

Iceland Responsible Fisheries Foundation (IRFF)

Iceland Responsible Fisheries Certification Programme



Icelandic Golden Redfish Commercial Fishery

2nd 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 2
Report Code:	ICE/RED/002.2/2021
Report Date:	21 December 2021

Global Trust Certification
Quayside Business Park,
Mill Street, Dundalk,
Co. Louth, Ireland.
T: + 353 42 932 0912
E: ClientServicesie@nsf.org

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

Foreword.....	2
1 Contents	3
1.1 List of Figures	5
1.2 List of Tables.....	6
2 Glossary	8
3 Executive Summary	9
3.1 Assessment Team Details	9
3.2 Details of applicable IRF Documents.....	9
4 Fishery Applicant Details	10
5 Units of Certification.....	11
6 Assessment Process	11
6.1 Surveillance Meetings	11
7 Summary Findings	17
7.1 Relevant changes to Legislation/Regulations and the Management Regime	17
7.2 Stock status update	22
7.3 Landings update	27
7.4 Enforcement and Compliance update.....	31
7.4.1 Enforcement by Fiskistofa	35
7.4.2 Enforcement by the Icelandic Coast Guard.....	37
7.5 Bycatch, habitat and ecosystem update	40
Associated species catch and bycatch to the fishery	40
Endangered, Threatened and Protected (ETP) and vulnerable species interactions	52
7.5.1.1 Habitat.....	56
7.5.1.2 Foodweb considerations	62
7.6 Update on consistency to the fundamental clauses of the RFM Fishery Standard	64
Section 1. Fisheries Management	64
7.6.1 Clause 1.1 Fisheries Management System and Plan for Stock Assessment, Research, Advice and Harvest Controls	64
7.6.2 Clause 1.2 Research and Assessment	64
7.6.3 Clause 1.3 Stock under Consideration, Harvesting Policy and the Precautionary Approach	66
7.6.4 Clause 1.4 External Scientific Review	67
7.6.5 Clause 1.5 Advice and Decisions on TAC	67
Section 2. Compliance and Monitoring	69
7.6.6 Clause 2.1 Implementation, Compliance, Monitoring, Surveillance and Control	69
7.6.7 Clause 2.2 Concordance between actual Catch and allowable Catch	73
7.6.8 Clause 2.3 Monitoring and Control.....	75
Section 3. Ecosystem considerations.....	79
7.6.9 Clause 3.1 Guiding Principle	79
Associated species catch and bycatch to the fishery	79
Endangered, Threatened and Protected (ETP) and vulnerable species interactions	79
7.6.9.1 Foodweb considerations	84
7.6.10 Clause 3.2 Specific Criteria	85
8 Update on compliance and progress with non-conformances and agreed action plans	88
8.1.1 Closed non-conformances.....	Error! Bookmark not defined.
8.1.2 Progress against open non-conformances	Error! Bookmark not defined.
8.1.3 New non-conformances	Error! Bookmark not defined.
8.1.4 New or revised corrective action plans	Error! Bookmark not defined.
8.1.5 Update on Recommendations (DELETE IF NONE)	97
9 Recommendations for continued certification	99
9.1 Certification Recommendation.....	Error! Bookmark not defined.

9.2	Certification Committee Determination	Error! Bookmark not defined.
10	References	100
11	Appendices	106
11.1	Appendix 1 – Assessment Team Bios	107
11.1.1	Assessment Team Bios	107

1.1 List of Figures

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).	20
Figure 2. Schematic overview of closed areas for protection of juvenile <i>S. norvegicus</i> 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.....	21
Figure 3. Distribution of Golden redfish in East Greenland, Iceland and Faroese waters. (Figure 5.3 of.....	22
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.....	24
Figure 5. Trawl stations and coverage area for the German redfish survey in East Greenland.....	24
Figure 6. Historic retrospective errors for Golden redfish. Current assessment (red line) compared with previous estimates (2017–2020).....	26
Figure 7. Geographical distribution of golden redfish bottom trawl catches in ICES Division 5.a 2006–2020.....	29
Figure 8. Nominal landings of golden redfish in tonnes by ICES Subareas and Divisions 1978–2020.	30
Figure 9. TAC and landings of golden redfish.	31
Figure 10. Overall number of ICG inspection from 1988 to 2021. Source: provided by the ICG during the remote audit, November 2021.....	38
Figure 11. Air surveillance by four different Icelandic assets from 2016 to 2021. Samtals is the total. Source: provided by the ICG during the remote audit, November 2021.	38
Figure 12. Overview of ICG infringement reports in 2016–2021. Source: provided by the ICG during the remote audit, November 2021.....	39
Figure 13. Icelandic cod harvest rate and biomass.	40
Figure 14. Icelandic haddock harvest rate and biomass.	41
Figure 15. Icelandic saithe harvest rate and biomass.	41
Figure 16. Catches, and IS-SMH juvenile (≤ 30 cm) and biomass indices. Grey areas represent 95% CI. Red horizontal lines indicate average biomass indices for 2016–2018 and for 2019–2020 used in the advice calculations.	42
Figure 17. Greenland halibut harvest rate and biomass.	43
Figure 18. Ling harvest rate and biomass.....	43
Figure 19. Starry skate harvest rate and biomass.	44
Figure 20. Atlantic wolffish harvest rate and biomass.	44
Figure 21. Spotted wolffish catches, juveniles index, harvest rate and biomass.....	45
Figure 22. Greater silver smelt harvest rate and biomass.....	46
Figure 23. Plaice harvest rate and biomass.	46
Figure 24. Norway lobster harvest rate and biomass.	47
Figure 25. Lemon sole harvest rate and biomass.....	48
Figure 26. Witch harvest rate and biomass.....	48
Figure 27. Tusk harvest rate and biomass.	49
Figure 28. Anglerfish harvest rate and biomass.	49
Figure 29. Megrím. Total biomass indices (upper left) and harvestable biomass indices 40 cm) (upper, right), biomass indices of larger ind. 53 cm) (lower left) and juvenile abundance indices (≤ 20 cm) lower right from the spring survey (blue) from 1985 and autumn survey (red) from 1996, along with the standard deviation.	50

Figure 30. Catches by gear type, IS-SMB juvenile (≤ 20 cm) and biomass (≥ 40 cm) indices. Grey areas represent 95% CI. Red horizontal lines indicate average biomass indices for 2017–2019 and 2020–2021 used to calculate the advice..... 51

Figure 31. Catches in Icelandic waters by gear type and catches in Greenlandic waters, IS-SMH juvenile (≤ 40 cm) and biomass (≥ 40 cm) indices. Grey areas represent 95% CI. Red horizontal lines indicate average biomass indices for 2016–2018 and for 2019–2020 used in the advice calculations. 52

Figure 32. Leaf scale gulper shark caught in the annual autumn survey, from 1995 to 2021. 54

Figure 33. D. batis caught in the annual spring survey, from 1985 to 2021. 54

Figure 34. Dogfish caught in the annual spring survey, 1985 to 2021. 55

Figure 35. Greenland shark caught in the annual spring survey. 55

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, 2012, and 2018. 57

Figure 37. MFRI overview of seabed mapping in Icelandic waters between 2000 and 2020. Source: <https://www.hafogvatn.is/en/research/seabed-mapping>. 58

Figure 38. Benthos recorded in the autumn Icelandic autumn groundfish survey in 2020. Number (kg) per tow. 59

Figure 39. Long term closures and selected fishing distribution around Iceland between 2009-2019..... 60

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> 61

Figure 41. Bottom trawl effort in Iceland. Red areas indicate highest effort, yellow areas indicate medium effort, while blue dots indicate lower effort. Source: Atlas/GIS website managed by Fiskistofa at <http://atlas.lmi.is/mapview/?application=haf> 62

Figure 42. Golden redfish. Catches by area, recruitment, fishing mortality (ages 9-19), and spawning stock biomass (SSB)..... 65

Figure 43. Overall number of ICG inspection from 1988 to 2021. Source: provided by the ICG during the remote audit, November 2021..... 71

Figure 44. Air surveillance by four different Icelandic assets from 2016 to 2021. Samtals is the total. Source: provided by the ICG during the remote audit, November 2021. 72

Figure 45. Overview of ICG infringement reports in 2016-2021. Source: provided by the ICG during the remote audit, November 2021..... 72

Figure 46. 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, 2012, and 2018. 82

Figure 47. Benthos recorded in the autumn Icelandic autumn groundfish survey in 2020. Number (kg) per tow. 83

Figure 48. Long term closures and selected fishing distribution around Iceland between 2009-2019..... 84

1.2 List of Tables

Table 1. Relevant GULF RFM program documents including applicable versions.9

Table 2. Applicant details. 10

Table 3. Unit of Certification (UoC). 11

Table 4. Summary of assessment meetings, 1st week of November 2021..... 11

Table 5. Short term closures in Iceland for the years 2018-2021. 34

Table 6. Directorate inspector days on fishing vessels (Source: Directorate of Fisheries, November 2021 remote audit). 34

Table 7. Fiskistofa suspected violations in 2020. Source: Fiskistofa 2020 Annual Report. 35

Table 8. Fiskistofa penalties and follow up for suspected violations in 2020. Source: Fiskistofa 2020 Annual Report.	36
Table 9. Status of bycatch and associated species in the golden redfish target and non-target fisheries.	40
Table 10. Golden redfish reference points.	66
Table 11. Short term closures in Iceland for the years 2018-2021.	70
Table 12. TACs and actual catches, according to MFRI (source: MFRI, 2021 advice).	74

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 international agreements to which the Icelandic authorities are party. Binding international agreements as applicable in Icelandic jurisdiction.

3 Executive Summary

This 2nd IRF surveillance audit was conducted in late 2021 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 the previous surveillance audit for this fishery. The site visits for the current surveillance were held remotely, due to Covid-19 travel restrictions. Video calls with the Client, industry, management, science and enforcement representatives were held on the 1st week of November 2021, to gather information on the fisheries under assessment, in addition to the desktop review part of the audit, and to discuss progress relative to any open non-conformances. 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 is deemed to be on track. No new non-conformance has been identified during the 2nd surveillance activities. The Assessment Team recommends for the existing certification to be maintained.

3.1 Assessment Team Details

Vito Romito, Lead Assessor

NSF International/Global Trust Certification Ltd.
 Quayside Business Centre,
 Dundalk, Co. Louth,
 Ireland.
 T: +353 (0)42 9320912
 E-mail: vromito@nsf.org

Dankert Skagen, MD, Assessor

Fisheries Science Consultant
 Fjellveien 96, 5019 Bergen,
 Norway
 Website: www.dwsk.net

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 Reykjavík
	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:	<i>Sebastes norvegicus</i>
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)

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 remote site visit meetings held on the 1st week of November 2021 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, 1st week of November 2021.

Meeting Date and Location	Personnel	Areas of discussion/agenda points
Date: 01 st of November 2021	The Client (opening meeting): Kristján Þórarinnsson, Fisheries Iceland;	<ul style="list-style-type: none"> ▪ Brief review or key highlights of the 2020/2021 fishing season for cod, haddock, saithe, golden redfish, ling, tusk and ISS herring. Any key issues or updates from an industry perspective? ▪ Issues with/changes resulting from Covid pandemic?

<p>Location: Remote, Video Call</p>	<p>Finnur Gardarsson, IRF Foundation.</p> <p>GT Assessment Team: Vito Romito Dankert Skagen</p>	<ul style="list-style-type: none"> ▪ Any significant changes in the management system, key laws or regulations in the past 12 months? ▪ Cod 2021 benchmark / SSB downward and F upward revision. ▪ Any updates from the day to day operations of the large and small fleet sectors? ▪ Plans for revisiting/updating Fishery Management Plans? ▪ Non-Conforming Areas and Corrective Actions ▪ Corrective Action relating to Non-Conformance 1: <i>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.</i> Regarding NC 1, what are the updates, new information or developments addressing the issue? ▪ Corrective Action relating to Non-Conformance 2: <i>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.</i> ▪ Regarding NC 2, what are the key developments regarding a) spotted wolffish (e.g. relating to research activities and/or live releases in the fishery)? In the last audit a potential recovery plan was discussed, as well as age reading and survival experiments in Icelandic waters. What are the updates? Has spotted wolffish been released in the past season? Catches in 2020/2021 were 1,300 t against a TAC of 314 t. Can we confirm if the excess catch (over the TAC) has been released alive and where is that recorded (the Fiskistofa website only reports total catch https://www.fiskistofa.is/veidar/aflaupplysingar/afliallartegundir/) ▪ As for b) the common loon element, what are the updates for the species? Is there any new data on this species abundance or bycatch in gillnet and longline gear? ▪ Any recent updates relating to the smartphone app deployed to facilitate recording of marine mammal and seabirds' bycatch in smaller vessels? Any thoughts on this system? Feedback from the small vessel sector about implementation? Is it helping collect bycatch information? ▪ 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? Updates? ▪ 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?
<p>Date: 2nd November 2021</p> <p>Location: Remote, Video call</p>	<p>Icelandic Coast Guard: Björgólfur H. Ingason, Chief controller, Icelandic Coast Guard; Asgrimur L. Asgrimsson, Chief of Operations, Icelandic Coast Guard.</p> <p>GT Assessment Team: Vito Romito Dankert Skagen</p>	<ul style="list-style-type: none"> ▪ 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? ▪ Has the level of resources and monitoring effort remained similar/changed in past 1-2 years? ▪ Have there been changes over the 2020/2021 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

		<p>under assessment)? Foreign vessels boarded? <i>Could you please provide us with tables/figures for this information as done in past years?</i></p> <ul style="list-style-type: none"> ▪ How many prosecutions and reprimands made against skippers did these activities (overall enforcement activities) result in? <i>Could you please provide us with tables/figures for this information as done in past years?</i> ▪ Are there many violations of fishermen fishing over their TAC? ▪ 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? ▪ Spotted wolffish can now be released after capture as per new 2020 regulation. Are fishermen reporting released vs retained spotted wolffish separately in the logbooks? ▪ Have there been any major changes in overall violation/compliance rate in the past 2-3 years? ▪ What is checked when vessels are boarded (gear specs, catch composition, logbook vs actual catches, other)? ▪ 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 2-3 years? ▪
<p>Date: 2nd November 2021</p> <p>Location: Remote, Video call</p>	<p>Directorate of Fisheries/Fiskistofa: Erna Jónsdóttir, Head of Administration Division, Fiskistofa; Sævar Guðmundsson, Head of Department, Fiskistofa.</p> <p>GT Assessment Team: Vito Romito Dankert Skagen</p>	<ul style="list-style-type: none"> ▪ Brief review or key highlights of the 2020/2021 fishing season for cod, haddock, saithe, golden redfish, ling, tusk and ISS herring. Any key issues or updates from a Fiskistofa perspective? Covid related changes? ▪ Any significant changes in the management system, key laws or regulations in the past 12 months? ▪ Any changes or updates of mention within Fiskistofa (e.g. staff) in the past 12 months? ▪ Any new or updated closed areas of mention (e.g. trawl or coral closures) within the Icelandic EEZ in the past 12-18 months? ▪ Has there been revisions in legislation and regulations? There was a mention previously that a revision process was ongoing. Is there any changes beyond editorial? Is there a good overview of changes? ▪ What rules are still in place for fishing outside the ordinary ITQ system (Hook and line, Byggðakvóti etc.) Status and essence of rules. ▪ Short term closures after re-organisation. How is it organised in practice, and how does it work now (number of closures by cause). How are they published? ▪ Redfish: Any plans for revision or renewal of the agreement between coastal states? ▪ Tusk: In recent years, about 30% of the catches in 5a are by foreigners. The TAC according to the HCR is allocated to Icelandic vessels. At present, total catch is close to recommended because Icelanders do not take their whole quota. Plans for a more permanent solution to this issue? ▪ Tusk: News about relation to Greenland? There was a warning in the last MFRI advice that catches from Greenland may have to be reconsidered in the assessment. ▪ Tusk: Tusk quotas spent on other species – is it possible to tell which? ▪ Haddock: There was added 8000t to the quota in 2020/21, from 45 389t to 53 389t and the plan was to subtract it next year. Apparently, 47,979 t were caught in the 2020/21 fishing year. What happens? ▪ Sampling of catches. 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.

		<ul style="list-style-type: none"> ▪ How many days have directorate inspectors spent on board of fishing vessels in the last 2 fishing seasons 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 a table for 2020-2021, 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 2020/2021 for each species in question? ▪ Monitoring of less valued species including elasmobranchs – is this something which has been started already? ▪ 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 2020/21? Are there examples of this? ▪ Non-Conforming areas and Corrective Actions ▪ <u>Corrective Action relating to Non-Conformance 1</u> (applicable to all certified fisheries): <i>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. Regarding NC 1, are there updates, new information or developments addressing the issue?</i> ▪ Any recent updates relating to the smartphone app deployed to facilitate recording of marine mammal and seabirds’ bycatch in smaller vessels? Any thoughts on this system? Feedback from fishermen? Is it helping collect bycatch information? Has the compliance of fishermen recording of such interactions improved? Do you see more reports of such non-fish species? ▪ <u>Corrective Action relating to Non-Conformance 2</u>: <i>There is insufficient evidence that adverse impacts of the cod, haddock and saithe fisheries on the following ecosystem components:</i> <ul style="list-style-type: none"> - <i>Spotted wolffish, and;</i> - <i>Common loon</i> <p style="margin-left: 40px;"><i>are being considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.</i></p> <p style="margin-left: 40px;">Regarding Spotted wolffish: Has spotted wolffish been released in the past season? Catches in 2020/2021 were 1,300 t against a TAC of 314 t. Can we confirm if the excess catch (over the TAC) has been released alive and where is that recorded (the Fiskistofa website only reports total catch but we don’t see releases</p> <p style="margin-left: 40px;">https://www.fiskistofa.is/veidar/aflaupplysingar/afliallartegundir/</p>
--	--	---

		<ul style="list-style-type: none"> ▪ 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? ▪ Collaboration between the Coast Guard and Fiskistofa relating to fisheries monitoring and enforcement activities. Updates for the past 12-18 months? ▪ 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? Updates? ▪ Any other changes or updates of mention for the 7 fisheries in question that may relate to day to day operations and monitoring activities, from a Fiskistofa perspective that we should discuss? ▪ AOB
<p>Date: 04th November 2021</p> <p>Location: Remote, Video call</p>	<p>Marine and Freshwater Research Institute (MFRI):</p> <p>Gudmundur Thordarson, Head of Demersal Division, MFRI;</p> <p>Bjarki Elvarsson, Senior Scientist, MFRI.</p> <p>GT Assessment Team: Vito Romito Dankert Skagen</p>	<ul style="list-style-type: none"> ▪ Cod 2021 benchmark / SSB downward and F upward revision. ▪ Cod: News about stock diversity and metapopulation ideas? ▪ Cod: Revision of assessment method etc. Points you want to highlight? More revisions to come? ▪ Cod: Is the catch stabilizer still used if SSB < SSBtrigger? According to the evaluation report (WKICECOD) it is not, but in all official statements it always applies. ▪ Benchmarks and revisions of management plans. What are the plans now 'after' the pandemic? Herring and redfish in particular. ▪ Tusk: Retro problem – further understanding? ▪ Ling. The historical retro in both the ICES and MFRI advise shows a quite large downward adjustment of biomass and upwards revision of mortality. The analytic retro looks much nicer. How come? ▪ Saithe: Why has the fishing area shifted (SW - NW)? - Fleet behavior or stock change? ▪ Herring: How confident are you that there is a strong year class coming in? ▪ Herring: Have you sufficient understanding of the retro-problems in the past to be able to take action if that becomes a problem again. ▪ Redfish: Recruitment failure – thoughts about why? ▪ Discards – new studies? Plans for alternative approaches?? ▪ Transfer of quotas between years and between species: Are there thoughts about how to balance practicality with precautionary approach? Better ways to protect vulnerable species? Plans to amend the rules? ▪ Non Conformances (NCs): 2 NCs were identified in previous IRF Full Assessments or carried over from the 4th Surveillance cycle in 2018. ▪ Non Conformance 1: <i>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.</i> ▪ Regarding NC 1, what are the updates and developments addressing the issue for 2021? ▪ Any recent updates relating to the smartphone app deployed to facilitate recording of marine mammal and seabirds' bycatch in smaller vessels? Any thoughts on this system? Feedback from fishermen? Is it helping collect bycatch information? ▪ Non Conformance 2: <i>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.</i> ▪ Regarding NC 2, what are the key developments regarding spotted wolffish (e.g. relating to research activities and/or live releases in the fishery)? In the last audit a potential

		<p>recovery plan was discussed, as well as age reading and survival experiments in Icelandic waters. What are the updates? Has spotted wolffish been released in the past season? Catches in 2020/2021 were 1,300 t against a TAC of 314 t. Can we confirm if the excess catch (over the TAC) has been released alive and where is there a record of it (the Fiskistofa website only reports total catch https://www.fiskistofa.is/veidar/aflaupplysingar/afliallartegundir/)?</p> <ul style="list-style-type: none"> ▪ Furthermore, are there any updates relating to common loon in terms of population research or bycatch information? ▪ Recent known interactions between the fisheries under assessment and the following: basking sharks and leafscale gulper sharks? ▪ Can the assessment team be provided with total catch in numbers of Grey skate (<i>Dipturus flossada / batis</i>) for the latest available MFRI survey? Any additional updates on the state of this endangered species / complex? ▪ What survey abundance or status updates can be provided regarding vulnerable/ETP species: 1) dogfish, 2) Greenland shark and 3) porbeagle shark? ▪ Have there been any recent interactions 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? ▪ Do you have updated bycatch information in Icelandic fisheries (e.g. cod gillnets, lumpfish nets, other gear) of harbour porpoise, harbour seals, grey seals, harp, ringed, hooded and bearded seals for 2020-2021? (we already have data you provided at the previous audit for 2016-2019) ▪ Do you have updated bycatch information in Icelandic fisheries (e.g. cod gillnets, lumpfish nets, longliners, purse seiners) relating to seabird bycatch for 2020-2021? (we already have data you provided at the previous audit 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)? ▪ Coral areas. Any research updates or new closures (proposed or implemented) in the past 12-18 months? ▪ Bycatch of deep water sponges are recorded during bi-annual groundfish surveys allowing managers to estimate the distribution of mass sponge occurrences. Any research updates? Any updates on management measures specific to conservation of sponge communities? ▪ Hydrothermal vents. Any research updates or new closures in the past 12-18 months? ▪ Mapping the distribution of benthic assemblages and habitats which are considered to be sensitive to trawling disturbances. Such information was deemed important in order to predict which species and habitats are at risk of being damaged by fishing activities and for the protection of important marine habitats in the future. Since the publication of the Vulnerable Marine Ecosystem NovasArc report in 2019 have there been additional research activities or plans to reflect and address the findings of the report? ▪ Any new studies, papers or reports on the Icelandic marine ecosystem's structure or foodweb dynamics?
<p>Date: 05th of November 2021</p> <p>Location: Remote, Video Call</p>	<p>The Client (closing meeting): Kristján Þórarinnsson, Fisheries Iceland; Finnur Gardarsson, IRF Foundation.</p> <p>GT Assessment Team: Vito Romito Dankert Skagen</p>	<ul style="list-style-type: none"> ▪ 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 system¹ covering all commercial species, including golden redfish². There is a principal Act (*last amendment No 116/2006*)³ and a number of supporting Acts and Regulations for the management of the fishery.⁴ 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 the Ministry of Industries and Innovation which has ultimate responsibility. The Ministry of Industries and Innovation⁵ 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)⁶, 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 Guard⁷ 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)⁸ 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 record⁹.

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

1 <http://www.fiskistofa.is/english/fisheries-management/>

2 <https://www.government.is/topics/business-and-industry/fisheries-in-iceland/>
[and](#)

<https://www.government.is/topics/business-and-industry/fisheries-in-iceland/fisheries-management/>

3 <https://www.althingi.is/lagas/nuna/2006116.html>

4 <https://simplebooklet.com/stjrnfiskveia20212022lgogreglugerir>

5 <http://eng.atvinnuvegaraduneyti.is/>

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

7 <http://www.lhg.is/english>

8 <https://www.hafogvatn.is>

9 <https://www.hafogvatn.is/is/midlun/utgafa/ritaskra>

Exploration of the Sea) by the ICES North-Western Working Group (NWWG), according to standards approved by ICES in regular benchmark assessments¹⁰. 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, with a general objective stated as: *The management strategy for Icelandic fish stocks, in general, is to maintain the exploitation rate at the level which is consistent with the Precautionary Approach and that generates maximum sustainable yield (MSY) in the long term.*¹¹ When harvest rules have been established in a management plan, as for golden redfish, the Ministry recognizes an obligation to set the TAC accordingly. The current management plan for golden redfish was examined and approved by ICES in 2014.¹² The plan is publicly available¹³. The revision led to changes in some reference points, but not in the rule itself.

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)¹⁴. 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, 2016¹⁵. A recent study of the transfer system in Iceland¹⁶ 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*

10 https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/WKREDMP/wkredmp_2014.pdf

11 <https://www.government.is/topics/business-and-industry/fisheries-in-iceland/>

12 https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/Special%20Requests/Iceland_Faroe_Islands_Greenland_Evaluation_of_Itmq_for_golden_redfish.pdf

13 <https://www.government.is/topics/business-and-industry/fisheries-in-iceland/>

14 <https://www.althingi.is/lagas/nuna/2006116.html>

15 <https://www.sciencedirect.com/science/article/pii/S0308597X16302238>

16 Oostdijk & al: www.pnas.org/cgi/doi/10.1073/pnas.2008001117

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 weighers¹⁷. 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 Strandveidar¹⁸, Bygdakvoti¹⁹), mostly to support local communities and small scale fisheries.

