Fiskistofa-1151844504903713/videos/304666984614930/

Revised corrective action plan (CAP) provided on the 14th February 2023 by the Client Group

Icelandic Commercial Fishery

IRF Client Action Plan

Reference is made to *IRF. Icelandic Cod Commercial Fishery. 2nd Surveillance Assessment Report* by Global Trust, where it is stated that two minor non-conformances are still open.

NC #1: Clause 2.3.2.4 (applies to all 7 fisheries). Although required by legislation, there is evidence of extensive non-reporting/under-reporting of seabirds and marine mammals bycatch such that the Assessment Team cannot be confident that catch amounts by species and fishing area (of marine mammals and seabirds) are estimated and continually recorded in fishing logbooks.

ACTION

By the 4th surveillance audit (expected October 2023), the client has:

a) Produced and distributed material to all members of Fisheries Iceland on the regulation and the obligation of reporting of seabirds and marine mammals bycatch. This will reach skippers using all types of gears.
b) Follow-up with a meeting especially with skippers using nets and lines.

Part of this is a cooperation with the Directorate of Fisheries which will start work on improving registration in logbooks, see letter from the CEO of the Directorate of Fisheries.

By the final auditable stage (expected October 2024), Marine and Freshwater Research Institute in Iceland will publish a report on bycatch of seabirds and marine mammals, see letter from the CEO of the MFRI.

NC #2: Clause 3.1.1. (applies to cod, haddock and saithe fishery). There is insufficient evidence that adverse impacts of the (cod, haddock and saithe) fisheries on the following ecosystem components: 1)

Spotted wolffish, and; 2) Common loon are being considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.

1) *Spotted wolffish:*

The client can confirm that Trackwell has updated the electronic logbooks and from now on instead of released spotted wolffish being registered in "comment" in logbooks, which is both unpractical for the skipper to register and makes it difficult for MRI to collect the data on released spotted wolffish from the logbookdatabase, there is now in the new and updated version of the logbook, a form for released species in which the skipper can register species and quantity as he does with catch. This logbook is now being installed in vessels.

ACTION

By the 4th surveillance audit (expected October 2023), the client has:

a) Follow up the updated logbook by urging vessel owners to install the new and updated version.
b) Contacted and set up a meeting with the industry to inform on the importance of releasing live spotted wolffish.

2) *Common loon*

By the 4th surveillance audit (expected October 2023), the client has:

a) Produced and distributed material to all members of Fisheries Iceland on the regulation and the obligation of reporting of seabirds and marine mammals bycatch. This will reach skippers using all types of gears.
b) Follow-up with a meeting especially with skippers using nets and lines.

Part of this is a cooperation with the Directorate of Fisheries which will start work on improving registration in logbooks, see letter from the CEO of the Directorate of Fisheries.

By the final auditable stage (expected October 2024), Marine and Freshwater Research Institute in Iceland will publish a report on bycatch of seabirds and marine mammals, see letter from the CEO of the MFRI.

Reykjavík, February 16th 2023

On behalf of Fisheries Iceland,

Hrefna Karlsdóttir

Support letters from MFRI and Fiskistofa

MARINE & FRESHWATER
RESEARCH INSTITUTE

To whom it may concern

Date: 15.02.2023
Ref:V2023-02-0106

The Directorate of Fisheries in Iceland received a grant from the Ministry of Food, Agriculture and Fisheries in February 2023 to strengthen monitoring of discards in Icelandic Waters and improving reporting in log-books.

The Marine and Freshwater Research Institute (MFRI) in Iceland is depending on reliable log-books and MFRI has had full access to these data for decades, for scientific purposes. MFRI is cooperating with the Directorate in the above mentioned project where the task of the institute is to evaluate if the level of reporting is sufficient for bycatch species, including seabirds and marine mammals.

It is expected that the outcome of the project will be published in October 2024.

On behalf of the Marine and Freshwater Research Institute,

Þorsteinn Sigurðsson
Director

HAFRANNSÓKNASTOFNUN
Rannsókna- og ráðgjafarstofnun hafs og vatna
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DIRECTORATE OF FISHERIES

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fiskistofa.is

Akureyri 15 February 2023

To whom it may concern

Keeping an electronic catch logbook has been mandatory for all fishing vessels in Iceland since 2020. The Directorate of Fisheries has discovered inaccurate registration in logbooks in some cases, and we aim to improve accuracy of registration in the logbooks. That will be done with improved automatic electronic validation of information on registered catch in the logbooks.

The Directorate of Fisheries received a grant from the Ministry of Food, Agriculture, and Fisheries in February 2023 to strengthen monitoring of discards in Icelandic waters. The focus of that project will be on electronic monitoring and comparison of data. The method used will be comparing data from vessels fishing in the same fishing grounds with and without on-board inspectors to analyse conspicuous differences in registration of catch and bycatch including seabirds and mammals. This methodology, known as case control, consists of a structured comparison of cases where an inspector is present with comparable control cases where inspection did not take place. One aspect of that project is to improve the accuracy of registrations in the catch logbooks that are important for data analysis.