Logbooks are compulsory, and recently, only electronic logbooks (or mobile phone apps) are accepted²⁰. The fishing year in Iceland runs from 1st September - 31st August.

Protective measures

These include area closures (temporary and permanent) and 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 2019²¹. 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)²².

17 <https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/20213>

18 <https://www.fiskistofa.is/fiskveidistjorn/umfiskveidistjornunarkerfid/strandveidar/>

19 <https://www.fiskistofa.is/veidar/aflaheimildir/bygdakvoti/>

20 <https://www.fiskistofa.is/fiskveidistjorn/afladagbaekur/>

21 <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>

22 <http://atlas.lmi.is/mapview/?application=haf>

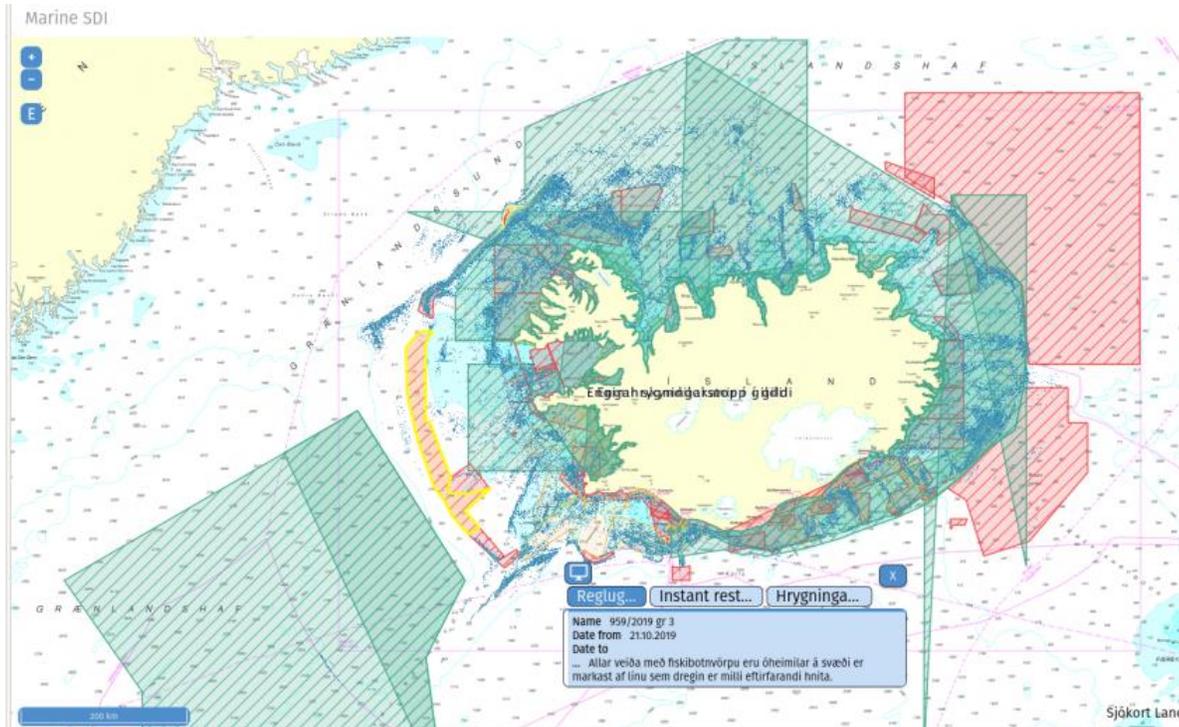


Figure 1. Screenshot of an example of the map in Hafsjá. The coloured fields are various closures. One (with yellow outline in the West) has been marked, and the label at the bottom gives details of that regulation. The small dots are location of catches (all gears in this example).

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.

There are mesh size regulations in place to protect juveniles; the standard mesh size in trawl is 135 mm²³. 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.²⁴ 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 redfish²⁵.

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

23 Mesh size regulations: <https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/4032>

24 <https://www.althingi.is/lagas/nuna/1996057.html>

25 <https://www.hafogvatn.is/static/research/files/fjolrit-142.pdf>

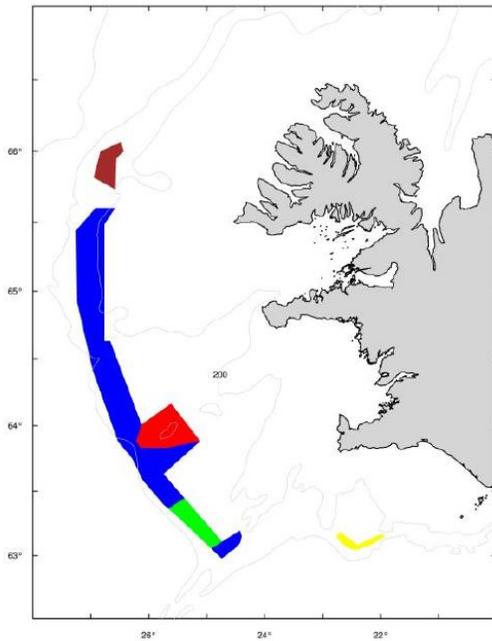


Figure 2. Schematic overview of closed areas for protection of juvenile *S. norvegicus* in Icelandic waters (ICES Division Va). These areas are either closed permanently or temporarily. The blue area is closed all year long; the red area is only open during the night or from 20:00–08:00 from October 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.²⁶

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 mm²⁷. 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.²⁸ Discards are not included in the assessment and are considered to be small. To some extent they are monitored, mostly for cod and haddock.

International relations

²⁶ https://www.ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2019/reg.27.561214_SA.pdf

²⁷ Mesh size regulations: <https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/4032>

²⁸ <https://www.althingi.is/lagas/nuna/1996057.html>

Policies incorporate a number of International Agreements and declarations ²⁹, 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](http://www.neafc.org/) (NEAFC)³⁰, [the Northwest Atlantic Fisheries Organization](http://www.nafo.int/) (NAFO)³¹, and [the North Atlantic Marine Mammal Commission](http://www.nammco.no/) (NAMMCO)³². 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 is an agreement between Iceland and Greenland, where a certain amount of the quota is set aside for Greenland. 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.

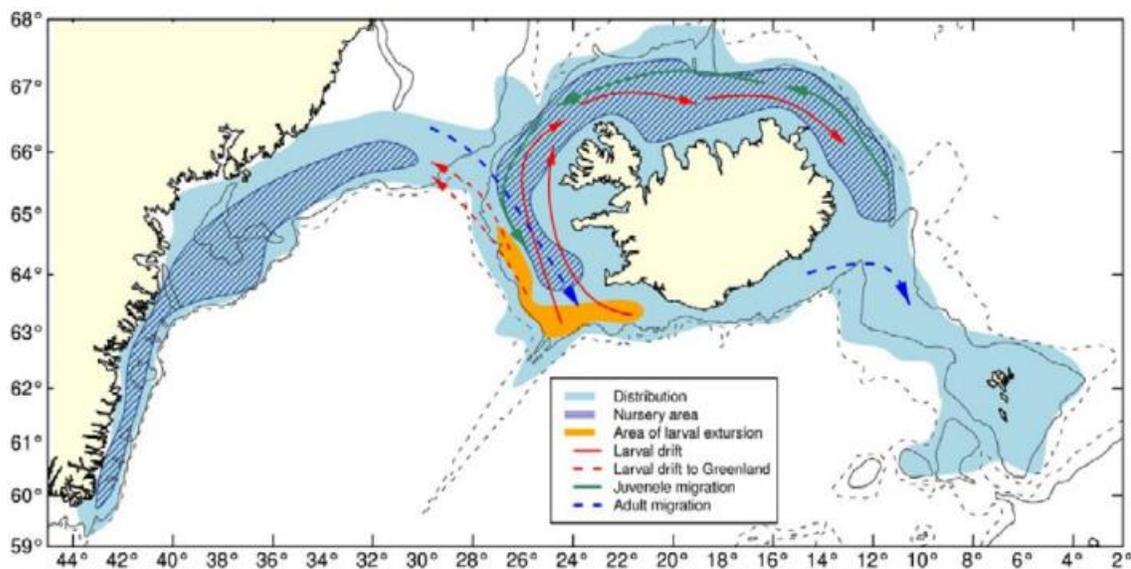


Figure 3. Distribution of Golden redfish in East Greenland, Iceland and Faroese waters. (Figure 5.3 of WKRED 2012).

29 <https://www.government.is/topics/business-and-industry/fisheries-in-iceland/international-policy/>

30 <http://www.neafc.org/>

31 <http://www.nafo.int/>

32 <http://www.nammco.no/>

Assessment method

The assessment is done with the Gadget software³³, 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 2014³⁴. 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 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)³⁵.

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 measure 116 fish.

Discards

33 <https://gadget-framework.github.io/gadget2/docs/userguide/>

34

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

35 https://www.ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2019/reg.27.561214_SA.pdf

Discards are not included in the assessment, and are considered to be negligible³⁶. In Iceland, discards are prohibited. A previous estimate of discards in Icelandic fisheries did not reveal measurable discards of golden redfish³⁷.

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.

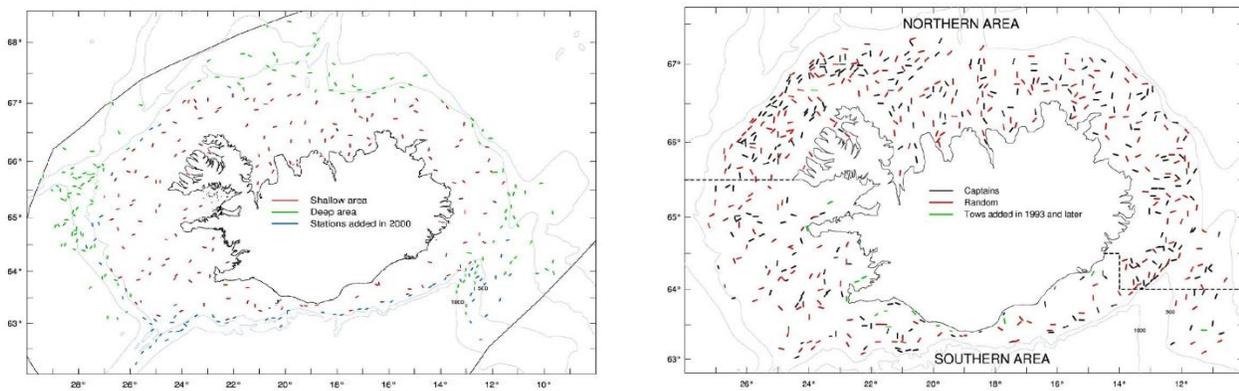


Figure 4. Trawl stations in the bottom trawl surveys. The stations are similar from year to year, with only small deviations. : Left: Spring survey. Right: Autumn survey.

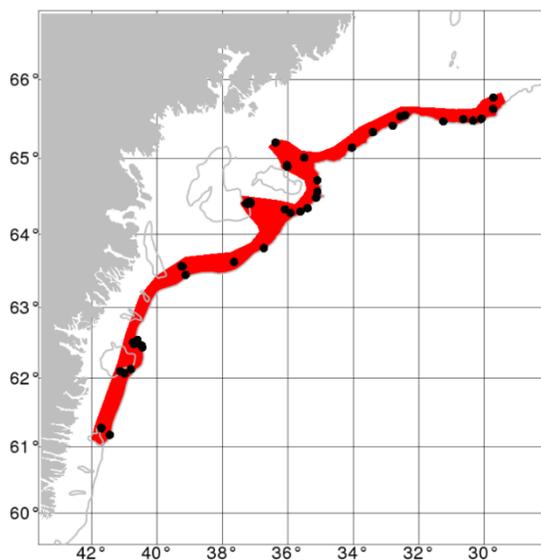


Figure 5. Trawl stations and coverage area for the German redfish survey in East Greenland.

³⁶ Communicated by MFRI at site visit 27/11-2018

³⁷ <https://www.hafogvatn.is/static/research/files/fjolrit-142.pdf>

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. In 2018 there was a downward revision of the stock estimate and corresponding upwards revision of fishing mortality, both for the most recent years and backwards in time. This appears to have been a technical problem with the method, most likely a combination of multiple optima and poor convergence.³⁸ A similar change appeared in the 2021 assessment (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)³⁹. Accordingly, the harvest rule should be robust to assessment uncertainty of the magnitude observed in 2018. Since about 2010, the stock has been above Btrigger.

However, NWWG⁴⁰ 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. 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.

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 ion 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 5.b and 14.b, mainly relevant survey and commercial samples of age and length. Biological reference points will need to be redefined depending on the assessment method, especially in relation to the Fp 0.5. A change in form of harvest control rule from an F-rule to a Harvest rate rule is planned.

Assessment results

The main results are indicated in Figure 6. 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.

38

http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%202019_Golden%20redfish%20in%20subareas%205,%206%20and%2014.pdf

39

https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/WKREDMP/wkredmp_2014.pdf; Section 4.5

40

[https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2021/NWWG_publication%20with%20multiple%20files/NWWG%202021_19%20Golden%20redfish%20\(Sebastes%20norvegicus\)%20in%20subareas%205,%206,%20and%2014.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2021/NWWG_publication%20with%20multiple%20files/NWWG%202021_19%20Golden%20redfish%20(Sebastes%20norvegicus)%20in%20subareas%205,%206,%20and%2014.pdf)

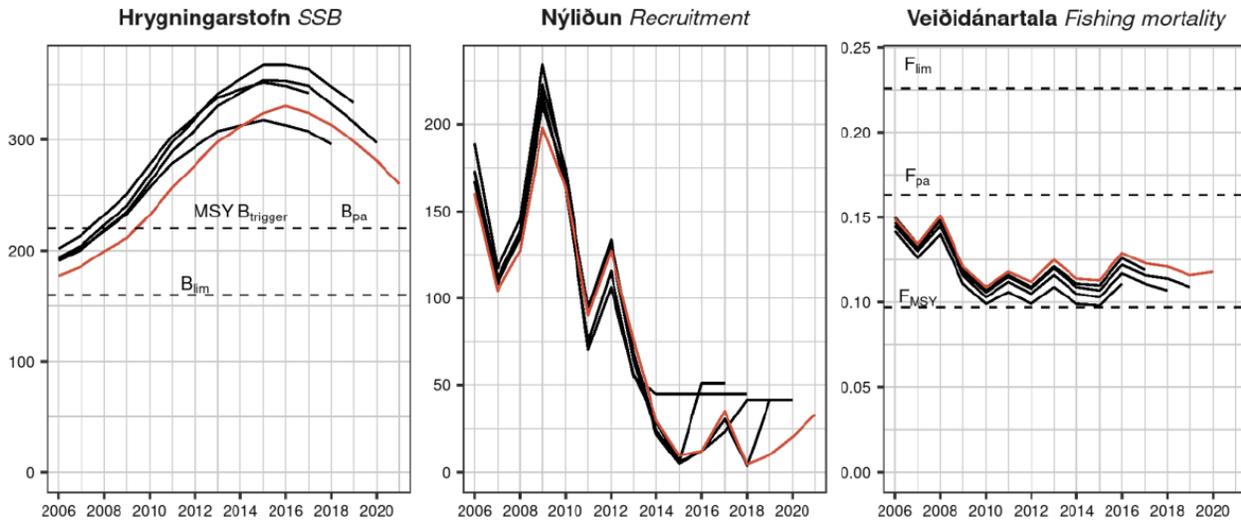


Figure 6. Historic retrospective errors for Golden redfish. Current assessment (red line) compared with previous estimates (2017–2020).

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:

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

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. B_{pa} = 220kt is derived as the 95 percentile of B_{lim} , assuming a CV of 0.2. F_{lim} is the F leading to B_{lim} in equilibrium, and F_{pa} 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 harvest rule in the plan is⁴¹:

- The annual TAC will be set consistent with the average fishing mortality rate of 0.097 in the advisory year for age-groups 9 – 19, when the spawning stock biomass (SSB) in the assessment year (SSB_y) is estimated to be above 220,000 t ($B_{trigger}$)
- When the SSB in the assessment year is estimated to be below 220,000 t ($B_{trigger}$), the TAC will be set consistent with a fishing mortality rate in the advisory year equal to $0.097 * (SSB_y / B_{trigger})$.

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.⁴² 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 weighers⁴³. 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.

Greenland

Management of redfish in Greenland waters is by the Greenland Ministry of Fisheries, Hunting and Agriculture. The catches of redfish in Greenland waters have 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. So far, the estimated catches of Golden redfish has amounted to about 1,700 t, which is 3 – 4% of the total catch. 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*.

41 <https://www.government.is/topics/business-and-industry/fisheries-in-iceland/>

42 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/WKREDMP/wkredmp_2014.pdf
; Section 4

43 <https://www.reglugerdir.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/20213>

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)⁴⁴.

Discards

Discards are not included in the assessment, and are considered to be negligible⁴⁵. In Iceland, discards are prohibited. A previous estimate of discards in Icelandic fisheries did not reveal measurable discards of golden redfish⁴⁶. 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.

44 https://www.ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2019/reg.27.561214_SA.pdf

45 Communicated by MFRI at site visit 27/11-2018

46 <https://www.hafogvatn.is/static/research/files/fjolrit-142.pdf>

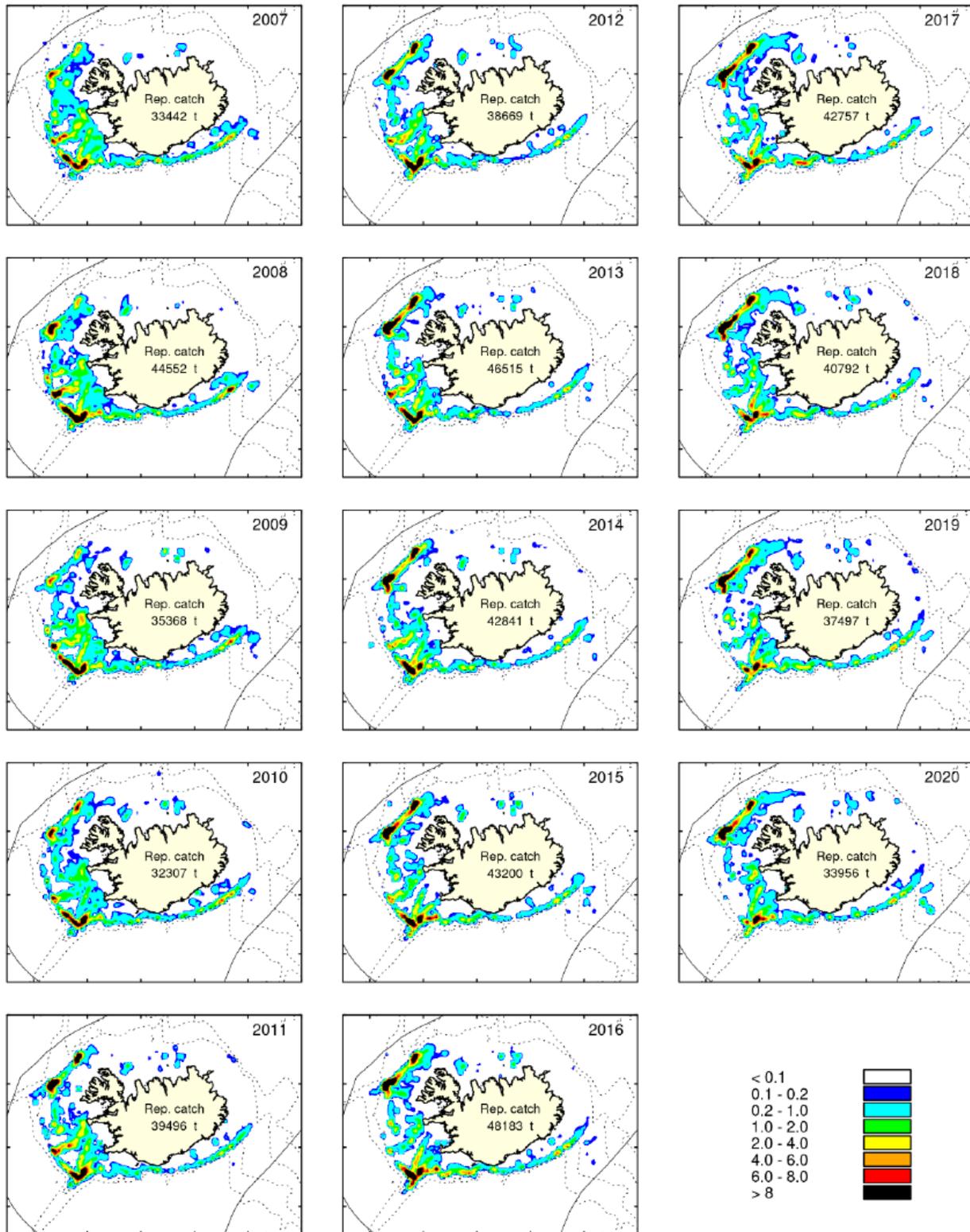


Figure 7. Geographical distribution of golden redfish bottom trawl catches in ICES Division 5.a 2006–2020.

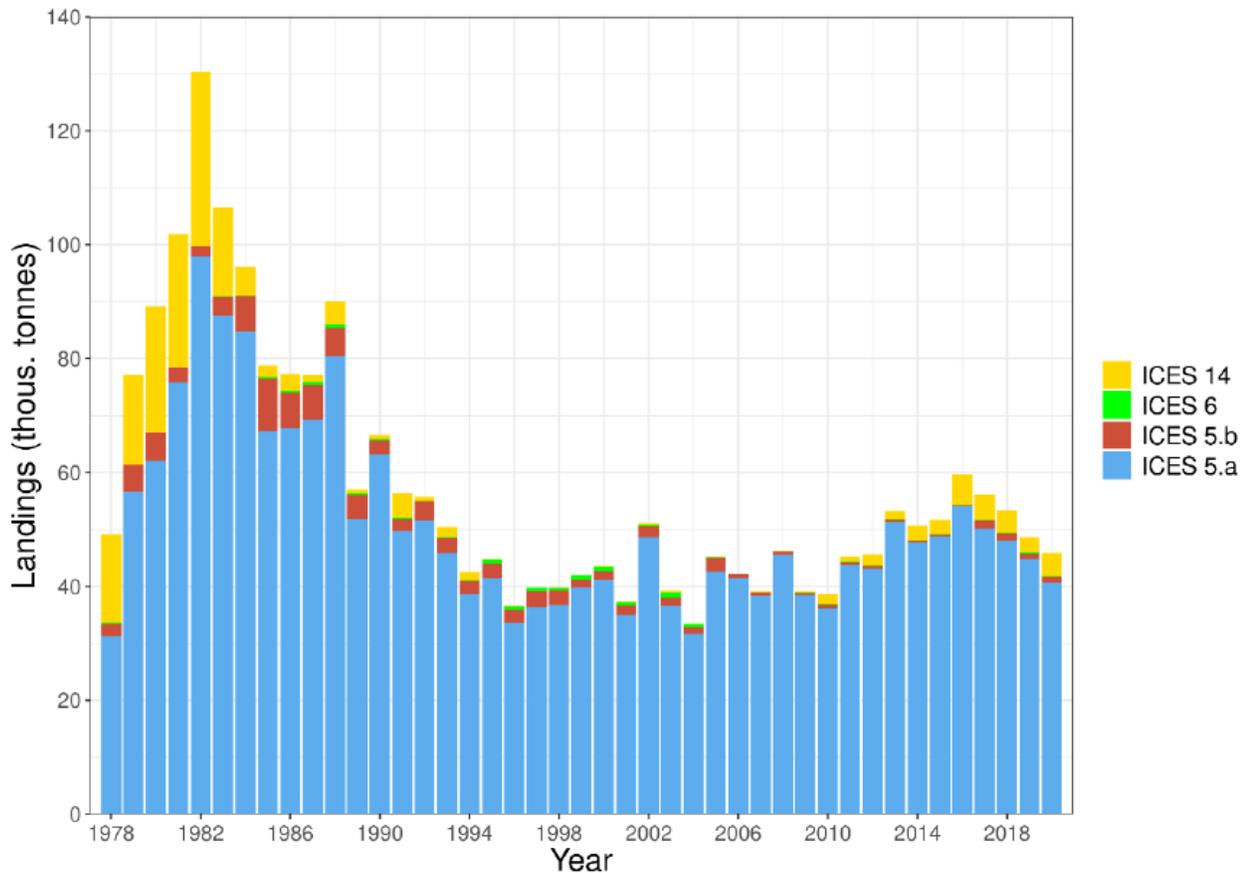


Figure 8. Nominal landings of golden redfish in tonnes by ICES Subareas and Divisions 1978–2020.

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 8). 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. In addition, there has been some retrospective bias in the assessment, leading to higher recommended TACs than justified in later estimates of the fishing mortality.

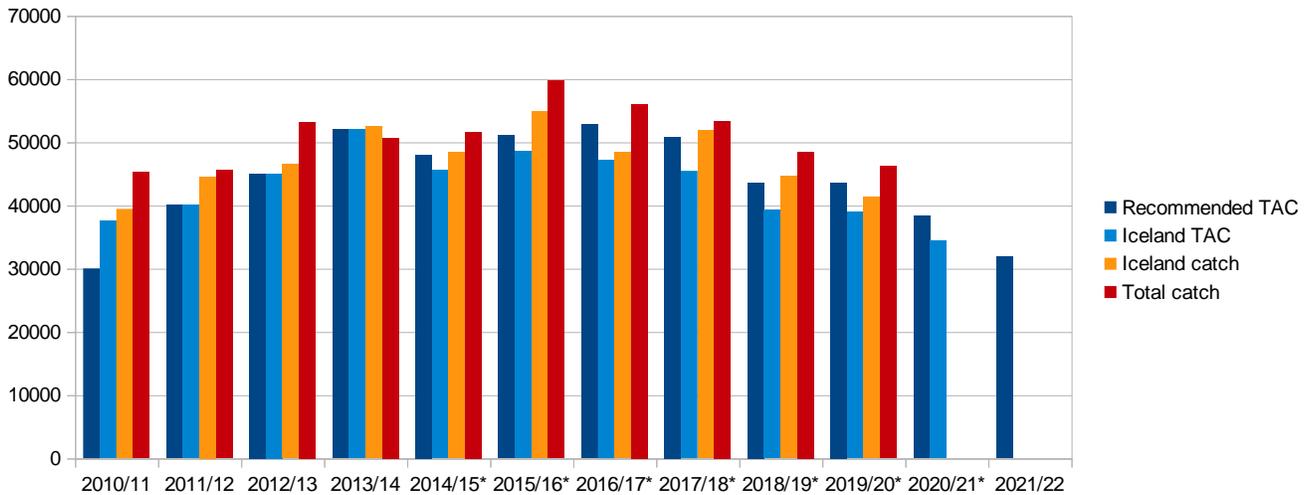


Figure 9. TAC and landings of golden redfish.

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)⁴⁷, the Fisheries Management Act (no. 116/2006)⁴⁸, 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 catches⁴⁹. 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 the Ministry’s website⁵⁰ (see also the digital booklet for the 2021-2022 regulations at https://vefbirting.prentmetoddi.is/raduneyti/stjorn_fiskveida_2020-21/94/).

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 1996⁵¹). Provisions of the Act on a Special Fee for Illegal Marine Catch⁵² are also applied as appropriate. Penalties

⁴⁷ <https://www.althingi.is/lagas/149a/1992036.html>

⁴⁸ <https://www.ecolex.org/details/legislation/fisheries-management-act-1990-lex-faoc003455/>

⁴⁹ <http://www.fiskistofa.is/english/about-the-directorate/>

⁵⁰ <https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2021/09/23/Stjorn-fiskveida-2021-2022-Log-og-reglugerdir/>

⁵¹ <https://www.althingi.is/lagas/149a/1996057.html>

⁵² <https://www.althingi.is/lagas/149a/1992037.html>

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 is on board and when not, to detect discards. Some findings have been published in 2019⁵³ and 2020⁵⁴.

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 Resources⁵⁵.

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. During the 2021 remote audit, Fiskistofa confirmed that starting in September 2020 smaller Icelandic vessels are now 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 298/2020⁵⁶. The App also called Afladagbókina or catch diary^{57 58} 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.

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 Directorate's website and obtain the catch, species, quota, remaining quota, quota rents for any vessel. The Directorate notes

⁵³ <http://www.fiskistofa.is/umfiskistofu/frettir/aflasamsetning-a-botnvorpu-og-dragnotarveidum>

⁵⁴ <http://www.fiskistofa.is/umfiskistofu/frettir/aflasamsetning-i-thorskanetum-og-botnvorpu>

⁵⁵ <https://www.stjornartidindi.is/Advert.aspx?RecordID=884be309-64a5-4367-9e4d-f5e7216b6f40>

⁵⁶ <https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887>

⁵⁷ <http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skrangu-afla>

⁵⁸ https://www.mbl.is/200milur/frettir/2020/08/31/oll_aflaskraning_rafraen_fra_og_med_morgundeginum/

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)⁵⁹ 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 2021 remote audit, Fiskistofa confirmed that they worked on this issue by increasing surveillance. The results of this surveillance are published online to show the violations and deter other potential violators⁶⁰.

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 990/2020⁶¹ on (7th) 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.

Furthermore, Fiskistofa supervised re-weighing 81 times during the 2019/2020 fishing season. 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.⁶²

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)⁶³.

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.⁶⁴

⁵⁹ <https://rikisendurskodun.is/wp-content/uploads/2019/01/Eftirlit-Fiskistofu-Stjornsysluuttek.pdf>

⁶⁰ <http://www.fiskistofa.is/umfiskistofu/frettir/hlutfall-kaelimidils-mai-til-agust>

⁶¹ <https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/22140>

⁶² http://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2020.pdf

⁶³ <https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2021/09/23/Stjorn-fiskveida-2021-2022-Log-og-reglugerdir/>

⁶⁴ <http://www.fiskistofa.is/>

All scientific advice is available online⁶⁵. 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 website⁶⁶.

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 (Fisheries Directorate pers. com. site visit November 2021). 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 5. Short term closures in Iceland for the years 2018-2021.

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
2020	Haddock	1
2020	Greenland halibut	1
2021	Sea cucumber	2
2021	Cod	3
2021	Haddock	1

Directorate Inspections at Sea

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

Table 6. Directorate inspector days on fishing vessels (Source: Directorate of Fisheries, November 2021 remote 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

⁶⁵ <https://www.ices.dk/advice/Pages/Latest-Advice.aspx>

⁶⁶ <http://atlas.lmi.is/mapview/?application=haf>

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
2021/2021 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.

Based on the latest available Fiskistofa report, published in 2020, 164 cases were suspected of violations. The table below contains information on the number of cases by category.

Table 7. Fiskistofa suspected violations in 2020. Source: Fiskistofa 2020 Annual Report⁶⁷.

Suspected violation	No.
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
Framhjálföldun / landing	6
Afladagbók / logbook	40
Vanskil afladagbókar / submitting logbook late	470
Veiðar án aflaheimilda / Fishing with insufficient catch quotas	6
Mál vegna umframaflla / Cases due to excess power	1321
Lax og silungsveiði / salmon and trout fishing	24
Undirmálsfiskur / bottom fish fishing	4
Röng tilgreining tegunda / Incorrect identification of species	3
Grásleppuveiðar / Greenland halibut fishing	13
Strandveiðar / coastal fishing	42

⁶⁷ http://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2020.pdf

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
---	----

The table below also contains information regarding the penalties for suspected violations. The information does not show whether the decision of the Directorate of Fisheries has been repealed or amended by a ruling of the industry and the Consumer Innovation Council. The information in the tables cannot be compared with each other. One case could deal with several types of offenses. This can result in penalties and correction of catch registration. In addition, several violations by the same party may have been merged into one case.

The Directorate of Fisheries sent 470 letters due to catch logbooks not being returned on time and 1,321 cases arose due to fishing in excess of catch quotas, which then must be rectified by purchasing additional quota to balance the books or no further fishing is permitted.

Table 8. Fiskistofa penalties and follow up for suspected violations in 2020. Source: Fiskistofa 2020 Annual Report⁶⁸.

Penalties for suspected violations	No.
Mál kærð til lögreglu / Cases reported to the police	13
Áminningar / reminders	28
vegna brota gegn reglum um veiðar/ for violations of fishing rules	8
vegna brota gegn reglum um vigtun og skráningu afla / for violations of the rules on weighing and registration of catches	4
vegna brota gegn reglum um afladagbók / for violations of the rules on catch logbooks	5
framhjálföndun / for landing	4
brottkast / discards	4
ófullnægjandi flokkun undirmáls (aflaskráning einnig leiðrétt) / inadequate sub-classification of catches (catch registration also corrected)	3
Svipting veiðileyfis/ Revocation of fishing license	11
vegna brota gegn reglum um veiðar / for violations of fishing rules	4
vegna brota gegn reglum um afladagbók /for violations of the rules on catch logbooks	5
vegna brottkasts / due to discard	2
Ófullnægjandi flokkun undirmáls (aflaskráning einnig leiðrétt) /Insufficient sub-category classification (catch registration also corrected)	1
Hindrun eftirlits / Obstruction of control	1
Afturköllun vigtarleyfis / Revocation of weighing license	1
Afturköllun framkvæmdaleyfis í eða við veiðivatn / Revocation of a construction permit in or near a fishing lake	1
Mál sent öðru stjórnvaldi / Case sent to another authority	4

⁶⁸ http://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2020.pdf

Ekki tilefni til beitingar viðurlaga eða leiðbeina / No need for sanctions or guidance	40
Leiðrétting aflaskráningar (auk leiðréttingar ófullnægjandi flokkunar undirmáls) / Correction of catch registration (in addition to correction of inadequate sub-classification of subheadings)	12
Leiðbeiningarbréf / Letter of instruction	119
Innheimtumál / Collection issues	
Ítrekunarbréf vegna ógreiddra veiðigjalda á árinu 2020: / Recurring letter regarding unpaid fishing fees in the year 2020:	181
Veiðileyfissviptingar: / Fishing license revocations:	26
Álagning gjalds vegna ólögmarks sjávarafla: / Imposition of a fee for illegal fishing	1323

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 November 2021 the ICG reported that surveillance in 2020 and 2021 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 (ICG).

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 DF 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 (see Table 5) and none based on Fisheries inspections by ICG. The overall number of inspections since 1988 is shown below.

Fjöldi skyndiskoðana frá 1998

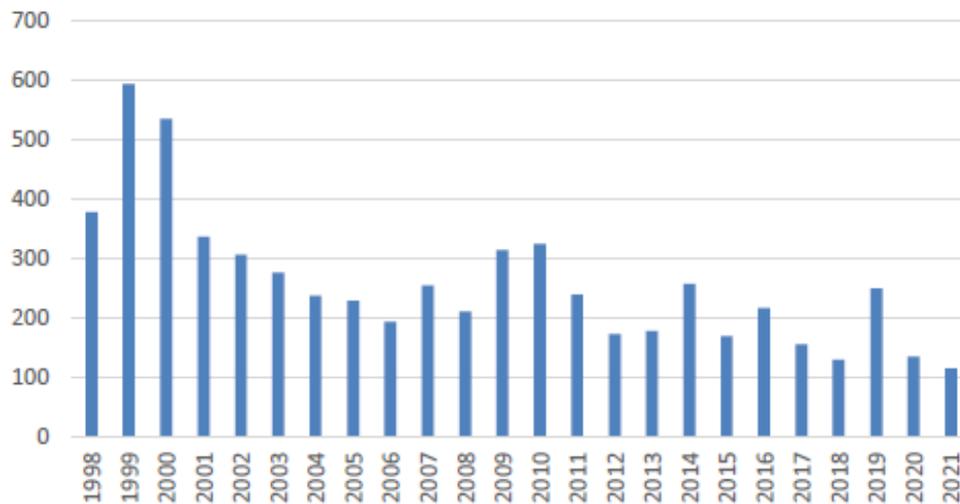


Figure 10. Overall number of ICG inspection from 1988 to 2021. Source: provided by the ICG during the remote audit, November 2021.

Also, we show here below a figure for the amount of air surveillance performed in 2021.

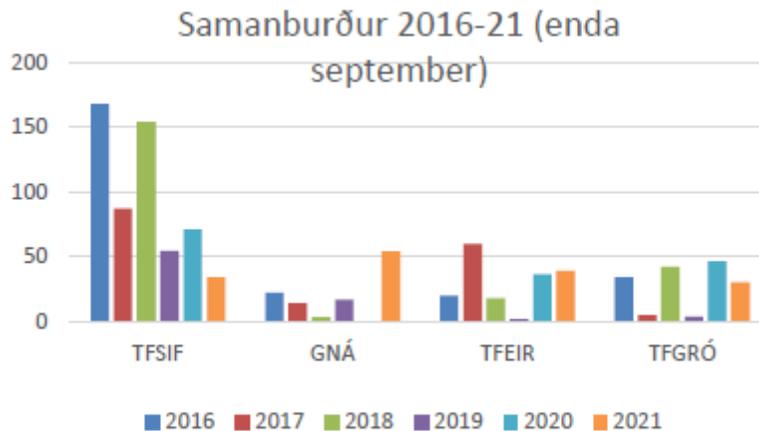


Figure 11. Air surveillance by four different Icelandic assets from 2016 to 2021. Samtals is the total. Source: provided by the ICG during the remote audit, November 2021.

Seven foreign flag vessels were also inspected the ICG in 2021, three Faroese vessels of which one was a longliner and two capelin fishing vessels, and four Norwegian capelin fishing vessels, all within Icelandic EEZ.

In terms of overall infringements, 8 reports of apparent infringements were reported in 2021, 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 2021, included: Lögskráningar/Crew registry, Veiðar /Fisheries, Veiðileyfi /Fishing permit, Ferilvöktun /Vessel monitoring, Farþegafjöldi /Passengers, Haffæri /Sea

worthiness and a new addition Fyrirmælum ekki fylgt /Instructions not obeyed. These are shown below (until the end of September 2021) compared to historical data up to 2016.

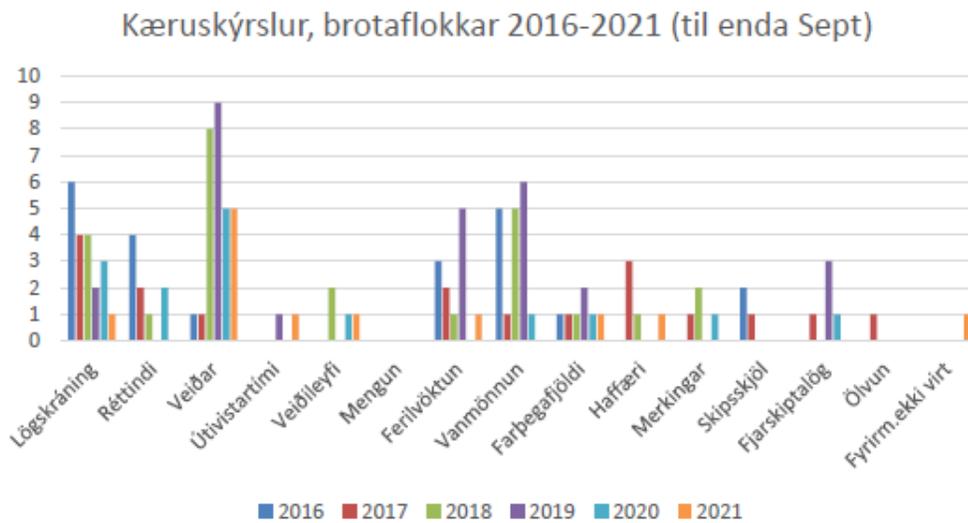


Figure 12. Overview of ICG infringement reports in 2016-2021. Source: provided by the ICG during the remote audit, November 2021.

From these eight reports, 12 apparent infringements were reported in 2021. For 2021, infringements on Veiðar /Fishing are the 5 most common, and adding Veiðileyfi /Fishing permit brings the total number of infringements specifically regarding fisheries to 6. No apparent infringement were reported in 2021 in the following categories; Réttindi /License, Mengun /Pollution, Vanmönnum /Manning, Merkingar /Markings, Skipsskjöl /Ships documents, Fjarskiptalög /Communications or Ölvun /intoxication. Of the 8 vessels that were reported for apparent infringements in 2021, up to end of September, 6 vessels are less than 24 meters in length; 2 are more than 24 meters in length, one of which is a passenger vessel.

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 2019⁶⁹. 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 page⁷⁰ for each individual species.

ÞORSKUR – COD (*Gadus morhua*)⁷¹

MFRI assesses that fishing pressure on the stock is above HRMSY. Spawning stock size is above MSY Btrigger, Bpa, and Blim. The stock was benchmarked in 2021 (ICES, 2021b), resulting in a downward revision of recruitment and stock size, and an upward revision in the fishing pressure. This is largely because relationship between stock-in-numbers and survey for age groups 6-9 was linear but is now assumed nonlinear, weight of survey indices of younger fish (ages 1-5) is now less than for older fish (ages 6-9) and survey indices of 1- and 2-year old fish from IS-SMH is no longer used in the assessment. These changes lead to better consistency between the assessment and the survey dynamics. The reference biomass in 2020 is thus estimated 20% lower in this year's assessment compared with last year's assessment.

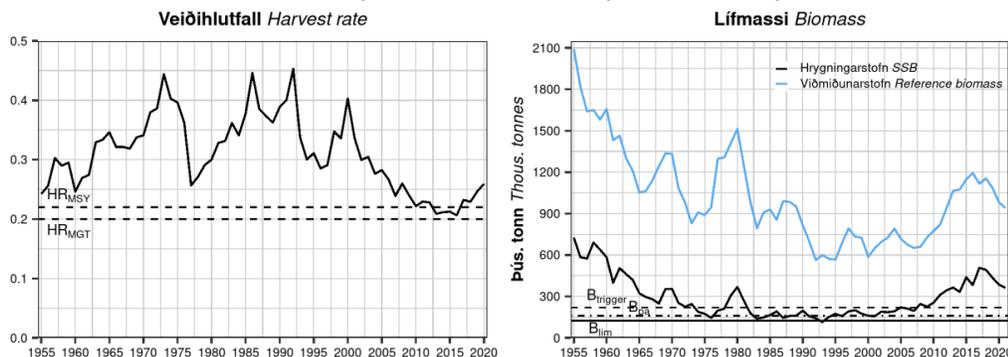


Figure 13. Icelandic cod harvest rate and biomass.

ÝSA – HADDOCK (*Melanogrammus aeglefinus*)⁷²

The spawning-stock biomass (SSB) has decreased since 2008, but stabilized above MSY Btrigger in recent years. MFRI and ICES assesses that fishing pressure on the stock is above both HRMSY and HRpa and below HRLim. Spawning stock size is above MSY Btrigger, Bpa and Blim. Reference biomass expected to increase in the next two years while the 2014 cohort remains in the fishery. The 2015–2017 cohorts are estimated close to the long-term mean recruitment and, while the 2018 cohort is estimated to be low, it is expected that the stock will remain stable, after the 2014 cohort has been removed

⁶⁹ <https://www.responsiblefisheries.is/media/1/form-9e-irf-icelandic-redfish-re-assessment-final-certification-report-july-2019.pdf>

⁷⁰ <https://www.hafogvatn.is/en/harvesting-advice>

⁷¹ <https://www.hafogvatn.is/static/extras/images/01-cod1259506.pdf>

⁷² <https://www.hafogvatn.is/static/extras/images/02-haddock1259378.pdf>

from the fishable biomass, due to lower fishing pressure. The results from scientific surveys conducted by the MFRI suggests that the 2019 and 2020 cohorts are above average.

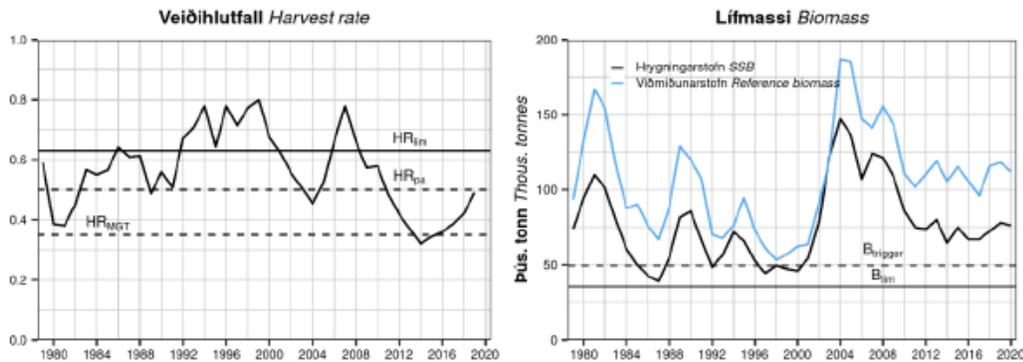


Figure 14. Icelandic haddock harvest rate and biomass.

UFSI – SAITHE (*Pollachius virens*)⁷³

The spawning-stock biomass (SSB) is currently at the time-series maximum. MFRI assesses that fishing pressure on this stock is below HRMSY, HRpa, and HRLim; spawning stock size is above MSY Btrigger, Bpa, and Blim.

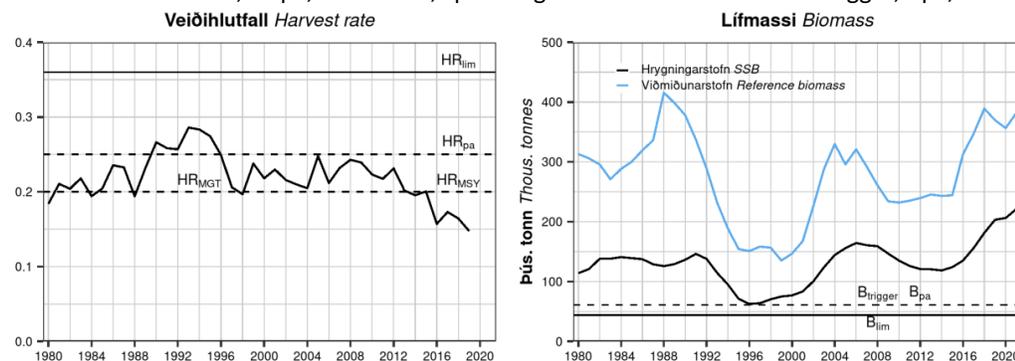


Figure 15. Icelandic saithe harvest rate and biomass.

DJÚPKARFI – DEMERSAL BEAKED REDFISH (*Sebastes mentella*)⁷⁴

The IS-SMH biomass index has been variable since 2012. Since 2007, survey estimates have consistently shown very low estimates for juveniles (≤ 30 cm). The biomass index shows some stability in recent years although recruitment is very limited and cause for caution. Catches in the previous 5 years have generally been in agreement with advice and TAC.

⁷³ <https://www.hafogvatn.is/static/extras/images/03-saithe1259383.pdf>

⁷⁴ <https://www.hafogvatn.is/static/extras/images/05-demersalsmentella1259395.pdf>

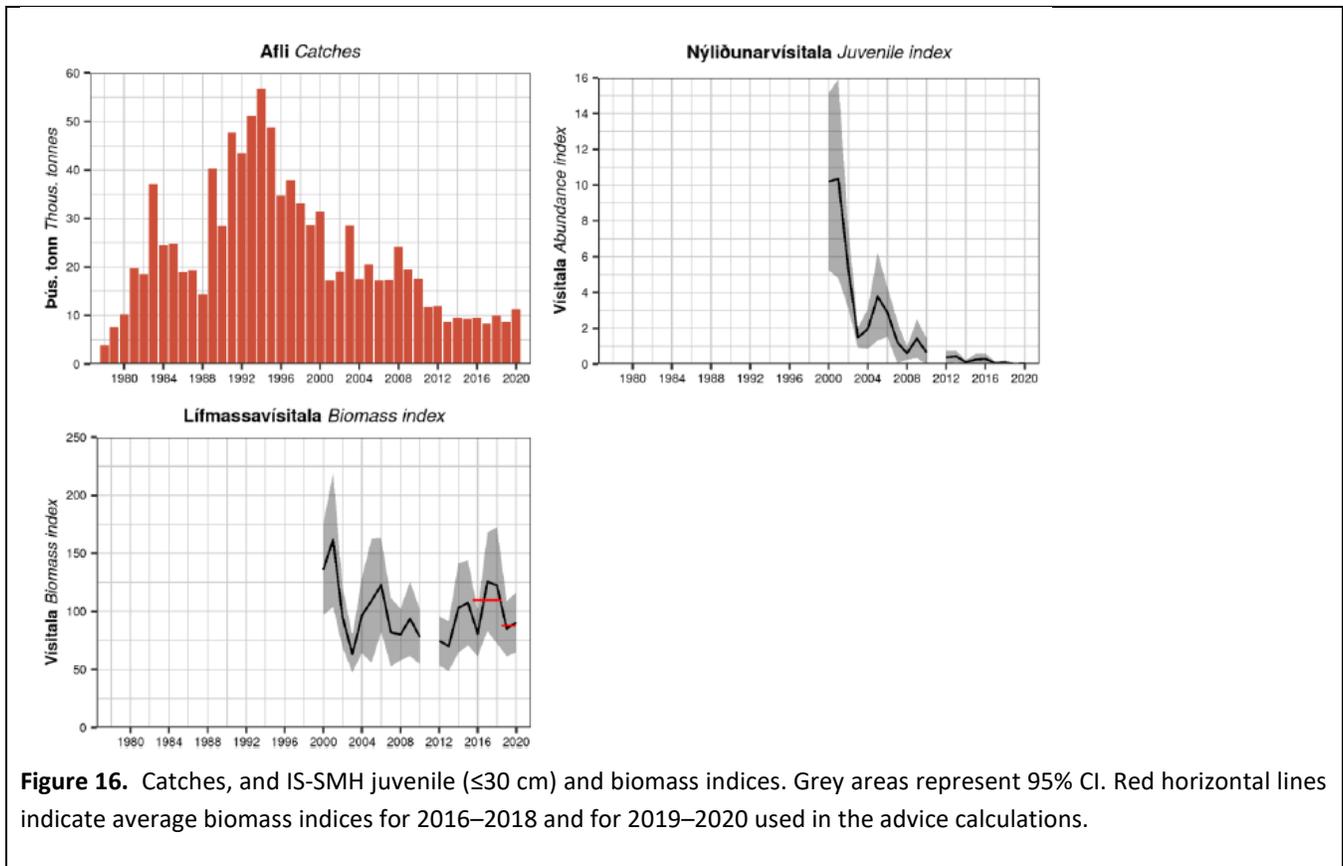


Figure 16. Catches, and IS-SMH juvenile (≤ 30 cm) and biomass indices. Grey areas represent 95% CI. Red horizontal lines indicate average biomass indices for 2016–2018 and for 2019–2020 used in the advice calculations.