Drones were introduced in the Directorate's surveillance effort in 2021. They have proved to be very effective in identifying discards. The drones are also effective in monitoring discards of birds and mammals and will be used to improve monitoring of the accuracy of catch registration in the logbooks.

Furthermore, the Directorate of Fisheries is now working on streamlining legal procedures regarding violations of logbook registration to better support correct registration. Another part of improving the registration is to put increased emphasis on information sharing and guidance for skippers on the Directorate of Fisheries webpage.

Ögmundur Knútsson PhD
CEO Directorate of Fisheries

Assessment Team determination on the revised CAP

The assessment team has reviewed the provided corrective action plan and support letters from the MFRI and Fiskistofa and is satisfied that implementation of the actions highlighted in those documents would address the non-conforming areas by late 2024, when the non-conformance/s are due to be closed.

8.1.3 Update on Recommendations

Assessment Teams may make Recommendations in areas where conformity to the RFM Standard could be improved. While Recommendations do not require Corrective Action Plans, the issues highlighted in these recommendations may be reviewed at surveillance audits.

Recommendation 1 (of 4)	
Clause:	1.1.9.2
Recommendation:	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).
Rationale:	A safety rule should be added to the FMP.
Progress against Recommendation:	The assessment team is not aware of any such progress. The next assessment benchmark is planned for 2023.

Recommendation 2 (of 4)	
Clause:	1.5.4
Recommendation:	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 between Iceland and Greenland, or equivalent, and *evaluated* through simulations as part of the next golden redfish benchmark evaluation.
Rationale:	Due to flexibility measures and catches by other countries the TAC is regularly exceeded
Progress against Recommendation:	The assessment team is not aware of any such progress.

Recommendation 3 (of 4)	
Clause:	1.5.8
Recommendation:	The Assessment Team recommends that the issue of yearly TAC overshooting (due to flexibility measures and other allowances in Iceland) is formally addressed at, and accounted for at the next management plan revision, and that the harvest control rule is evaluated through simulation by addressing the implementation bias (resulting in TAC overshooting) in the order of magnitude experienced in recent years.
Rationale:	Due to flexibility measures and catches by other countries the TAC is regularly exceeded
Progress against Recommendation:	The assessment team is not aware of any such progress. The next assessment benchmark is planned for 2023.

Recommendation 4 (of 4)	
Clause:	3.1.1 and 3.1.2
Recommendation:	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).

Recommendation 4 (of 4)	
	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[167]) and sea-pen fields[168]. 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.
Rationale:	These VMEs are not formally protected.
Progress against Recommendation:	The Ministry of Industry and Innovation has begun work on formulating a protection policy for vulnerable bottom ecosystems (or vulnerable marine ecosystems) within the Icelandic economic zone to shape procedures for the protection of fragile benthic ecosystems based on international standards criteria that Iceland is signatory to. The closures that MFRI proposed are being processed at present time (October 2022) by the Ministry of Fisheries. The closures include Hydrothermal vents, Sponge Aggregations mixed with Cauliflower coral ground and Sponge Aggregations on underwater mountains.

[167] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Ecosystem_overview-Icelandic_Waters_ecoregion.pdf
[168] https://novasarc.hafogvatn.is/project/

9 Recommendations for continued certification

9.1 Certification Recommendation

Following this surveillance audit, the Assessment Team recommends that the fishery be awarded continuing certified against the IRF Responsible Fisheries Management Standard Revision 2.0.

9.2 Certification Committee Determination

The involvement of a Certification's Certification Committee is only required where one or more new non-conformances are raised during a Surveillance Audit.

As no new non-conformances were raised during this Surveillance Audit, the involvement of a Global Trust's Certification Committee is not required; therefore, the above recommendation of the assessment team constitutes a Determination.

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11 Appendices

11.1 Appendix 1 – Assessment Team Bios

11.1.1 Assessment Team Bios

Based on the technical expertise required to carry out this assessment, an Assessment Team was selected as follows.

Vito Romito, Lead Assessor

Vito has 10 years of expertise in fisheries certification and is an ISO14001 Certified Lead Auditor and MSC FCR v.2.0 and FCP v.2.1 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 worked for a year in Tanzania, carrying out comparative biodiversity assessments of pristine and dynamited coral reef 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 fishery assessments in Alaska, Iceland and Louisiana. Vito has also carried out several 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 assessments involving 40+ different species including salmonid, groundfish, pelagic, flatfish, crustacean and cephalopod species in Europe, North and South America, and SE Asia. For three years, as a senior fisheries consultant and then manager with RS Standards Ltd., he was involved in the development and testing of a Data Deficient Fisheries framework and v.2.0 fisheries standard for the ASMI Alaska RFM Scheme, and IFFO RS Improver/FIP projects related to South East Asia multispecies bottom trawl fisheries. Vito re-joined the SAI Global Fisheries Team in 2018 and has since been involved in MSC and RFM fisheries assessments in Canada, New England, Iceland, Alaska and Louisiana, the Baltic Sea, Ireland and Italy.

Dankert Skagen, Assessor

Dankert retired from the Institute of Marine Research (IMR), Bergen in 2010, 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 more 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 has 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. Dankert has been involved with sustainability assessment of Icelandic fisheries for 10 years.