GRÁLÚÐA – GREENLAND HALIBUT (*Reinhardtius hippoglossoides*)⁷⁵

The stock biomass is stable and is above MSY Btrigger. Fishing mortality is estimated to be just below FMSY.

⁷⁵ <https://www.hafogvatn.is/static/extras/images/08-greenlandhalibut1259406.pdf>

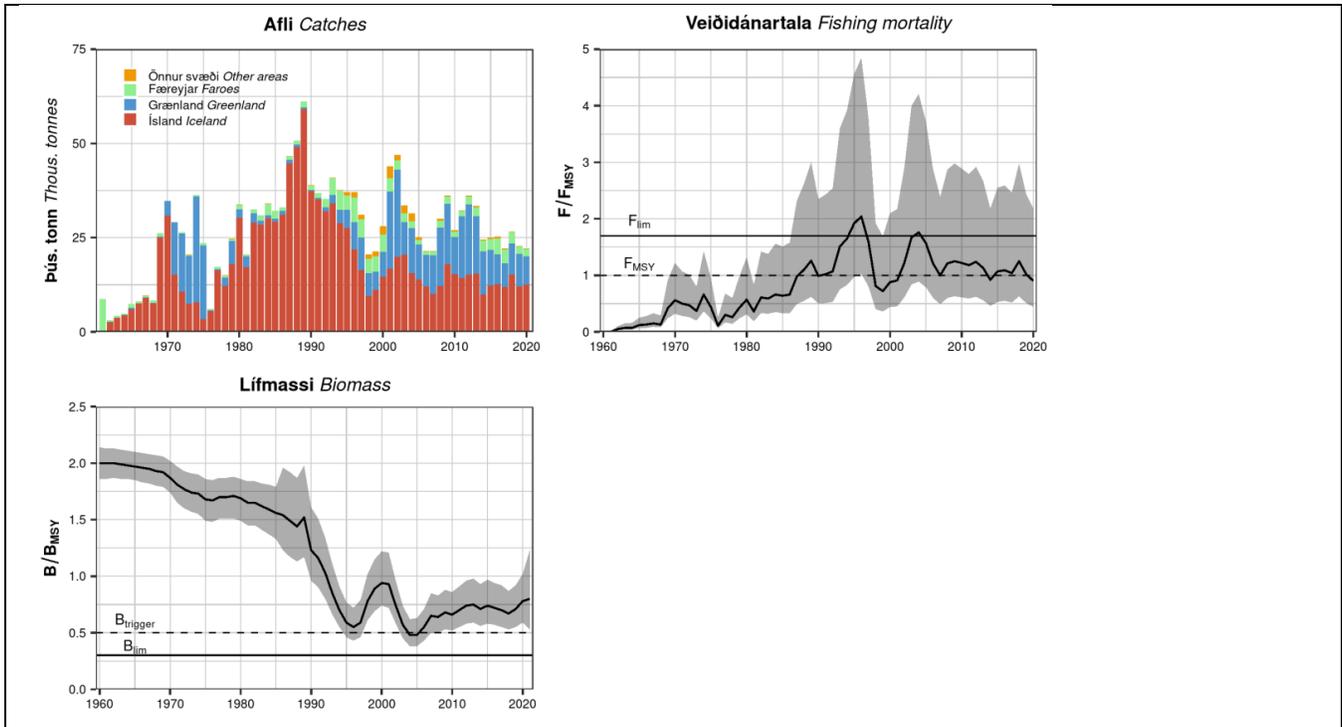


Figure 17. Greenland halibut harvest rate and biomass.

LANGA – LING (*Molva molva*)⁷⁶

The spawning-stock biomass (SSB) and the reference biomass (ling >75 cm) in 2013–2018 were among the highest in the time series, but are now declining. Harvest rate (HR) has decreased since 2008 and is now the lowest in the time series, but above HR_{MGT} and HR_{MSY}. Recruitment was high from 2004 to 2011 but has declined to the levels of the 1980s and 1990s.

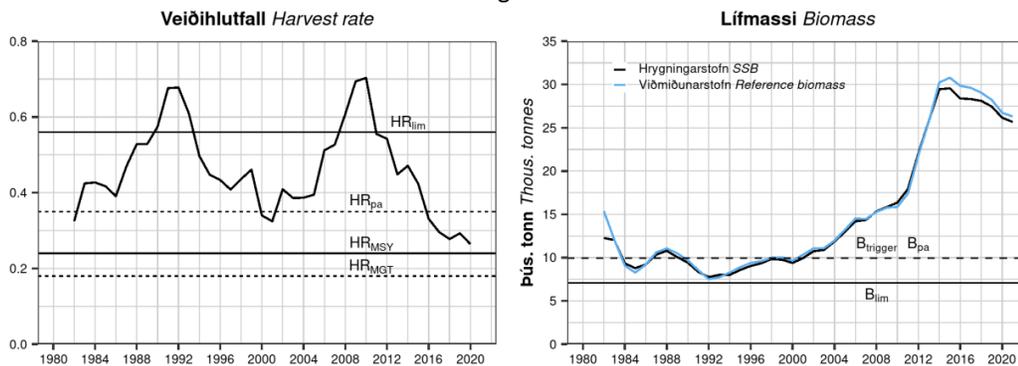


Figure 18. Ling harvest rate and biomass.

TINDASKATA – STARRY RAY (*Amblyraja radiata*)⁷⁷

The survey biomass index (IS-SMB) shows a long-term decreasing trend. Since 2008, the biomass index has been stable but at the lowest level in the time series. The abundance index of juveniles (<21 cm) shows large variation without any clear trend. Recruitment is stable with some increasing trends. MFRI advises that when the precautionary approach is

⁷⁶ <https://www.hafogvatn.is/static/extras/images/17-ling1259442.pdf>

⁷⁷ <https://www.hafogvatn.is/static/extras/images/24-starryray1259469.pdf>

applied, catches in the fishing year 2021/2022 should be no more than 921 tonnes. The catches in the previous 3 years were below this threshold ranging from 5520 to 798 tonnes.

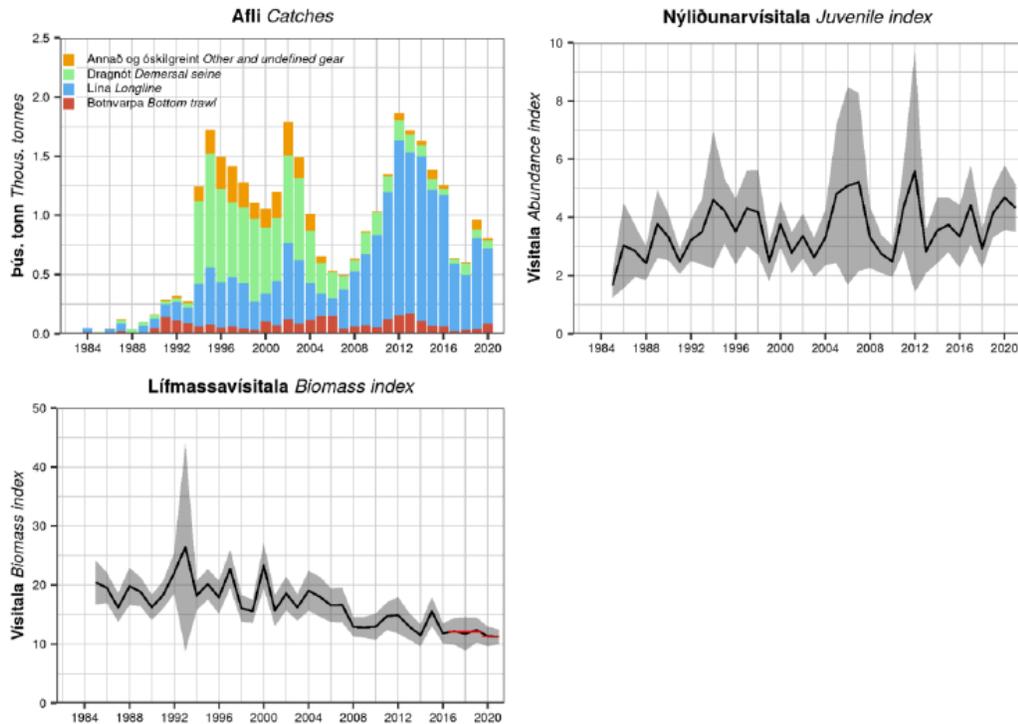


Figure 19. Starry skate harvest rate and biomass.

STEINBÍTUR–ATLANTIC WOLFFISH (*Anarhichas lupus*)⁷⁸

Fishing pressure on the stock is below FMSY. MFRI cannot assess the stock status relative to maximum sustainable yield (MSY) and precautionary approach (PA) reference points, because the reference points are undefined. However, exploitable biomass is assessed to be above candidate reference points.

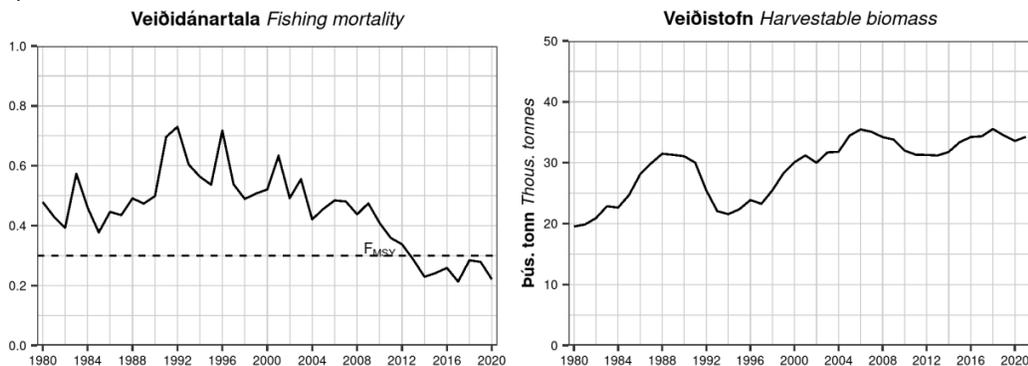


Figure 20. Atlantic wolffish harvest rate and biomass.

HLÝRI – SPOTTED WOLFFISH (*Anarhichas minor*)⁷⁹

⁷⁸ <https://www.hafogvatn.is/static/extras/images/15-atlanticwolffish1259434.pdf>

⁷⁹ <https://www.hafogvatn.is/static/extras/images/16-spottedwolffish1259438.pdf>

In the re-assessment for this fishery in 2019⁸⁰ 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). More generally speaking, and since spotted wolffish are mainly caught as bycatch, catches have been above recommendations since 2012, and biomass indices are now at historically low levels, MFRI recommended in their 2020 advice that fishermen will be allowed to release spotted wolffish caught beyond set TAC. The first formal TAC was instituted for the 2019/2020 season to maintain catches within a set limit. The biomass index has decreased since 2008 and continuously from 2015. SSB is likely to be below any candidate value of Blim. The juvenile index indicates a recruitment failure since 2012. Fproxy has been above target in recent years.

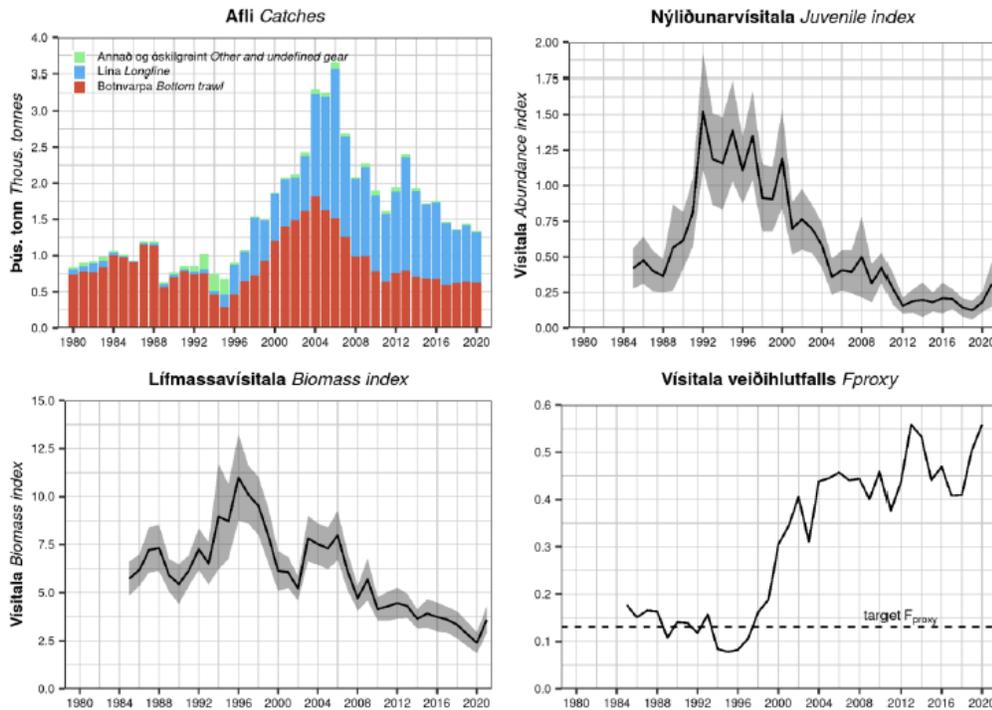


Figure 21. Spotted wolffish catches, juveniles index, harvest rate and biomass.

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)⁸¹ showed a 92-100% post capture survival for spotted wolffish following net entrapment 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. 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.

⁸⁰ <https://www.responsiblefisheries.is/media/1/form-9e-irf-icelandic-redfish-re-assessment-final-certification-report-july-2019.pdf>

⁸¹ Grant, S.M., and Hiscock, W. 2014. Post-capture survival of Atlantic Wolffish (*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>

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 1256/2020⁸² which now allows fishers to discard viable (living) spotted wolffish, as opposed to landing it dead, taking advantage of the high post capture survival of this fish. The regulation continues in the 2021/2022 fishing season⁸³. 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 will be recorded. 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 bring the catches within TAC as a first step towards stock rebuilding.

GULLAX – GREATER SILVER SMELT (*Argentina silus*)⁸⁴

The spawning-stock biomass (SSB) is estimated at historical high level and has increased continuously since 2012. Fishing mortality has decreased significantly since 2013 and is now well below FMSY. Recruitment shows an increasing trend since 2006.

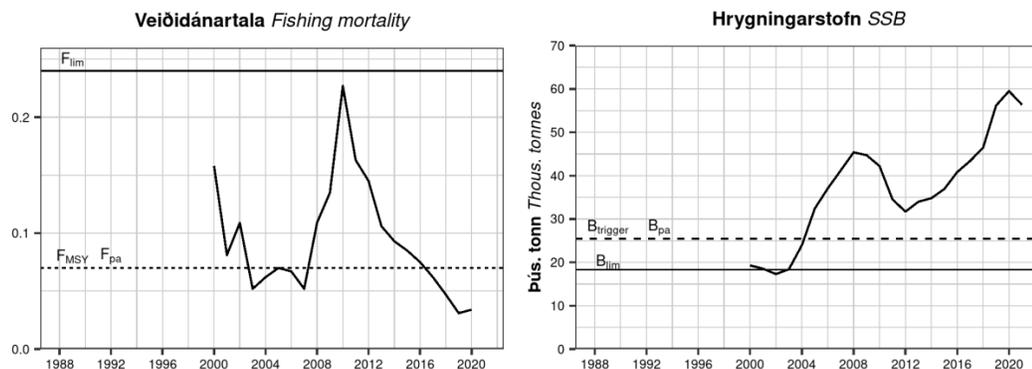


Figure 22. Greater silver smelt harvest rate and biomass.

SKARKOLI – PLAICE (*Pleuronectes platessa*)⁸⁵

The harvestable biomass steadily increased from 2000–2015. Fishing mortality has declined since 1997 and has been around FMSY since 2011.

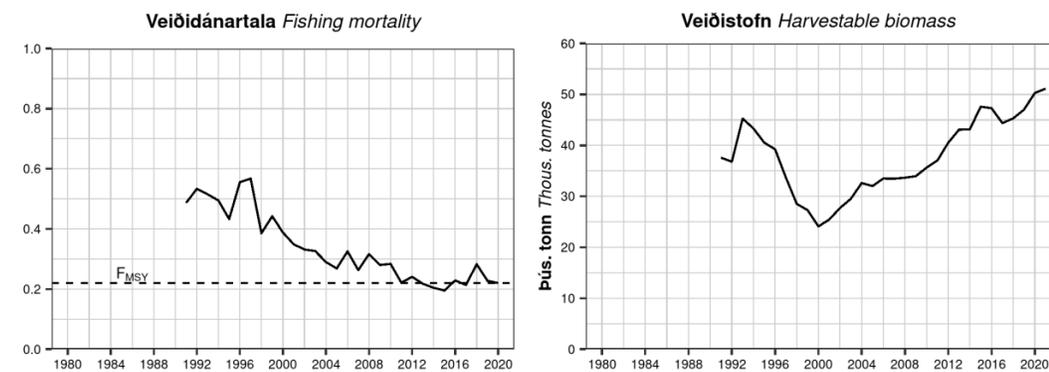


Figure 23. Plaice harvest rate and biomass.

⁸² Reglugerð um (2.) breytingu á reglugerð nr. 468/2013, um nýtingu afla og aukaafurða.

⁸³ <https://www.hafogvatn.is/static/extras/images/16-spottedwolffish1259438.pdf>

⁸⁴ <https://www.hafogvatn.is/static/extras/images/23-greatersilversmelt1259465.pdf>

⁸⁵ <https://www.hafogvatn.is/static/extras/images/09-plaice1259410.pdf>

HUMAR – NORWAY LOBSTER (*Nephrops norvegicus*)⁸⁶

Stock abundance is estimated to have declined by 27% from 2016–2020. The harvest rate has declined from 1.9% in 2016 to 0.4% in 2020. Burrow density in 2020 (0.065 burrows/m²) is one of the lowest reported for other functional units within ICES. The stock is assumed to be below any candidate value for Blim. MFRI advised a monitoring fishery of no more than 143 tonnes in 2021 for sampling and mapping of distribution. MFRI furthermore advises that Norway lobster fishing areas in Jökuldjúp and Lónsdjúp should be closed for all Norway lobster fishing. To reduce fishing disturbance on Norway lobster grounds, MFRI also advised that areas in Breiðamerkjúp, Hornafjarðardjúp and Lónsdjúp remain to be closed for bottom trawling other than Norway lobster trawling. Since 2014/15 catches have been within advice and within the National TAC. The harvest rate is now nominal (i.e. 0.4%).

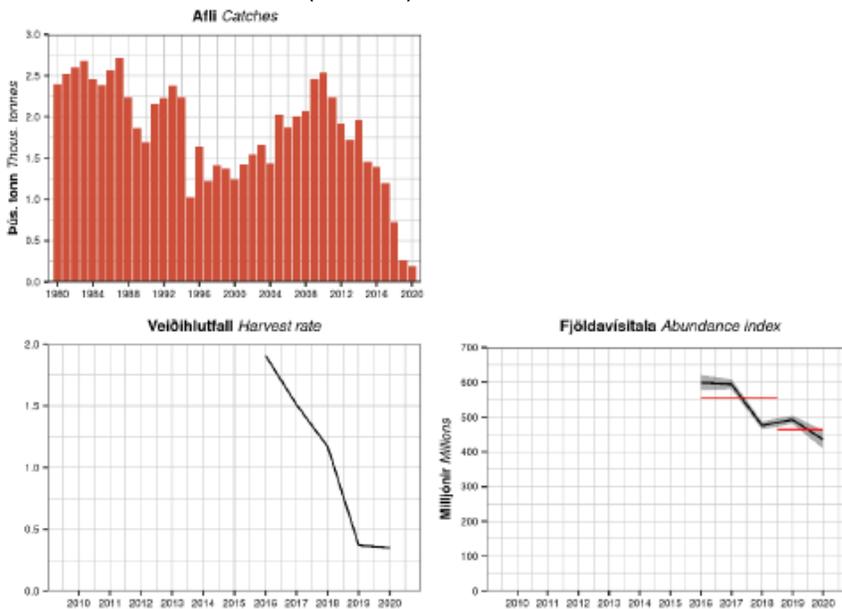


Figure 24. Norway lobster harvest rate and biomass.

ÞYKKVALÚRA – LEMON SOLE (*Microstomus kitt*)⁸⁷

The IS-SMB biomass index has been variable and decreasing from the maximum in 2006. Fproxy has been highly variable for two decades. IS-SMB recruitment index is close to average but increased considerably this year.

⁸⁶ <https://www.hafogvatn.is/static/extras/images/040-humar1235184.pdf>

⁸⁷ <https://www.hafogvatn.is/static/extras/images/10-lemonsole1259413.pdf>

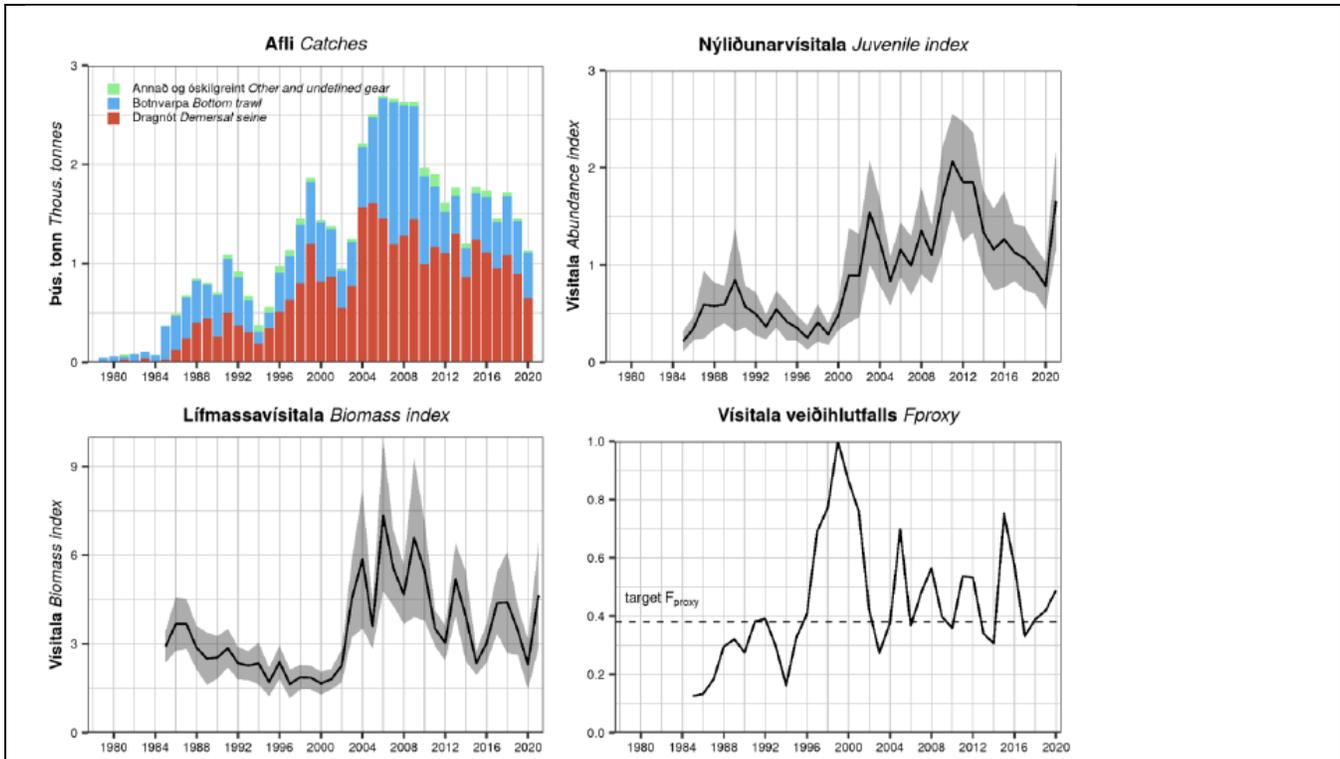


Figure 25. Lemon sole harvest rate and biomass.

LANGLÚRA – WITCH (*Glyptocephalus cynoglossus*)⁸⁸

IS-SMB biomass index has been high since 2004. The recruitment index has, however, declined since 2009 and reached an all-time low in 2011–2020, with some increase in the last year of data. Fproxy has remained relatively stable over the last eight years at the target F_{proxy} reference point.

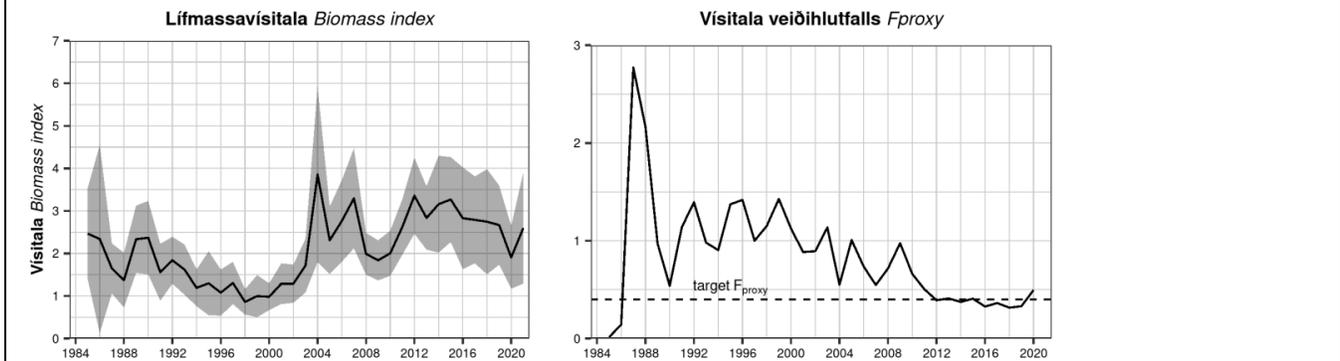


Figure 26. Witch harvest rate and biomass.

KEILA – TUSK (*Brosme brosme*)⁸⁹

⁸⁸ <https://www.hafogvatn.is/static/extras/images/11-witch1259417.pdf>

⁸⁹ <https://www.hafogvatn.is/static/extras/images/19-tusk1259450.pdf>

SSB has remained constant at a low level in recent years but the reference biomass (tusk ≥ 40 cm) has decreased since 2008 and is now at a low level in the time series. Harvest rate declined in 2010–2017, but has increased since then and is above HRMGT and HR_{MSY}. Recruitment in 2012–2014 was low, but has increased since then and was high in the past 3 years.

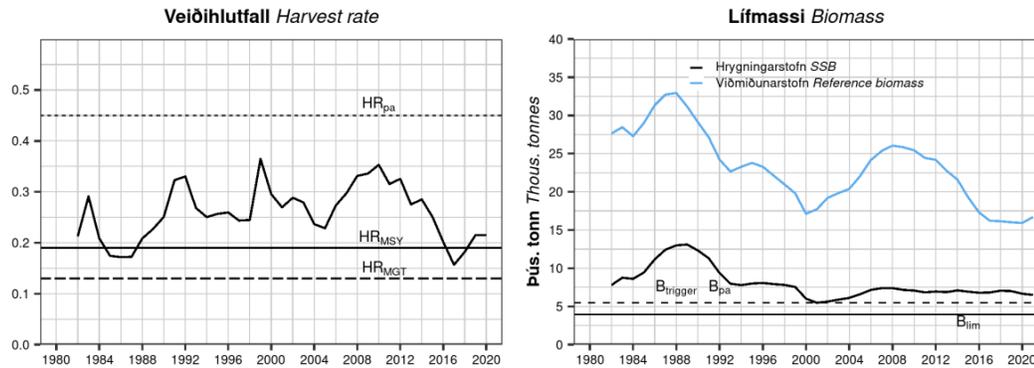


Figure 27. Tusk harvest rate and biomass.

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 advice and National TAC.

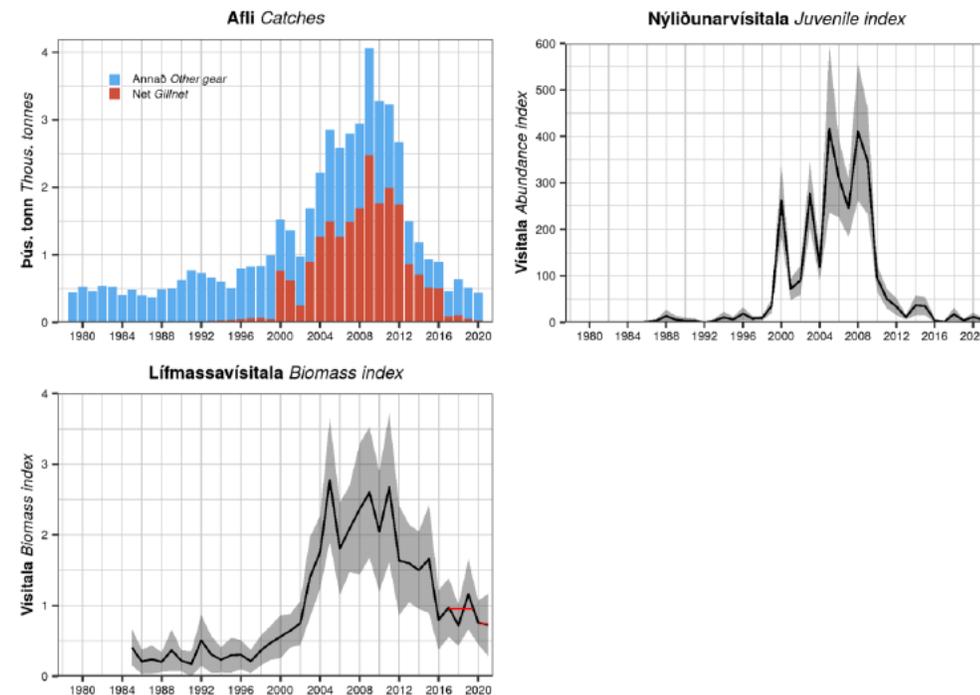


Figure 28. Anglerfish harvest rate and biomass.

⁹⁰ <https://www.hafogvatn.is/static/extras/images/20-anglerfish1259454.pdf>

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. To ensure stock conservation, the MFRI has made for the first time a recommendation on TAC for megrim for the 2021/2022 fishing year.

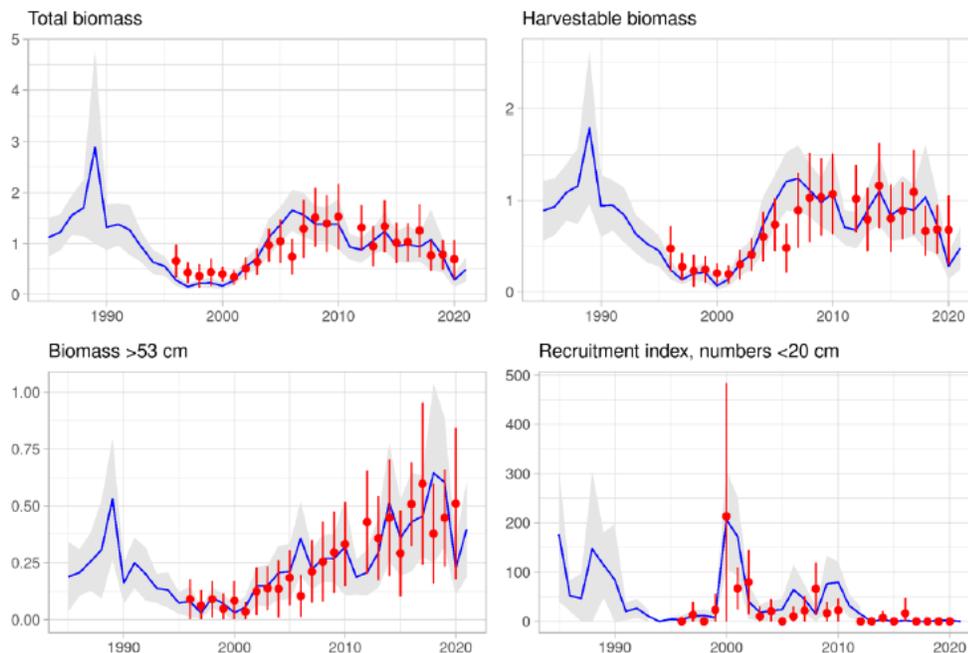


Figure 29. Megrim. Total biomass indices (upper left) and harvestable biomass indices 40 cm (upper, right), biomass indices of larger ind. 53 cm (lower left) and juvenile abundance indices (≤ 20 cm) lower right from the spring survey (blue) from 1985 and autumn survey (red) from 1996, along with the standard deviation.

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.

⁹¹ <https://www.hafogvatn.is/static/extras/images/12-megrim1259421.pdf>

⁹² <https://www.hafogvatn.is/static/extras/images/21-whiting1259458.pdf>

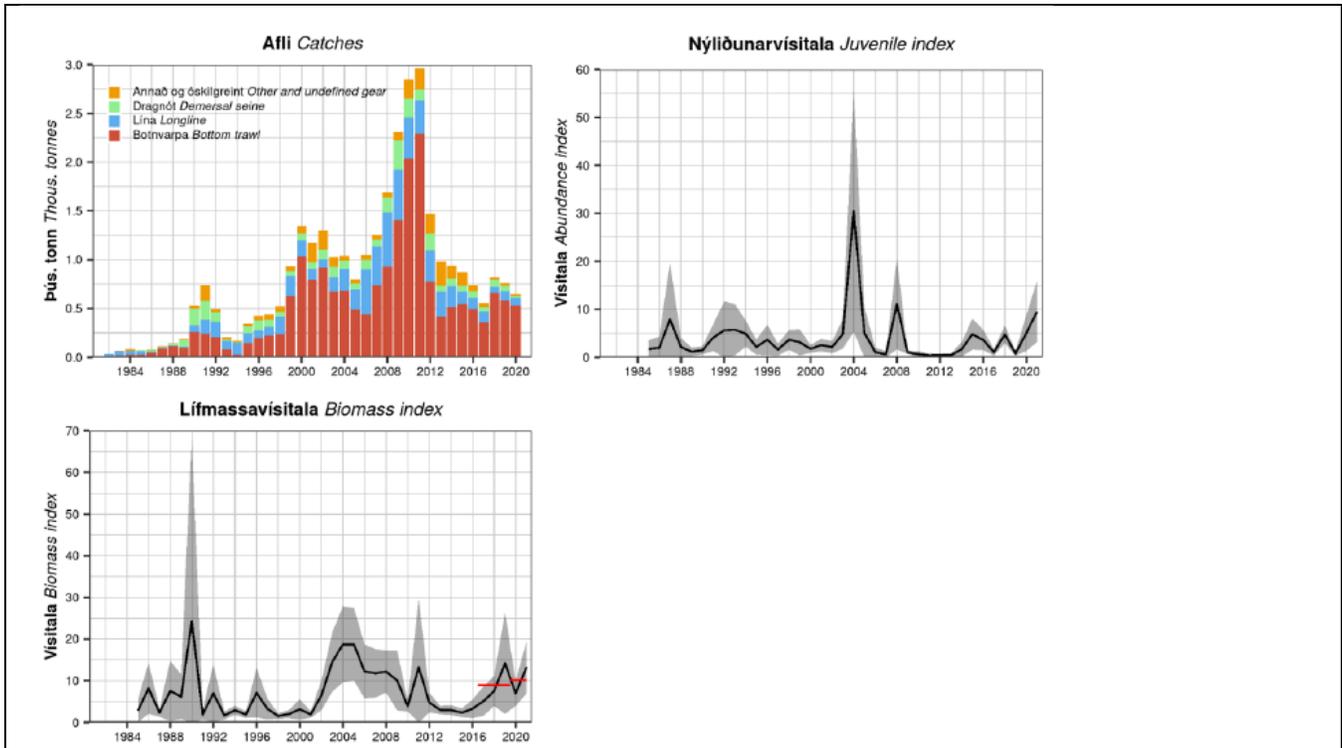
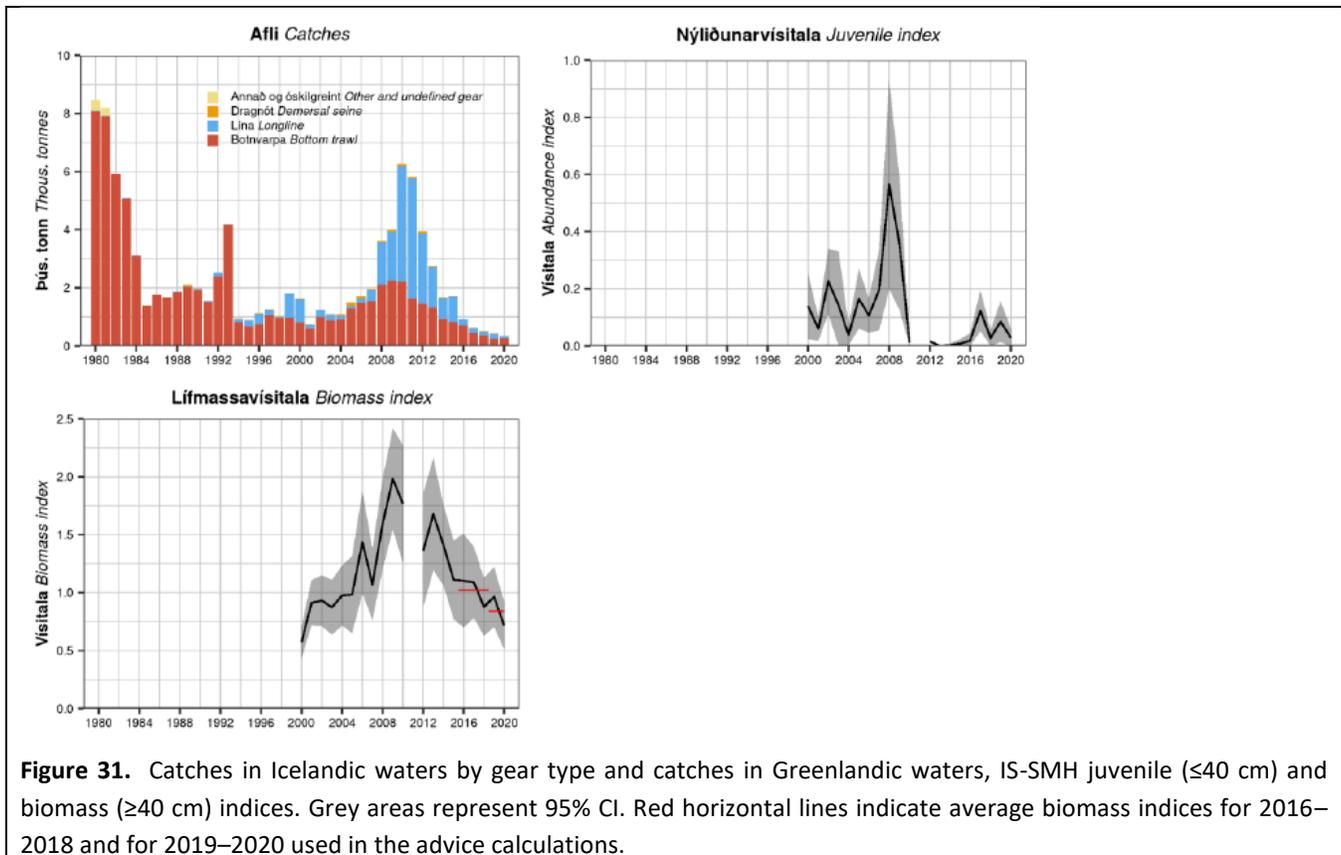


Figure 30. Catches by gear type, IS-SMB juvenile (≤ 20 cm) and biomass (≥ 40 cm) indices. Grey areas represent 95% CI. Red horizontal lines indicate average biomass indices for 2017–2019 and 2020–2021 used to calculate the advice.

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. Catches have been well below advice in the past 5 years.

⁹³ <https://www.hafogvatn.is/static/extras/images/18-blueling1259446.pdf>



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.

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 List⁹⁴ (population trend unknown, last assessed in 2020). They are also classified as Least Concern in the Icelandic National Redlist (based on a 2016 assessment)⁹⁵. Annual estimates of harbour porpoise by-catch have decreased in recent years as gillnet effort has decreased (see

⁹⁴ <https://www.iucnredlist.org/species/17027/50369903>

⁹⁵ <https://www.ni.is/node/27406>

table below), from a high of 7,300 animals in 2003 to about 1600 animals in 2009–2013⁹⁶ and down to about 750 animals in 2014-2015.

The latest Report of the NAMMCO Scientific Committee Working Group on Harbour Porpoise (19-22 March 2019)⁹⁷ reported the following about the Icelandic harbour porpoise population.

After reviewing the assessment and noting the recent decline in by-catch, 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.

An aerial survey in Iceland is planned for harbour porpoise in 2023.

Harbour seals

The MFRI 2021 advice for harbour seals⁹⁸ 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

The MFRI has been conducting pinger/acoustic device testing in gillnet fisheries for several years now, with mixed results. The last device tested in 2019-2020 showed promise, and publication on the results and possible larger scale trials were planned for 2021 (MFRI, personal communication, November 4th 2021).

Gulper sharks

⁹⁶ 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>

⁹⁷ https://nammco.no/wp-content/uploads/2019/02/final-report_hpwg-2019.pdf

⁹⁸ <https://www.hafogvatn.is/static/extras/images/radgjof-landselur20201286028.pdf>

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

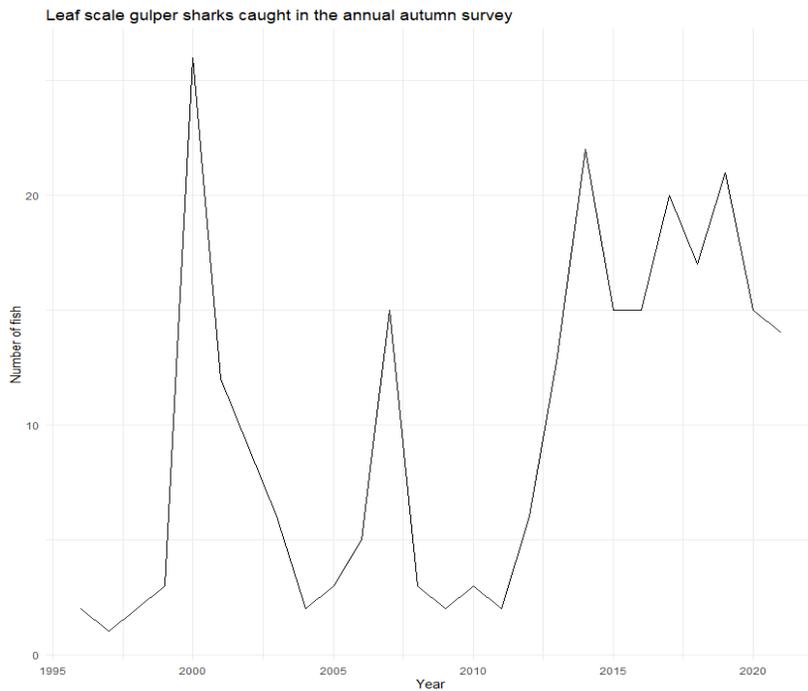


Figure 32. Leaf scale gulper shark caught in the annual autumn survey, from 1995 to 2021.

Grey skate (*Dipturus flossada / batis*) landed catch in 2019 was 194 t, and 160 t in 2020. Survey abundance is variable but has been on average relatively stable in recent years.

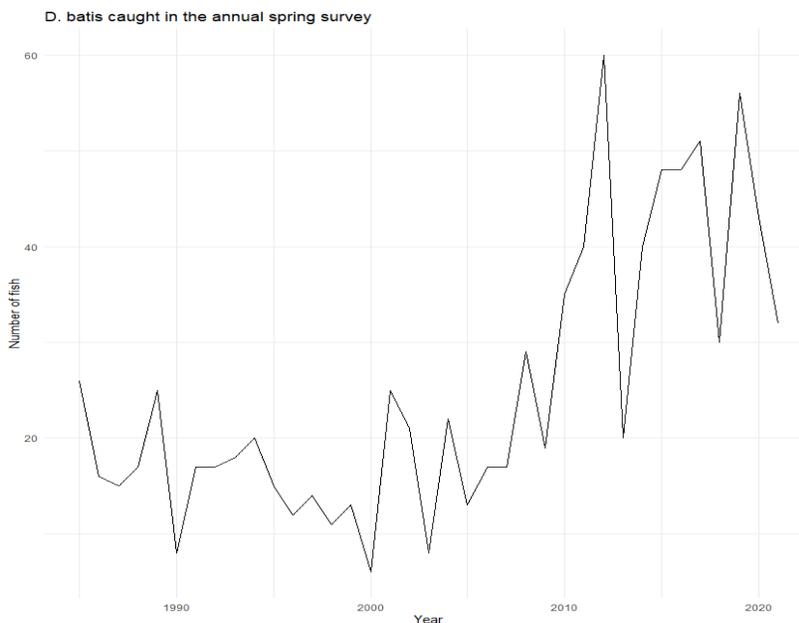


Figure 33. D. batis caught in the annual spring survey, from 1985 to 2021.

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

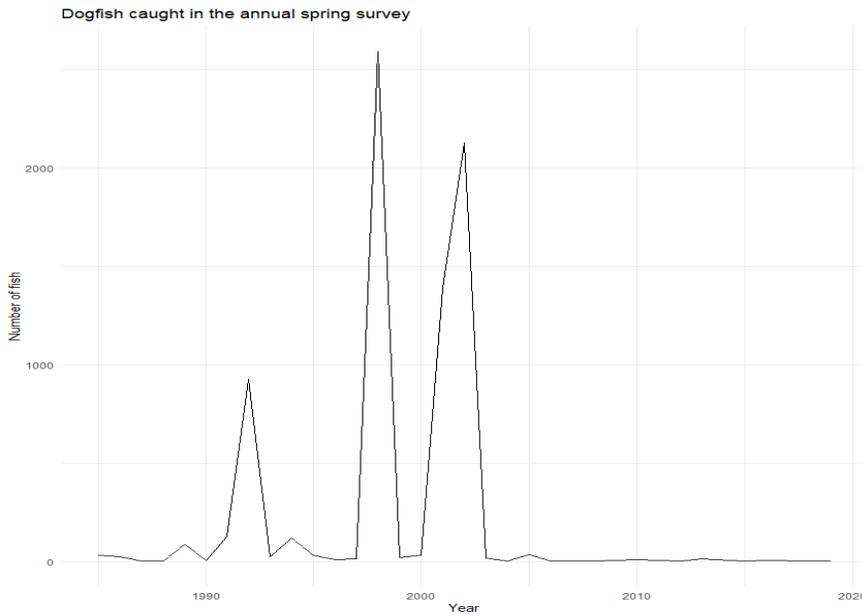


Figure 34. Dogfish caught in the annual spring survey, 1985 to 2021.

Landed catch of Greenland shark (*Somniosus microcephalus*) was 6 t in 2019 and 2 t in 2020. Survey trends are also very sporadic.

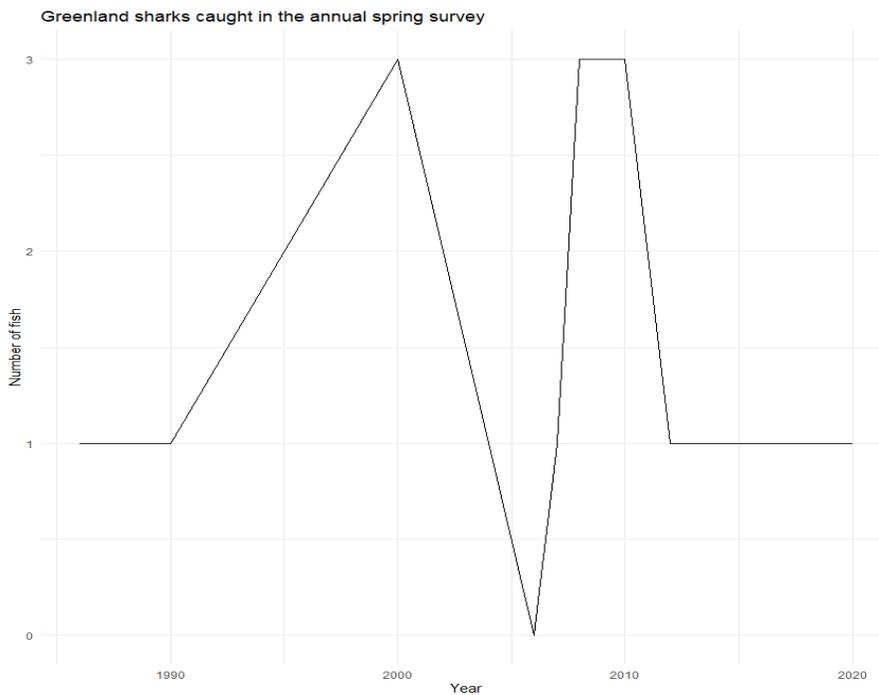


Figure 35. Greenland shark caught in the annual spring survey.

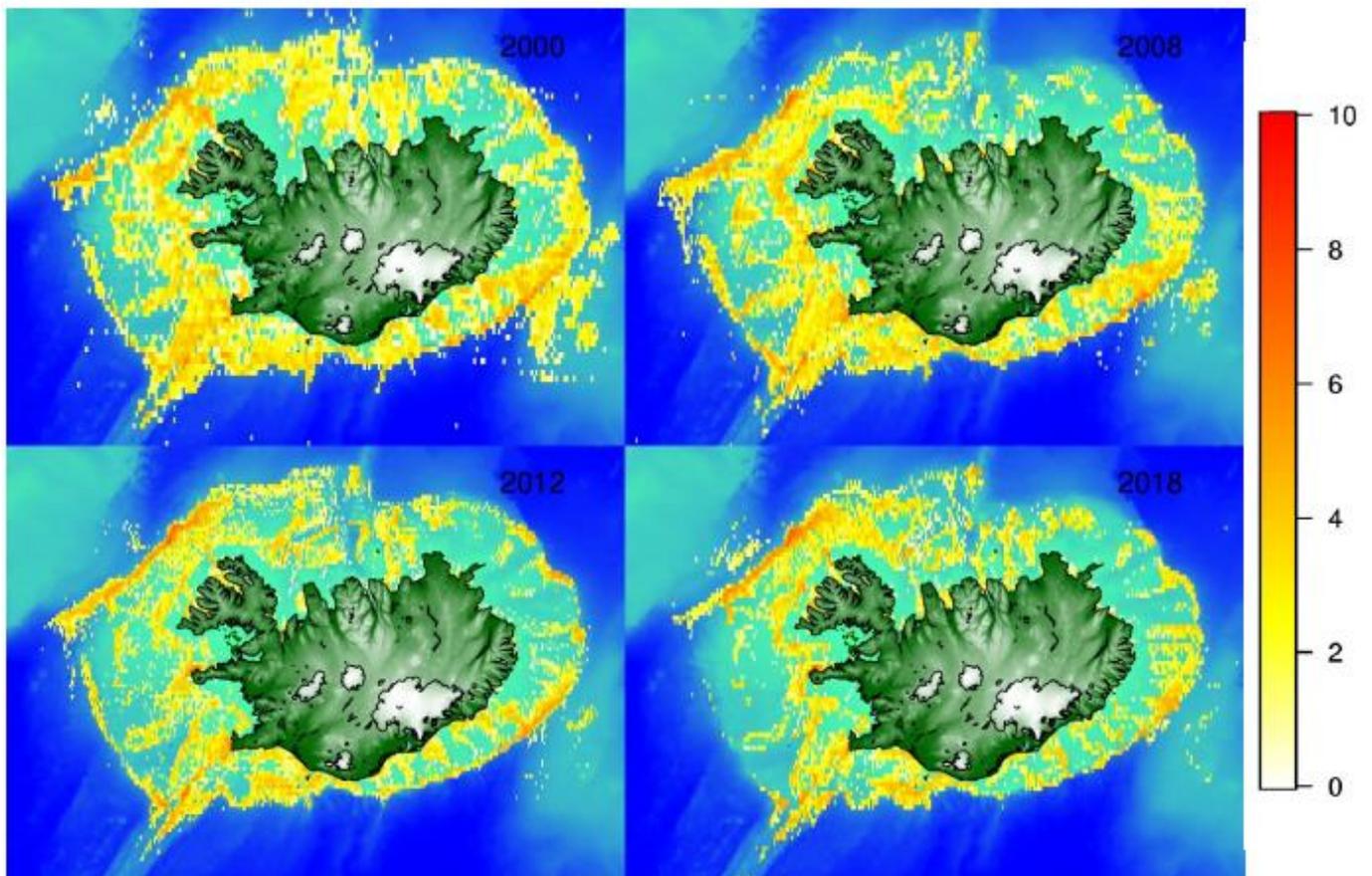
Landed catch of porbeagle in 2019 was 2.6 t and 3.6 t in 2020.

Porbeagles (*Lamna nasus*) are rarely caught in surveys, but two were caught in the autumn survey in 2021 and one in the gillnet survey in 2019.

7.5.1.1 Habitat

Trawl effort spatial extent

The ICES 2020 Icelandic ecosystem overview report⁹⁹ indicates that 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. 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 km² of the ecoregion in 2018, corresponding to ca. 17.5 % of the ecoregion’s spatial extent. A map of spatial distribution of bottom trawl effort is shown below. The Icelandic bottom trawl fleet consists of about 50 vessels (30–80 m length) fishing mainly for cod, haddock, saithe, redfish, and Greenland halibut.



⁹⁹ https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2020/2020/EcosystemOverview_IcelandicWaters_2020.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, 2012, and 2018.

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. An update of their work has been provided below.

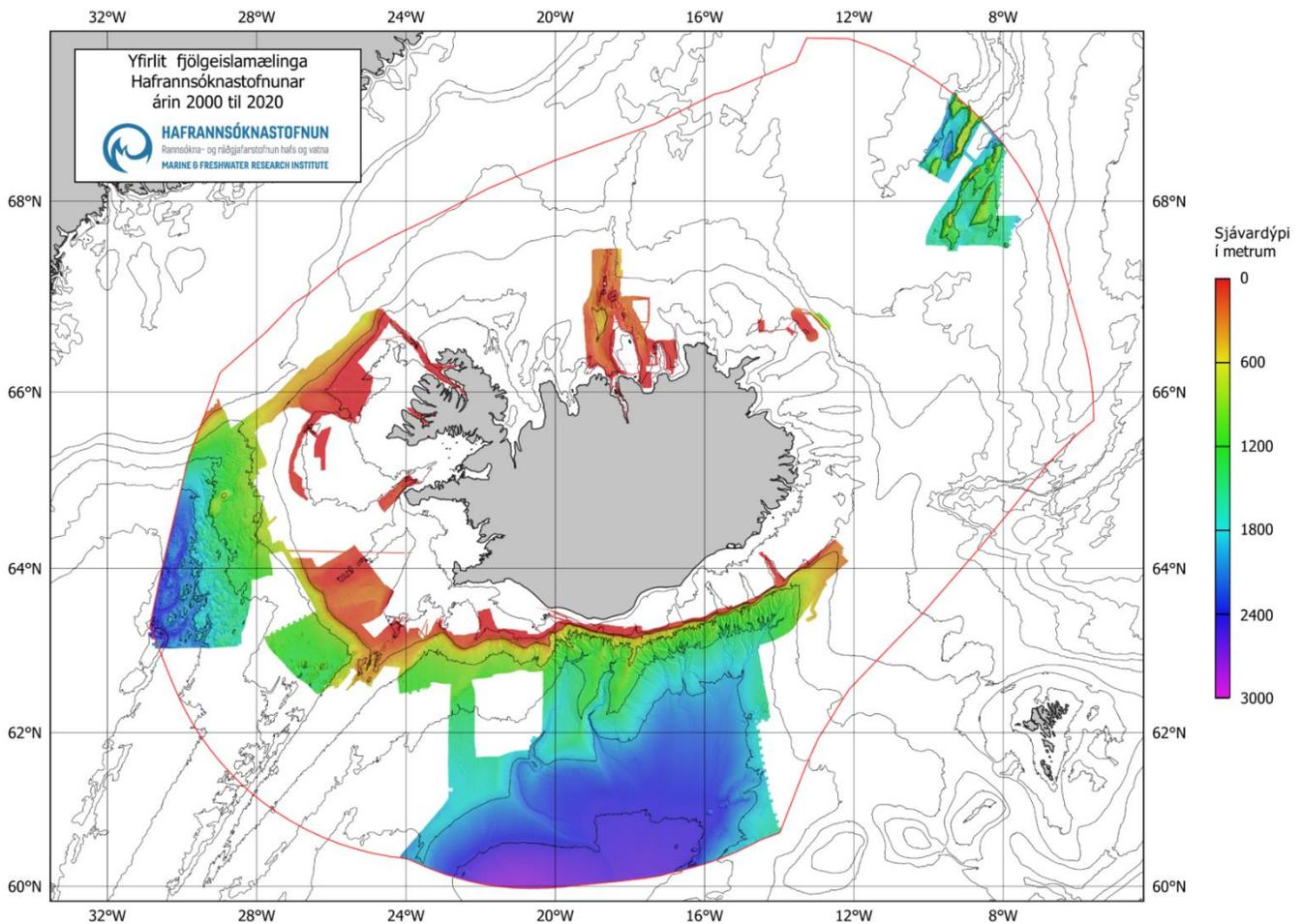


Figure 37. MFRI overview of seabed mapping in Icelandic waters between 2000 and 2020. Source: <https://www.hafogvatn.is/en/research/seabed-mapping>.

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)¹⁰⁰. 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)¹⁰¹ 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 managerial 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 managerial purposes.

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. 2020¹⁰²) (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 (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.

¹⁰⁰ <http://norden.diva-portal.org/smash/get/diva2:1304079/FULLTEXT02.pdf>

¹⁰¹ <https://www.frontiersin.org/articles/10.3389/fmars.2020.00131/full>

¹⁰² 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>

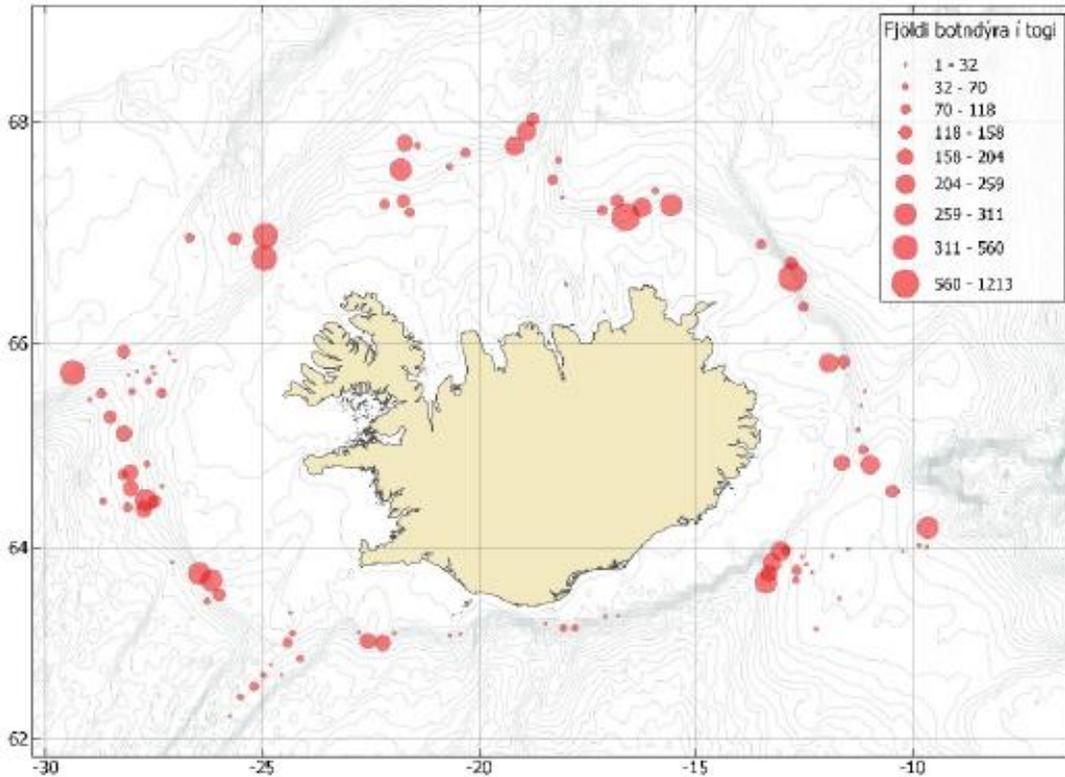


Figure 38. Benthos recorded in the autumn Icelandic autumn groundfish survey in 2020. Number (kg) per tow.

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. 2021¹⁰³. 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.

¹⁰³ 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>

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).

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.

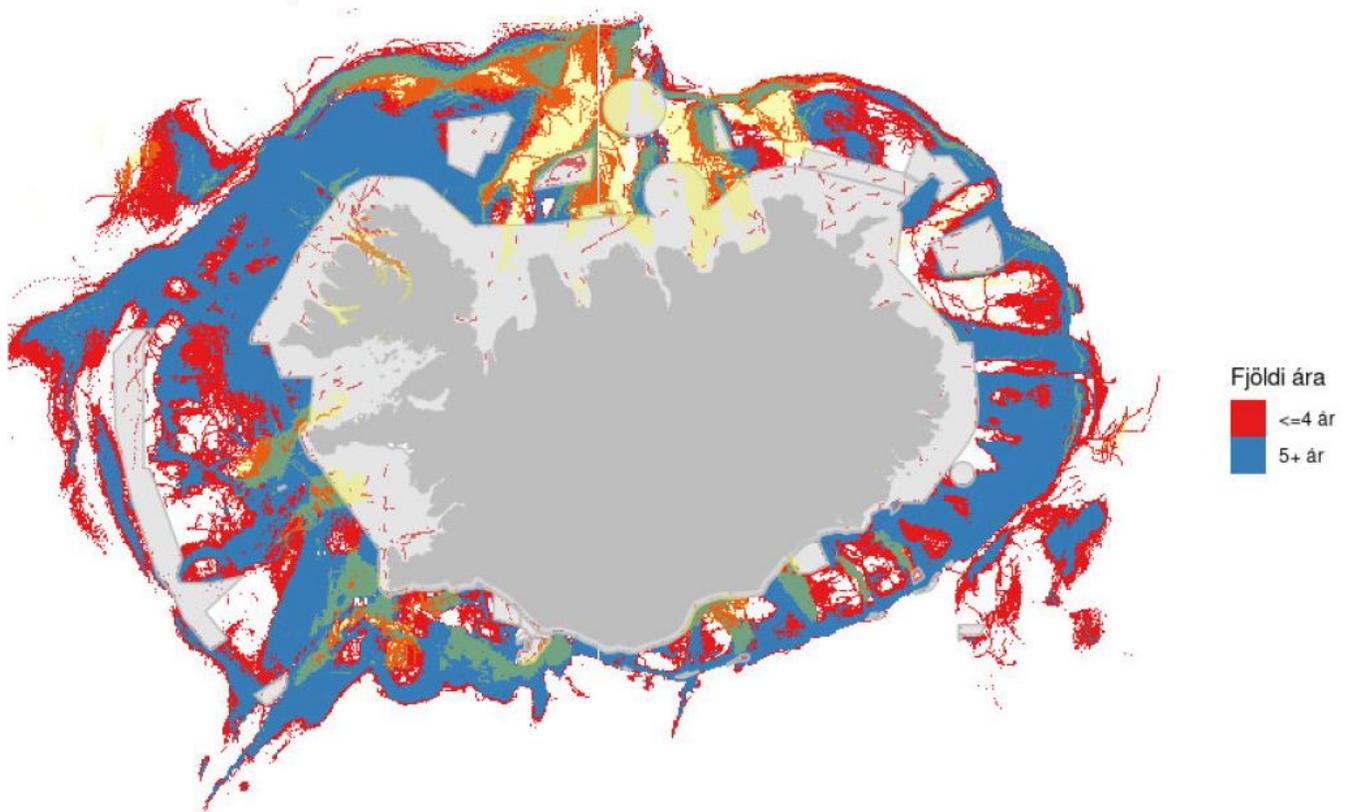


Figure 39. Long term closures and selected fishing distribution around Iceland between 2009-2019.

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.

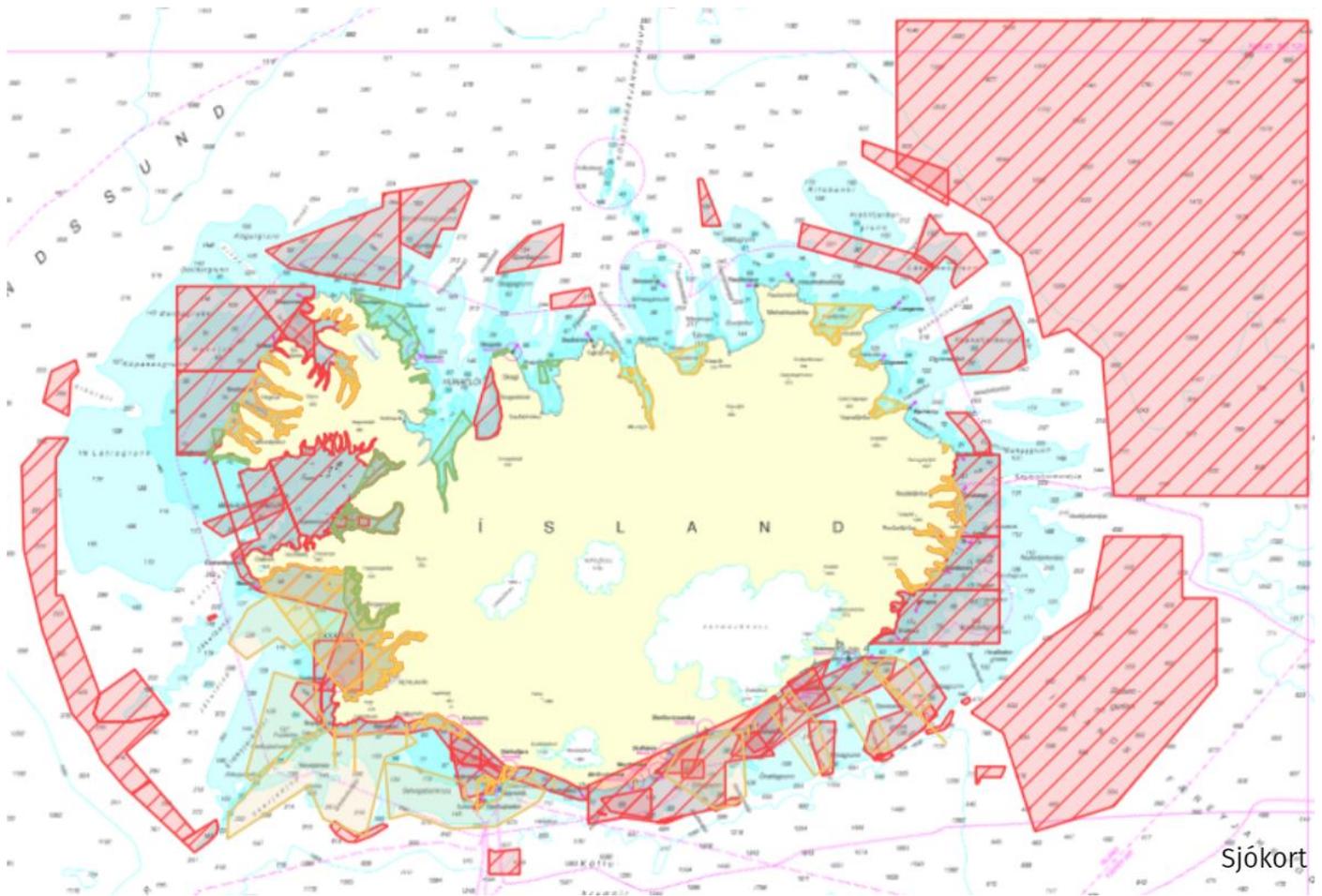


Figure 40. Regulatory long-term closures in Iceland, all gear types. Red closures tend to be bottom trawl and sometime all gear closures. Yellow/orange boxes with internal lines near the coast (East, West and North West) are longline closures. Open yellow/orange boxes south and southeast of Iceland are 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> .

Bottom trawl effort from the same map can be seen in the figure below.

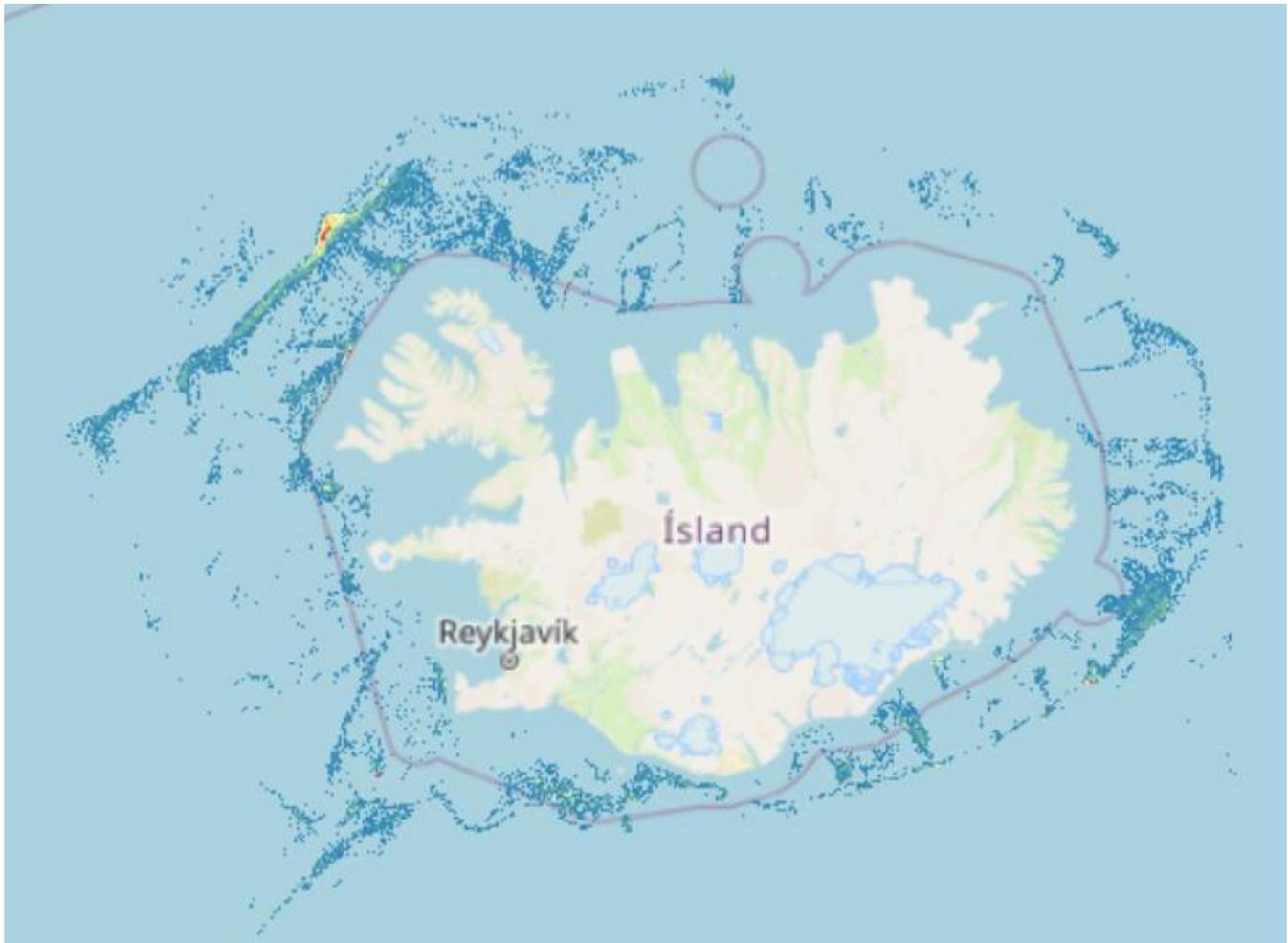


Figure 41. Bottom trawl effort in Iceland. Red areas indicate highest effort, yellow areas indicate medium effort, while blue dots indicate lower effort. Source: Atlas/GIS website managed by Fiskistofa at <http://atlas.lmi.is/mapview/?application=haf>.

The MRFI has proposed new closures to protect vulnerable ecosystems to the Ministry of Fisheries.

7.5.1.2 Foodweb considerations

The MRFI 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 2021¹⁰⁴. According to the 2021 acoustic autumn survey, the SSB is estimated 1 833 000 tonnes. The stock is in good status.

Fishbase reports¹⁰⁵ 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

¹⁰⁴ <https://www.hafogvatn.is/static/extras/images/lodnahaust20211278547.pdf>

¹⁰⁵ <http://www.fishbase.se/summary/Sebastes-norvegicus.html>

and temporal variations in the diet of redfish¹⁰⁶. 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 items¹⁰⁷.

Aside from the Sturludottir *et. al.* 2018¹⁰⁸ 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.

¹⁰⁶ <https://academic.oup.com/icesjms/article/63/9/1682/699283>

¹⁰⁷ <http://www.fishbase.se/Ecology/FishEcologySummary.php?StockCode=517&GenusName=Sebastes&SpeciesName=norvegicus>

¹⁰⁸ <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: <ul style="list-style-type: none"> – The fisheries management system – The fisheries management plan
Summary of relevant changes:	<p>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 Industries and Innovation 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.</p> <p>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). Log books are compulsory, and recently, only electronic logbooks (or mobile phone apps) are accepted. The fishing year in Iceland runs from 1st September - 31st August.</p> <p>All catches have to be accounted against quotas, and there is an active market for buying and selling quotas as needed. For most stocks, including golden redfish, quotas can be transferred between years and between species, within certain bounds.</p> <p>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.</p>
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 from Iceland and age-length data from Iceland. In addition, survey data from Iceland (bottom trawl

1.2 Research and Assessment

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.

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 2021 MFRI assessment¹⁰⁹ 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.

There has 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.

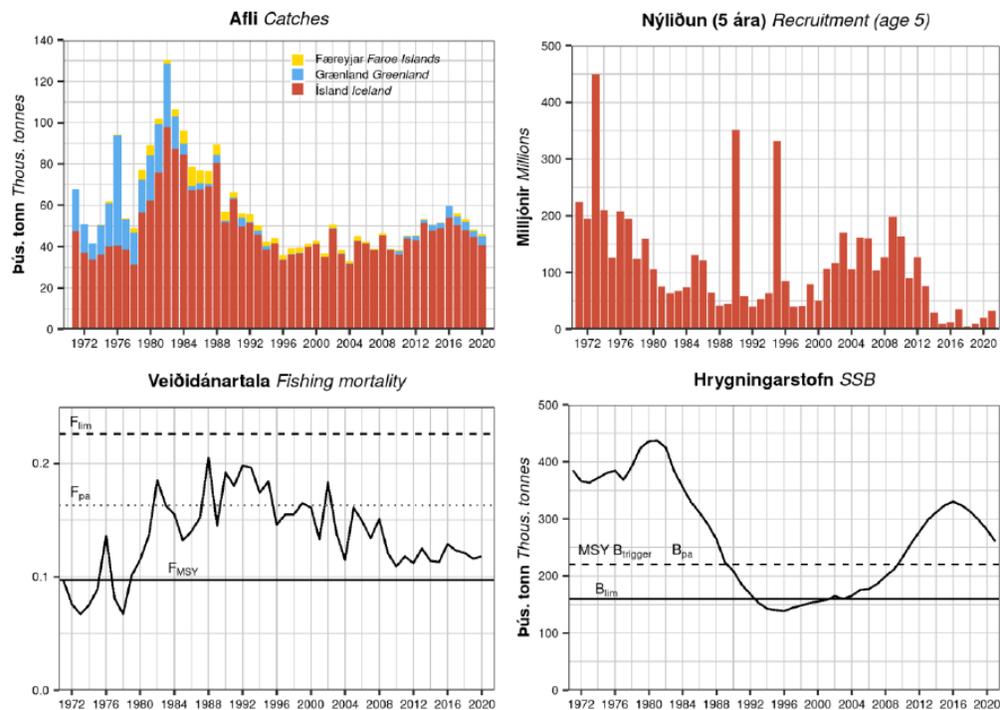


Figure 42. Golden redfish. Catches by area, recruitment, fishing mortality (ages 9-19), and spawning stock biomass (SSB).

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.

¹⁰⁹ <https://www.hafogvatn.is/static/extras/images/04-goldenredfish1259391.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, were established by ICES at the benchmark process in 2014. The lowest observed SSB (160000 tones estimated in 2012) was taken as B_{lim} , and B_{pa} was set by multiplying with a safety margin of 1.4, corresponding to an assessment CV of 0.2. The limit fishing mortality (F_{lim}) was calculated as that leading below B_{lim} with 50% probability, and the precautionary fishing mortality was set as $F_{lim}/1.4$, again assuming an assessment CV of 0.2.

Table 10. Golden redfish reference points.

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

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 F_{max} .

The management plan that was approved in 2014 has been applied since then. The plan has a harvest rule formulated as¹¹⁰:

- The annual TAC will be set consistent with the average fishing mortality rate of 0.097 in the advisory year for age-groups 9 – 19, when the spawning stock biomass (SSB) in the assessment year (SSB_y) is estimated to be above 220,000 t ($B_{trigger}$)
- When the SSB in the assessment year is estimated to be below 220,000 t ($B_{trigger}$), the TAC will be set consistent with a fishing mortality rate in the advisory year equal to $0.097 * (SSB_y / B_{trigger})$.

The golden redfish in Icelandic and Faroese waters is generally adult, while the nursery area in in East Greenland. In Iceland, there is a closed area on the western shelf break to protect small redfish (Figure 3 in Section 7.1.) Other protective measures include mesh size regulations, rules for landing of undersized fish, discard ban and sorting grids in shrimp

110 <https://www.government.is/topics/business-and-industry/fisheries-in-iceland/>

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)
	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:	<p>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.</p> <p>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.</p> <p>Iceland has broad international scientific cooperation through organisations such as the Northeast Atlantic Fisheries Commission (NEAFC)¹¹¹, the Northwest Atlantic Fisheries Organization (NAFO)¹¹², and the North Atlantic Marine Mammal Commission (NAMMCO)¹¹³. Icelandic scientists have been involved in many international projects arranged by these organizations and in co-operative projects with research institutes and universities.</p>
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:	<p>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 ¹¹⁴. Normally, the MFRI advice follows the ICES advice. The Minister of Fisheries and Agriculture decides on the TAC of the saithe 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.</p>

111 <http://www.neafc.org/>

112 <http://www.nafo.int/>

113 <http://www.nammco.no/>

114 <https://www.hafogvatn.is/static/extras/images/04-goldenredfish1259391.pdf>

1.5 Advice and Decisions on TAC	
	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. 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.

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	
<p>Summary of relevant changes:</p>	<p>The Icelandic Directorate of Fisheries, or Fiskistofa¹¹⁵, 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. More specifically, the Directorate of Fisheries works in accordance with the following Acts, the Directorate of Fisheries Act (no. 36/1992)¹¹⁶, the Fisheries Management Act (no. 116/2006)¹¹⁷, 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 catches¹¹⁸. 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.</p> <p>The Icelandic Coast Guard¹¹⁹ 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.</p> <p>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 1996¹²⁰). Provisions of the Act on a Special Fee for Illegal Marine Catch¹²¹ 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).</p> <p>Summary of relevant updates in 2021</p> <p>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 (Fisheries Directorate pers. com. site visit November 2021). 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</p>

¹¹⁵ <https://www.fiskistofa.is/umfiskistofu/>

¹¹⁶ <https://www.althingi.is/lagas/149a/1992036.html>

¹¹⁷ <https://www.ecolex.org/details/legislation/fisheries-management-act-1990-lex-faac003455/>

¹¹⁸ <http://www.fiskistofa.is/english/about-the-directorate/>

¹¹⁹ <http://www.lhg.is/english>

¹²⁰ <https://www.althingi.is/lagas/149a/1996057.html>

¹²¹ <https://www.althingi.is/lagas/149a/1992037.html>

2.1 Implementation, Compliance, Monitoring, Surveillance and Control

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 2018-2021.

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
2020	Haddock	1
2020	Greenland halibut	1
2021	Sea cucumber	2
2021	Cod	3
2021	Haddock	1

Directorate Inspections at Sea

Days spent by Fisheries Directorate inspectors at sea inspecting vessels is shown in Table 6. 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.

Based on the latest available 2020 Fiskistofa report, in 2020, 164 cases were suspected of violations. Table 8 contains information on the number of cases by category.

Table 8 also contains information regarding the penalties for suspected violations. The information does not show whether the decision of the Directorate of Fisheries has been repealed or amended by a ruling of the industry and the Consumer Innovation Council. The information in the tables cannot be compared with each other. One case could deal with several types of offenses. This can result in penalties and correction of catch registration. In addition, several violations by the same party may have been merged into one case.

The Directorate of Fisheries sent 470 letters due to catch logbooks not being returned on time and 1,321 cases arose due to fishing in excess of catch quotas, which then must be rectified by purchasing additional quota to balance the books or no further fishing is permitted.

2.1 Implementation, Compliance, Monitoring, Surveillance and Control

Enforcement by the Icelandic Coast Guard

At sea surveillance is primarily the remit of the Icelandic Coast Guard (I0043G). 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 November 2021 the ICG reported that surveillance in 2020 and 2021 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 (ICG).

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 DF 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 (see Table 5) and none based on Fisheries inspections by ICG. The overall number of inspections since 1988 is shown below.

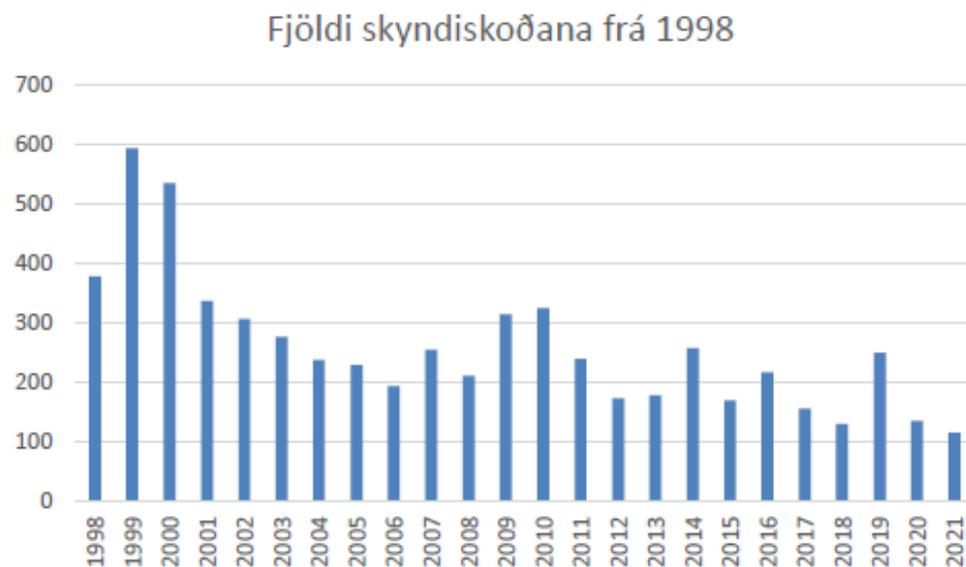


Figure 43. Overall number of ICG inspection from 1988 to 2021. Source: provided by the ICG during the remote audit, November 2021.

Also, we show here below a figure for the amount of air surveillance performed in 2021.

2.1 Implementation, Compliance, Monitoring, Surveillance and Control

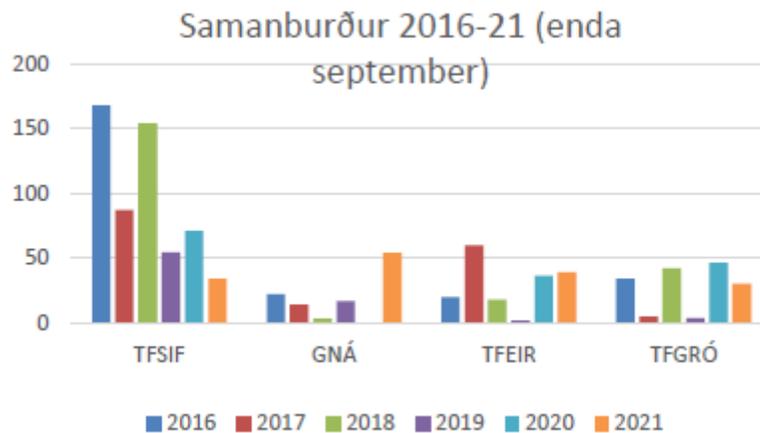


Figure 44. Air surveillance by four different Icelandic assets from 2016 to 2021. Samtals is the total. Source: provided by the ICG during the remote audit, November 2021.

Also, seven foreign flag vessels were inspected the ICG in 2021, three Faroese vessels of which one was a longliner and two capelin fishing vessels, and four Norwegian capelin fishing vessels, all within Icelandic EEZ.

In terms of overall infringements, 8 reports of apparent infringements were reported in 2021, 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 2021, included: Lögskráningar/Crew registry, Veiðar /Fisheries, Veiðileyfi /Fishing permit, Ferilvöktun /Vessel monitoring, Farþegafjöldi /Passengers, Haffæri /Sea worthiness and a new addition Fyrirmælum ekki fylgt /Instructions not obeyed. These are shown below (until the end of September 2021) compared to historical data up to 2016.

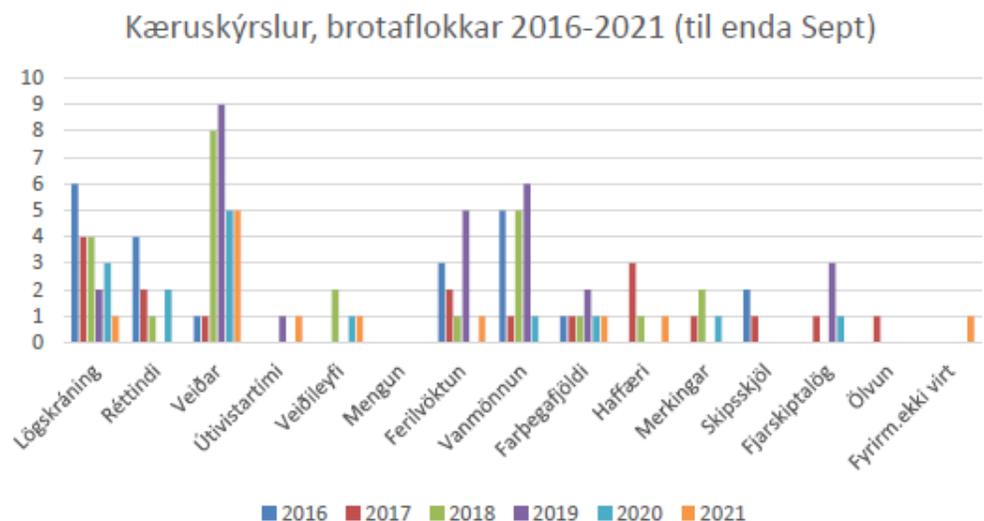


Figure 45. Overview of ICG infringement reports in 2016-2021. Source: provided by the ICG during the remote audit, November 2021.

From these eight reports, 12 apparent infringements were reported in 2021. For 2021, infringements on Veiðar /Fishing are the 5 most common, and adding Veiðileyfi /Fishing permit brings the total

2.1 Implementation, Compliance, Monitoring, Surveillance and Control	
	number of infringements specifically regarding fisheries to 6. No apparent infringement were reported in 2021 in the following categories; Réttindi /License, Mengun /Pollution, Vanmönnun /Manning, Merkingar /Markings, Skipsskjöl /Ships documents, Fjarskiptalög /Communications or Ölvun /intoxication. Of the 8 vessels that were reported for apparent infringements in 2021, up to end of September, 6 vessels are less than 24 meters in length; 2 are more than 24 meters in length, one of which is a passenger vessel.
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:	<p>Context</p> <p>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.746/2016¹²². These must be electronic (e-logs). Small vessels used to use paper logbooks until late 2020 when regulation 298/2020¹²³ implemented the use of an electronic app. The App also called Afladagbókina or catch diary^{124 125} automatically records the location of the boat during fishing and the captains 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:</p> <ul style="list-style-type: none"> • 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. <p>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</p>

¹²² <https://www.stjornartidindi.is/Advert.aspx?RecordID=42a16a67-60a7-4ae7-ad7c-0f53fc254654>

¹²³ <https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887>

¹²⁴ <http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla>

¹²⁵ 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

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)⁵⁵.

2021 updates

The Minister of Fisheries and Agriculture decides on the TAC of the golden redfish stock for each fishing year (Sept –Aug) in accordance to law (Fisheries Management Act 116), based on HCR and the advice mentioned below. Before catch is allocated, proportions of the TAC of some species is removed for various reasons such as for the coastal fisheries which any small boat in possession of a licence may access, for research purposes or for chartered angling vessels. Catches of Golden redfish are consistently above advice, in the past 3 seasons averaging 7.3%. These apparent overages in previous years were due to landings of juveniles through the VS catch system (up to 5% of TAC), catches by other nations that exceed what was set aside for that (including Faroese catches for which there is no TAC), various arrangements to allow flexibility and reduce the incentive for discards across the entire spectrum of species managed in Iceland created to allow the functioning of the global discard ban.

Table 12. TACs and actual catches, according to MFRI (source: MFRI, 2021 advice¹²⁶).

Fiskveiðiar Fishing year	Tillaga Recommended TAC	Aflamark fyrir Ísland National TAC	Afli á Íslandsmiðum Catch in Icelandic waters	Afli við Austur Grænland ¹⁾ Catch in East Greenland waters ¹⁾	Afli við Færeyjar ¹⁾ Catch in Faroese waters ¹⁾	Afli alls ¹⁾ Total catch ¹⁾
2010/2011	30 000	37 500	39 432	1 005	493	45 271
2011/2012	40 000	40 000	44 514	2 017	491	45 594
2012/2013	45 000	45 000	46 549	1 499	372	53 171
2013/2014	52 000	52 000	52 451	2 706	201	50 676
2014/2015	48 000 ²⁾	45 600	48 349	2 562	270	51 601
2015/2016	51 000 ²⁾	48 500	54 818	5 442	165	59 648
2016/2017	52 800 ²⁾	47 205	48 352	4 501	1 397	56 008
2017/2018	50 800 ²⁾	45 450	51 857	4 004	1 330	53 348
2018/2019	43 600 ²⁾	39 240	44 616	2 665	1 053	48 464
2019/2020	43 568 ²⁾	38 896	41 251	4 108	1 297	46 190
2020/2021	38 343 ²⁾	34 379				
2021/2022	31 855 ²⁾					

¹⁾ Almanaksár – Calendar year.

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

References:

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.

¹²⁶ <https://www.hafogvatn.is/static/extras/images/04-goldenredfish1259391.pdf>

7.6.8 Clause 2.3 Monitoring and Control

<p>2.3 Monitoring and Control including:</p> <ul style="list-style-type: none"> 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 	
<p>Summary of relevant changes:</p>	<p>Context</p> <p>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.</p> <p>Catches by vessel are monitored and recorded in near real-time in a central database maintained by the Fisheries Directorate¹²⁷. The official weight of the catch is subtracted from that vessels individual 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:</p> <ol style="list-style-type: none"> 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 <p>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,</p>

¹²⁷ <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

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.

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 fines¹²⁸.

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.

¹²⁸ <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

Updates for 2021

During the November remote site visit 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 2021 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 catch and bycatch, including that of marine mammals and seabirds. This follows regulation 298/2020¹²⁹. The App also called Afladagbókina or catch diary^{130 131} 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.

As of November 2021, the system 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/Fiskistofa IT staff collaboration. 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

¹²⁹ <https://www.reglugerdir.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887>

¹³⁰ <http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla>

¹³¹ https://www.mbl.is/200milur/frettir/2020/08/31/oll_aflaskraning_rafraen_fra_og_med_morgundeginum/

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	
	<p>fishermen. A tutorial video on the use of the App was also published on the Fiskistofa website https://www.fiskistofa.is/ymsaruppl/tilkynningar/afladagbocarapp-myndband and on the Fiskistofa facebook site¹³².</p> <p>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.</p> <p>Status: Open, Corrective Actions in place to be reviewed annually in subsequent audits. Corrective actions are deemed to be on track.</p> <p>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.</p>
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.

¹³² <https://www.facebook.com/Fiskistofa-1151844504903713/videos/304666984614930/>

Section 3. Ecosystem considerations

7.6.9 Clause 3.1 Guiding Principle

3.1 Guiding Principle	
Summary of relevant changes:	<p>Associated species catch and bycatch to the fishery</p> <p>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 2019¹³³. A status update on each of these species is provided in Table 9.</p> <p>Endangered, Threatened and Protected (ETP) and vulnerable species interactions</p> <p>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.</p> <p>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.</p> <p>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).</p> <p>Harbour Porpoises (<i>Phocoena phocoena</i>)</p> <p>Harbour porpoises are classified as Least Concern in the IUCN Red List¹³⁴ (population trend unknown, last assessed in 2020). They are also classified as Least Concern in the Icelandic National Redlist (based on a 2016 assessment)¹³⁵. 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 2009–2013¹³⁶ and down to about 750 animals in 2014-2015.</p> <p>The latest Report of the NAMMCO Scientific Committee Working Group on Harbour Porpoise (19-22 March 2019)¹³⁷ reported the following about the Icelandic harbour porpoise population.</p>

¹³³ <https://www.responsiblefisheries.is/media/1/form-9e-irf-icelandic-redfish-re-assessment-final-certification-report-july-2019.pdf>

¹³⁴ <https://www.iucnredlist.org/species/17027/50369903>

¹³⁵ <https://www.ni.is/node/27406>

¹³⁶ 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>

¹³⁷ https://nammco.no/wp-content/uploads/2019/02/final-report_hpwg-2019.pdf

3.1 Guiding Principle

After reviewing the assessment and noting the recent decline in by-catch, 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.

An aerial survey in Iceland is planned for harbour porpoise in 2023.

Harbour seals

The MFRI 2021 advice for harbour seals¹³⁸ 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

The MFRI has been conducting pinger/acoustic device testing in gillnet fisheries for several years now, with mixed results. The last device tested in 2019-2020 showed promise, and publication on the results and possible larger scale trials were planned for 2021 (MFRI, personal communication, November 4th, 2021).

Sharks

¹³⁸ <https://www.hafogvatn.is/static/extras/images/radgjof-landselur20201286028.pdf>

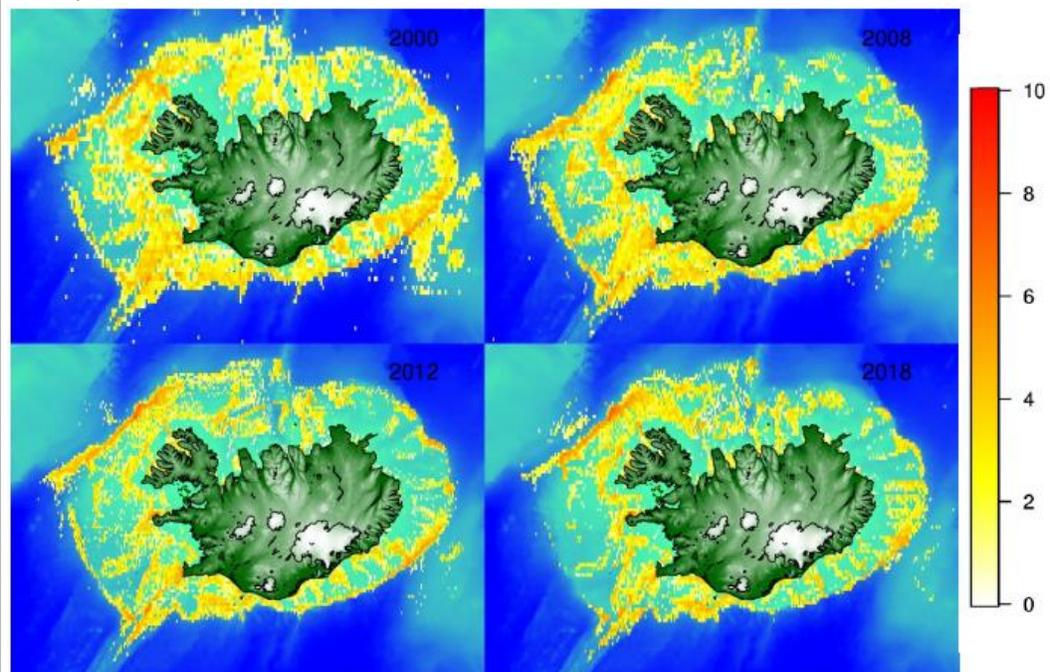
3.1 Guiding Principle

Generally speaking, landed catches of sharks remain quite small. Some catch of leaf scale gulper sharks has been recorded, last in 2016. Grey skate (*Dipturus flossada / batis*) landed catch in 2019 was 194 t, and 160 t in 2020. Survey abundance is variable but has been on average relatively stable in recent years. Landed catch of dogfish (*Squalus acanthias*) was 1 t in 2019 and 3 t in 2020. Survey trends are very sporadic. Landed catch of Greenland shark (*Somniosus microcephalus*) was 6 t in 2019 and 2 t in 2020. Survey trends are also very sporadic. Landed catch of porbeagle in 2019 was 2.6 t and 3.6 t in 2020. Porbeagles (*Lamna nasus*) are rarely caught in surveys, but two were caught in the autumn survey in 2021 and one in the gillnet survey in 2019.

Trawl effort spatial extent

The ICES 2020 Icelandic ecosystem overview report¹³⁹ indicates that 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.

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 km² of the ecoregion in 2018, corresponding to ca. 17.5 % of the ecoregion’s spatial extent. A map of spatial distribution of bottom trawl effort is shown below. The Icelandic bottom trawl fleet consists of about 50 vessels (30–80 m length) fishing mainly for cod, haddock, saithe, redfish, and Greenland halibut.



¹³⁹ https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2020/2020/EcosystemOverview_IcelandicWaters_2020.pdf

Figure 46. 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, 2012, and 2018.

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 distribution and environmental factors related to them (Buhl - Mortensen et al. 2019)¹⁴⁰. 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)¹⁴¹ 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 managerial 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 managerial purposes.

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. 2020¹⁴²) (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 (Fig. 47). 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.

3.1 Guiding Principle

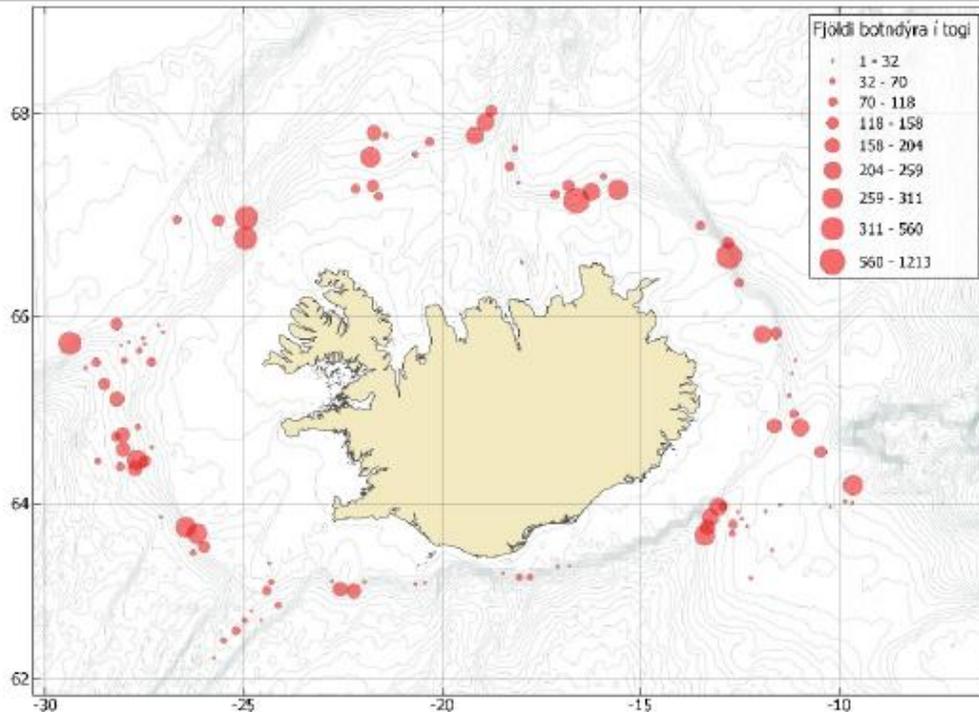


Figure 47. Benthos recorded in the autumn Icelandic autumn groundfish survey in 2020. Number (kg) per tow.

Policy for vulnerable marine ecosystems

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. 2021¹⁴³. 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

¹⁴⁰ <http://norden.diva-portal.org/smash/get/diva2:1304079/FULLTEXT02.pdf>

¹⁴¹ <https://www.frontiersin.org/articles/10.3389/fmars.2020.00131/full>

¹⁴² 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>

¹⁴³ 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>

3.1 Guiding Principle

- 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).

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.

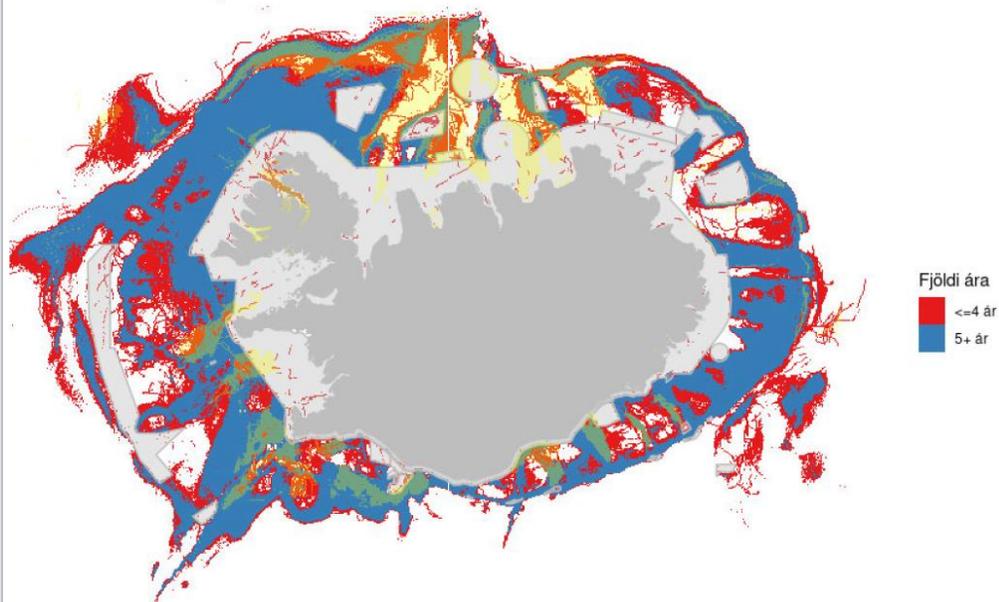


Figure 48. Long term closures and selected fishing distribution around Iceland between 2009-2019.

The MRFI has proposed new closures to protect vulnerable ecosystems to the Ministry of Fisheries.

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

3.1 Guiding Principle	<p>ecosystems. Icelandic capelin’s status was assessed by the MFRI again in 2021¹⁴⁴. According to the 2021 acoustic autumn survey, the SSB is estimated 1 833 000 tonnes. The stock is in good status.</p> <p>Fishbase reports¹⁴⁵ 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 redfish¹⁴⁶. Golden redfish are epibenthic-pelagic and are preyed upon by larger fish including Atlantic cod, Atlantic halibut, harbour seals and whales.</p> <p>Their trophic level is 4.0 ± 0.68 se; based on food items¹⁴⁷.</p> <p>Aside from the Sturludottir <i>et. al.</i> 2018¹⁴⁸ 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.</p>
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:	<ul style="list-style-type: none"> 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:	<p>Context and updates</p> <p>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. 2021), which include results 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</p>

¹⁴⁴ <https://www.hafogvatn.is/static/extras/images/lodnahaust20211278547.pdf>

¹⁴⁵ <http://www.fishbase.se/summary/Sebastes-norvegicus.html>

¹⁴⁶ <https://academic.oup.com/icesjms/article/63/9/1682/699283>

¹⁴⁷ <http://www.fishbase.se/Ecology/FishEcologySummary.php?StockCode=517&GenusName=Sebastes&SpeciesName=norvegicus>

¹⁴⁸ <https://www.sciencedirect.com/science/article/pii/S0165783618301620>

<p>3.2 Specific Criteria including:</p> <ul style="list-style-type: none"> 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 	<p>shark, Atlantic halibut, orange roughy, shagreen ray, etc... Catch records for over 50 species can be retrieved on their website.¹⁴⁹</p> <p>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.</p> <p>The status of bycatch and associated species has been detailed in the previous clause. Spotted wolffish is depleted and subject to corrective actions by management authorities 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).</p> <p>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.</p> <p>Habitat considerations are listed in the yearly ICES ecosystem report for the Icelandic waters, the last of which was published in December 2020¹⁵⁰. 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 km² 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.</p> <p>Aside from the Sturludottir <i>et. al.</i> 2018¹⁵¹ publication showing that Golden redfish appears to be reasonably well connected to other key fish species as both prey and predator but it</p>
---	---

¹⁴⁹ <http://www.fiskistofa.is/veidar/aflastada/aflastodulisti/>

¹⁵⁰ https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2020/2020/EcosystemOverview_IcelandicWaters_2020.pdf

¹⁵¹ <https://www.sciencedirect.com/science/article/pii/S0165783618301620>

3.2	<p>Specific Criteria including:</p> <ul style="list-style-type: none"> 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
	<p>does not appear to be a key prey species in the Icelandic marine ecosystem, there are no further updates on this topic.</p> <p>Precautionary considerations are integrated in the management of associated and non-target species.</p>
References:	<p>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.</p>
Statement of continuing consistency to the IRF Fishery Standard	<p>The fishery continues to remain consistent with the standard.</p>

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 surveillance¹⁵² and re-assessment¹⁵³ 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 NCs for this 2nd Surveillance is shown below. No new non-conformances were identified during the current audit.

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:	<p>The recording of marine mammals and seabirds by number and species is required by Icelandic regulation¹⁵⁴. 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 <i>et al.</i> 2015¹⁵⁵ and the March 2018 MFRI report titled: “Bycatch of Seabirds and Marine Mammals in lumpsucker gillnets 2014-2017”.</p> <p>Pallson <i>et al.</i> 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.</p>

¹⁵² <https://www.responsiblefisheries.is/media/1/form-9h-irf-icelandic-golden-redfish-4th-surveillance-2018final.pdf>

¹⁵³ <https://www.responsiblefisheries.is/media/1/form-9e-irf-icelandic-redfish-re-assessment-final-certification-report-july-2019.pdf>

¹⁵⁴ <https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967>

¹⁵⁵ <https://www.hafogvatn.is/static/research/files/fjolrit-178.pdf>

	<p>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 2017¹⁵⁶.</p> <p>Furthermore according to a 2017 presentation to NAMMCO’s Working group on bycatch of marine mammals; <i>“logbooks have unfortunately proven unreliable”</i> and <i>“bycatch of birds and marine mammals is 18x higher when observer is present vs logbook records”</i>.</p> <p>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.</p>
Corrective Action Plan	<p>In accordance with rules of the IRF Programme, the Client is required to submit a Corrective Action Plan (CAP) within 28 days.</p> <p>The Client submitted the following CAP in February 2019</p>

¹⁵⁶ <https://www.hafogvatn.is/static/files/skjol/techreport-bycatch-of-birds-and-marine-mammals-lumpsucker-en-final-draft.pdf>



To whom it may concern

ÁTVINNUVEGA-OG
NÝSKÖPUNARRÁÐUNEYTIÐ

Ministry of Industries and Innovation

Skúlagötu 4 101 Reykjavík Iceland
tel.: + (354) 545 9700 postur@anr.is
anr.is

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).

	<p>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:</p> <p>Year 1: Ongoing work to further refine the actions identified above in terms of specific deliverables with their accompanying timeline;</p> <p>Year 2: Initiate deliverable x, y, z identified in Year 1;</p> <p>Year 3: Fully implement and report on progress;</p> <p>Year 4: Continued implementation and reporting.</p>
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



To whom it may concern

ATVINNUVEGA-OG
NÝSKÖPUNARRÁÐUNEYTIÐ

Ministry of Industries and Innovation

Skúlagötu 4 101 Reykjavík Iceland
tel.: + (354) 545 9700 postur@anr.is
anr.is

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 initiated 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

	<p>continue to collaborate directly with various stakeholders and to explore multiple options and solutions.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p>
Assessment Team Determination on Year-1 Corrective Evidence	<p>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.</p> <p>The first surveillance activities will review evidence that the corrective actions highlighted above have been carried out.</p>
Year 2 progress (1st Surveillance, early 2021)	<p>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 298/2020¹⁵⁷. The App was designed and trialled between 2018 and 2020. The App also called Afladagbókina or catch diary¹⁵⁸</p>

¹⁵⁷ <https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887>

¹⁵⁸ <http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla>

¹⁵⁹ 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

¹⁵⁹ https://www.mbl.is/200milur/frettir/2020/08/31/oll_aflaskraning_rafraen_fra_og_med_morgundeginum/

	Total seabirds	32	45	37	71	185
	Demersal longline					
	Species	2016	2017	2018	2019	Total
	Northern fulmar	61	303	539	195	1098
	Northern gannet	0	27	3	0	30
	Seagull species	25	8	3	0	36
	Total seabirds	86	338	545	195	1164
	Demersal otter trawl					
	Species	2016	2017	2018	2019	Total
	Harbour seal	0	0	3	1	4
	Unidentified dolphin	0	0	1	0	1
	Total marine mammals	0	0	4	1	5
	Northern gannet	0	0	0	3	3
	Total seabirds	0	0	0	3	3
	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	<p>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.</p> <p>The 2nd surveillance activities will review evidence that the corrective actions highlighted above have been carried out.</p>					
Year 3 progress (2nd Surveillance, late 2021)	<p>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.</p>					

	<p>A tutorial video on the use of the App was also published on the Fiskistofa website https://www.fiskistofa.is/ymsaruppl/tilkynningar/afladagbocarapp-myndband and on the Fiskistofa Facebook site¹⁶⁰.</p> <p>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.</p>
Assessment Team Determination on Year-3 Corrective Evidence	<p>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.</p> <p>The 3rd surveillance activities will review evidence of continuous implementation of the App in the small vessel sector.</p>

8.1.1 New non-conformances

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

8.1.2 New or revised corrective action plans

Not applicable

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.
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

¹⁶⁰ <https://www.facebook.com/Fiskistofa-1151844504903713/videos/304666984614930/>

Recommendation 2 (of 4)	
	Iceland and Greenland, or equivalent, and <i>evaluated</i> 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.

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). 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 ¹⁶¹) and sea-pen fields ¹⁶² . 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.

¹⁶¹ http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2017/2017/Ecosystem_overview-Icelandic_Waters_ecoregion.pdf

¹⁶² <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.

10 References

<p>Agnarsson, S., T. Matthiasson and F. Girya. 2016. Consolidation and distribution of quota holdings in the Icelandic fisheries. <i>Marine Policy</i>, 72:263-270</p>	<p>https://www.sciencedirect.com/science/article/pii/S0308597X16302238</p>
<p>Althingi. 1996. Act 1996 nr. 57 on the conduct of marine fish stocks. Accessed 14 December 2021.</p>	<p>http://www.althingi.is/lagas/148a/2015112.html</p>
<p>Althingi. 2006. Fisheries Management Act, Lög No. 116 -2006 um stjórn fiskveiða. Accessed 14 December 2021.</p>	<p>https://www.althingi.is/lagas/nuna/2006116.html</p>
<p>Althingi. 2017. Act amending the Act on Access to Marine Marine Stocks and the Act on the Directorate of Fisheries (monitoring of weighing license holders). Accessed 14 December 2021.</p>	<p>https://www.althingi.is/altext/stjt/2017.048.html</p>
<p>Althingi. 2018. Act on fishing in Iceland's exclusive fishing zone 1997 no. May 26. Icelandic law, 20 January 2019. Issue 149a. Accessed 14 December 2021.</p>	<p>https://www.althingi.is/lagas/nuna/1997079.html</p>
<p>Althingi. Act 2015 nr. 112 on Marine Research Institute, research and advisory body for sea and water. Accessed 14 December 2021.</p>	<p>https://www.althingi.is/lagas/nuna/2015112.html</p>
<p>Althingi. Act Concerning the Treatment of Commercial Marine Stocks (Act No. 57 1996). Ministry of Business and Innovation. Accessed 14 December 2021.</p>	<p>https://www.althingi.is/lagas/149a/1996057.html</p>
<p>Althingi. Act on a Special Fee for Illegal Marine Catch (1992 nr. 37). Ministry of Business and Innovation. Accessed 14 December 2021.</p>	<p>https://www.althingi.is/lagas/149a/1992037.html</p>
<p>Althingi. Act on the Directorate of Fisheries (1992 no. 36). Ministry of Business and Innovation. Accessed 14 December 2021.</p>	<p>https://www.althingi.is/lagas/149a/1992036.html</p>
<p>Buhl-Mortensen L., Burgos J. M., Steingrund P., Buhl-Mortensen P., Ólafsdóttir S. H. and Ragnarsson S. A. 2019. Vulnerable marine ecosystems (VMEs) Coral and sponge VMEs in Arctic and sub-Arctic waters - Distribution and threats. <i>TemaNord</i> 2019:519 ISSN 0908-6692 http://dx.doi.org/10.6027/TN2019-519</p>	<p>http://norden.diva-portal.org/smash/get/diva2:1304079/FULLTEXT02.pdf</p>

Burgos JM, Buhl-Mortensen L, Buhl-Mortensen P, Ólafsdóttir SH, Steingrund P, Ragnarsson SÁ and Skagseth Ø. 2020. Predicting the Distribution of Indicator Taxa of Vulnerable Marine Ecosystems in the Arctic and Sub-arctic Waters of the Nordic Seas. Front. Mar. Sci. 7:131. doi: 10.3389/fmars.2020.00131	https://www.frontiersin.org/articles/10.3389/fmars.2020.00131/full
Collection of laws and regulations in Icelandic fishery, 2021-2022 season.	https://simplebooklet.com/stjrnfiskveia20212022lgo_greglugerir
Collette, B., Fernandes, P. & Heessen, H. 2015. Anarhichas minor. The IUCN Red List of Threatened Species 2015: e.T18263655A44739959.	https://www.iucnredlist.org/species/18263655/44739959#population
Fiskistofa. 2020 Fiskistofa Annual Report, 2020. Maritime surveillance chapter. Directorate of Fisheries	http://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2020.pdf
Fiskistofa. 2020. About Fisheries Management. Accessed 14 December 2021.	http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Krokaaflamarksbatar
Fiskistofa. 2020. About the Directorate of Fisheries. Accessed 14 December 2021.	http://www.fiskistofa.is/umfiskistofu/
Fiskistofa. 2020. About the Directorate. Accessed 14 December 2021.	http://www.fiskistofa.is/english/about-the-directorate/
Fiskistofa. 2020. Catch composition in cod nets and bottom trawls to detect discards. Accessed 14 December 2021.	http://www.fiskistofa.is/umfiskistofu/frettir/aflasamsetning-i-thorskanetum-og-botnvorpu
Fiskistofa. 2020. Catch logbook - App for electronic catch registration. Accessed 14 December 2021.	http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skranningu-afla
Fiskistofa. 2021. About Fisheries Management. Accessed 14 December 2021.	http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/#Sveigjanleiki_i_aflamarkskerfinu
Fiskistofa. 2021. Allocation of catch quotas for the fishing year 2020/2021. Accessed 14 December 2021.	http://www.fiskistofa.is/veidar/aflaheimildir/uthluta_daflamark/
Fiskistofa. 2021. Catch and quota status by fish species. Accessed 14 December 2021.	http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/
Fiskistofa. 2021. Catches of all species. Accessed 14 December 2021.	http://www.fiskistofa.is/veidar/aflaupplýsingar/afliall_artegundir/
Fiskistofa. 2021. Closures. Accessed 14 December 2021.	http://www.fiskistofa.is/fiskveidistjorn/veidibann
Fiskistofa. 2021. Cod equivalents. Accessed 14 December 2021.	http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/thorskigildisstudlar/
Fiskistofa. 2021. Fisheries Control Division Accessed 14 December 2021.	http://www.fiskistofa.is/umfiskistofu/starfsemi/veidieftirlitssvid/

Fiskistofa. 2021. Fisheries Management. Accessed 14 December 2021.	http://www.fiskistofa.is/fiskveidistjorn/
Fiskistofa. 2021. Gutting factor. Accessed 14 December 2021.	http://www.fiskistofa.is/fiskveidistjorn/stjornfiskveida/slaeingarstudlar/
Fiskistofa. 2021. Overview map over closures etc (Hafsja). Accessed 14 December 2021.	http://atlas.lmi.is/mapview/?application=haf
Fiskistofa. 2021. Overview of VS catches by species. Accessed 14 December 2021.	http://www.fiskistofa.is/veidar/aflastada/vs-afla/vsafli.jsp
Fiskistofa. 2021. Regulatory Closures. Accessed 14 December 2021.	http://www.fiskistofa.is/fiskveidistjorn/veidibann/reglugerdarlokanir/
Fiskistofa. 2021. Rules for logbooks. Accessed 14 December 2021.	https://www.fiskistofa.is/fiskveidistjorn/afladagbaekur/
Fiskistofa. 2021. Rules for quotas for small communities (Byggdakovti). Accessed 14 December 2021.	http://www.fiskistofa.is/veidar/aflaheimildir/byggdakovti/
Fiskistofa. 2021. Rules for small scale near shore fisheries (Strandveidar). Accessed 14 December 2021.	http://www.fiskistofa.is/fiskveidistjorn/umfiskveidistjornunarkerfid/strandveidar/
Fiskistofa. 2021. Transfer of fishing rights. Accessed 14 December 2021.	http://www.fiskistofa.is/eydublod/flutningurveidiheimilda/
Fiskistofa. The Icelandic Directorate of Fisheries - Responsibilities and main tasks. Accessed 14 December 2021.	http://www.fiskistofa.is/media/utgefingefni/DOF.pdf
Government of Iceland. 2021. Fisheries Management – main page. Incl. Link to harvest rules.	https://www.government.is/topics/business-and-industry/fisheries-in-iceland/
Government of Iceland. 2021. Government statement on international policy	https://www.government.is/topics/business-and-industry/fisheries-in-iceland/international-policy/
Government of Iceland. 2021. Statement on Fisheries Management.	https://www.government.is/topics/business-and-industry/fisheries-in-iceland/fisheries-management/
Guðjón Már Sigurðsson & al. Mælingar á brottkasti þorsks og ýsu 2016-2018	https://www.hafogvatn.is/static/research/files/1608029972-hv2020-41.pdf
ICES home page	http://www.ices.dk
ICES. 2014. Report of the Workshop on Redfish Management Plan Evaluation (WKREDMP).	https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2014/WKREDMP/wkredmp_2014.pdf
ICES. 2019. Stock annex for Golden redfish in Iceland, Greenland and Faroes.	https://www.ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2019/reg.27.561214_SA.pdf
ICES NWWG report 2018: Golden redfish	http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2018/NWWG/21%20NWWG%20Report%202018_Sec%2019_Golden

	%20redfish%20in%20subareas%205,%206%20and%2014.pdf
ICES NWWG report 2021: Golden redfish	https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2021/NWWG_publication%20with%20multiple%20files/NWWG%202021_19%20Golden%20redfish%20(Sebastes%20norvegicus)%20in%20subareas%205,%206,%20and%2014.pdf
ICES. 2014. Advice on management plan for Golden redfish.	https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2014/Special%20Requests/Iceland_Faroe_Islands_Greenland_Evaluation_of_Itmp_for_golden_redfish.pdf
ICG. 2021. Icelandic Coast Guard. Accessed 14 December 2021.	http://www.lhg.is/english
Jakobsdóttir K. B., Jón Sólmundsson H. B., Kristinsson K., Ólafsdóttir S. H. og Bogason V. 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
Manuals for the Icelandic bottom trawl surveys Hafrannsóknir nr. 156.	https://www.hafogvatn.is/static/research/files/fjolrit-156.pdf
MFRI. 'Muppet': Multi Use Pre Programmed Ecosystem Toolbox	https://github.com/Hafro/Muppet_HCR/
MFRI. 2021. 2021 Cod technical report. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/01-cod_tr1206999.pdf
MFRI. 2021. 2021 Anglerfish advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/20-anglerfish1259454.pdf
MFRI. 2021. 2021 Anglerfish technical report. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/20-anglerfish_tr1259453.pdf
MFRI. 2021. 2021 Atlantic halibut advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/07-atlanticahalibut1259402.pdf
MFRI. 2021. 2021 Atlantic wolffish advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/15-atlanticwolffish1259434.pdf
MFRI. 2021. 2021 Blue Ling advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/18-blueling1259446.pdf

MFRI. 2021. 2021 Blue whiting advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/kolm_unni_20211278352.pdf
MFRI. 2021. 2021 Capelin advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/lodna_haust20211278547.pdf
MFRI. 2021. 2021 Cod advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/01-cod1259506.pdf
MFRI. 2021. 2021 Dab advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/13-dab1259425.pdf
MFRI. 2021. 2021 Demersal beaked redfish advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/05-demersalsmentella1259395.pdf
MFRI. 2021. 2021 Golden redfish advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/04-goldenredfish1259391.pdf
MFRI. 2021. 2021 Golden redfish technical report. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/04-goldenredfish_tr1259389.pdf
MFRI. 2021. 2021 Greater silver smelt advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/23-greatersilversmelt1259465.pdf
MFRI. 2021. 2021 Greenland halibut advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/08-greenlandhalibut1259406.pdf
MFRI. 2021. 2021 Haddock advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/02-haddock1259378.pdf
MFRI. 2021. 2021 Haddock technical report. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/02-haddock_tr1259376.pdf
MFRI. 2021. 2021 harbour seal advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/radji_of-landselur20201286028.pdf
MFRI. 2021. 2021 Herring advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/22-herring1259461.pdf
MFRI. 2021. 2021 Herring technical report. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/30-herring_tr1260934.pdf
MFRI. 2021. 2021 Lemon sole advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/10-lemonsole1259413.pdf
MFRI. 2021. 2021 Ling advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/17-ling1259442.pdf
MFRI. 2021. 2021 Ling technical report. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/17-ling_tr1259440.pdf
MFRI. 2021. 2021 Mackerel advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/makrill_20211278360.pdf

MFRI. 2021. 2021 Megrím technical report. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/12-megrím_tr1259422.pdf
MFRI. 2021. 2021 Megrím advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/12-megrím1259421.pdf
MFRI. 2021. 2021 Plaice advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/09-plaice1259410.pdf
MFRI. 2021. 2021 Saithe advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/03-saithe1259383.pdf
MFRI. 2021. 2021 Saithe technical report. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/03-saithe_tr1259382.pdf
MFRI. 2021. 2021 seals advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/radgi-of-landselur20201286028.pdf
MFRI. 2021. 2021 Spotted wolffish advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/16-spottedwolffish1259438.pdf
MFRI. 2021. 2021 Spotted wolffish technical report. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/16-spottedwolffish_tr1259436.pdf
MFRI. 2021. 2021 Starry Ray advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/24-starryray1259469.pdf
MFRI. 2021. 2021 Tusk advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/19-tusk1259450.pdf
MFRI. 2021. 2021 Tusk technical report. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/19-tusk_tr1259448.pdf
MFRI. 2021. 2021 Whiting advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/21-whiting1259458.pdf
MFRI. 2021. 2021 Witch advice. Marine and Freshwater Research Institute.	https://www.hafogvatn.is/static/extras/images/11-witch1259417.pdf
MFRI. 2021. MFRI Organisational Chart. Marine and Freshwater Research Institute. Accessed 24 January 2021.	https://www.hafogvatn.is/static/files/enska/skipurit_hafrannsoknastofnun_enska.pdf
MFRI. 2021. Seabed mapping. Marine Research Institute.	https://www.hafogvatn.is/en/research/seabed-mapping
MII. 2020. Regulation 1256/2020 on (2nd) amendment to Regulation no. 468/2013, on the utilization of catch and by-products (spotted wolffish live release). Ministry of Industry and Innovation	https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/22242
MII. 2020. Regulation 298/2020 on registration and electronic submission of catch information (via App). Ministry of Industry and Innovation	https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887

MII. 2020. Regulation 726/2020 on commercial fishing in the fishing year 2020/2021. Ministry of Industry and Innovation.	https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/0726-2020
MRI. 2010. Manuals for the Icelandic bottom trawl surveys in spring and autumn. Hafrannsóknir nr. 156. Marine Research Institute.	http://www.hafro.is/Bokasafn/Timarit/fjolrit-156.pdf
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
Nordic Council of Ministers. 2021. Vulnerable marine ecosystems (VMEs) Coral and sponge VMEs in Arctic and sub-Arctic waters – Distribution and threats.	http://norden.diva-portal.org/smash/get/diva2:1304079/FULLTEXT02.pdf
Ólafsdóttir S. H., Ragnarsson S. A., Burgos J. M., Hjörleifsson H., Jakobsdóttir K og Þórðarson G. 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
Oostdijk, Maartje, Conor Byrne, Gunnar Stefánsson, Maria J. Santos, Pamela J. Wood (2020). Catch–quota matching allowances balance economic and ecological targets in a fishery managed by individual transferable quota Proceedings of the National Academy of Sciences Oct 2020, 117 (40) 24771-24777.	https://www.pnas.org/content/117/40/24771
Regulation 743/2002. Reglugerð um möskvastærðir- og utbúnað varpna til veiða á botnfiski, rækju og humri. (Mesh size and technical regulations in bottom trawl for demersal fish, shrips and nephrops.)	https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/4032
Regulation 745/2016. Reglugerð um vigtunog skráningu sjávaraflla. Regulation on weighing	https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/20213
Regulation nr. 660/2019. Detailed rules for permanent closures for long line.	https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21661
Regulation nr. 660/2019. Detailed rules for permanent closures for trawl	https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21660
Vefbirting. 2021. Fisheries Regulation 2021-2022.	https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2021/09/23/Stjorn-fiskveida-2021-2022-Log-og-reglugerdir/

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.