Iceland Responsible Fisheries Foundation (IRFF)

Iceland Responsible Fisheries Certification Programme

CERTIFIED

Icelandic Saithe 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/SAI/002.2/2021
Report Date:	21 December 2021

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Foreword

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

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

1 Contents

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2 Glossary

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

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

3 Executive Summary

This 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-conformances are 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

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

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

3.2 Details of applicable IRF Documents

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

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

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

4 Fishery Applicant Details

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

5 Units of Certification

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

Table 3. Unit of Certification (UoC).		
Species:	**Common name (ENG and ISL):**	Icelandic saithe (Ufsi)
	Latin name:	*Pollachius virens*
Geographical Area(s)		Iceland 200-mile EEZ within FAO Fishing Area 27
Stock(s)		Saithe in ICES Division 5a (Iceland grounds)
Management System		Ministry of Industries and Innovation (Iceland)
Fishing gear(s)/method(s)		Demersal trawl; Gill-net; Longline; Danish Seine; Hook and line (Handline) by small vessels; Gears from other Icelandic fisheries legally landing saithe*
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

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

Meeting Date and Location	Personnel	Areas of discussion/agenda points
Date: 01st of November 2021 Location: Remote, Video Call	The Client (opening meeting): Kristján Þórarinsson, Fisheries Iceland; Finnur Gardarsson, IRF Foundation. GT Assessment Team: Vito Romito Dankert Skagen	▪ 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? ▪ 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: *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, what are the updates, new information or developments addressing the issue? ▪ Corrective Action relating to Non-Conformance 2: *There is insufficient evidence that adverse impacts of the cod, haddock and saithe fisheries on the following ecosystem components:* *Spotted wolffish, and;* *Common loon* *are being considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.* ▪ Regarding NC 2, what are the key developments regarding 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?
Date: 2nd November 2021 Location: Remote, Video call	Icelandic Coast Guard: Björgólfur H. Ingason, Chief controller, Icelandic Coast Guard; Asgrimur L. Asgrimsson, Chief of Operations, Icelandic Coast Guard. GT Assessment Team: Vito Romito Dankert Skagen	▪ 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 under assessment)? Foreign vessels boarded? *Could you please provide us with tables/figures for this information as done in past years?* ▪ How many prosecutions and reprimands made against skippers did these activities (overall enforcement activities) result in? *Could you please provide us with tables/figures for this information as done in past years?* ▪ Are there many violations of fishermen fishing over their TAC? ▪ 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? ▪

Date: 2nd November 2021 Location: Remote, Video call	Directorate of Fisheries/Fiskistofa: Erna Jónsdóttir, Head of Administration Division, Fiskistofa; Sævar Guðmundsson, Head of Department, Fiskistofa. GT Assessment Team: Vito Romito Dankert Skagen	▪ 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 no 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. ▪ 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** ▪ Corrective Action relating to Non-Conformance 1 (applicable to all certified fisheries): *Although required by legislation, there is evidence of extensive non-reporting/under-reporting of seabirds and marine mammals bycatch 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?** ▪ 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? ▪ Corrective Action relating to Non-Conformance 2: *There is insufficient evidence that adverse impacts of the cod, haddock and saithe fisheries on the following ecosystem components:* - *Spotted wolffish, and;* - *Common loon* *are being considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.* Regarding 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 https://www.fiskistofa.is/veidar/aflaupplysingar/afliallartegundir/) ▪ 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
Date: 04th November 2021 Location: Remote, Video call	Marine and Freshwater Research Institute (MFRI): Gudmundur Thordarson, Head of Demersal Division, MFRI;	▪ 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?

	Bjarki Elvarsson, Senior Scientist, MFRI. GT Assessment Team: Vito Romito Dankert Skagen	▪ 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? ▪ Sathe: 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: *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, 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: *There is insufficient evidence that adverse impacts of the cod, haddock and saithe fisheries on the following ecosystem components:* *Spotted wolffish, and;* *Common loon* *are being considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.* ▪ Regarding NC 2, what are the key developments regarding spotted wolffish (e.g. relating to research activities and/or live releases in the fishery)? 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 there a record of it (the Fiskistofa website only reports total catch https://www.fiskistofa.is/veidar/aflaupplysingar/afliallartegundir/)? ▪ 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 (*Dipturus flossada / batis*) 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?
Date: 05th of November 2021 Location: Remote, Video Call	The Client (closing meeting): Kristján Þórarinsson, Fisheries Iceland; Finnur Gardarsson, IRF Foundation. GT Assessment Team: Vito Romito Dankert Skagen	▪ 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 / Background

7.1 Relevant changes to Legislation/Regulations and the Management Regime

Fisheries legislation

Iceland has an established Marine Policy and a structured management system[1] covering all commercial species, including saithe[2]. 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 Innovation[5] 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 Directorate of Fisheries (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 Guard[7] is responsible for control at sea, both of the catches and the quality 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 record[9].

TAC and ITQ system

Limiting the total annual catch of saithe 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://www.althingi.is/lagasafn/kaflar/nuna/33.html (laws)
and
https://www.reglugerd.is/reglugerdir/33/ (regulations)
See also: 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)[10] by the ICES North-Western Working Group (NWWG)[11], according to standards approved by ICES in regular benchmark assessments[12]. 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 saithe, 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.*[13] When harvest rules have been established in a management plan, as for saithe, the Ministry recognizes an obligation to set the TAC accordingly. The current management plan for saithe was last examined and approved by ICES in 2019.[14,] The plan is publicly available [15].

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

1 Each vessel is assigned a quota share (%) in each stock, initially based primarily on catch history over a reference period.
2 The annual allowable catch for each vessel from each stock is obtained by multiplying the TAC of the year and the vessel's quota share (as a proportion).

Quotas can be transferred between vessels; this applies both to quota shares and annual catch allotments. For most stocks, including saithe, 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, as well as reducing the incentive for discarding, 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 et al, 2016[17]. A recent study of the transfer system in Iceland (Oostdijk & al, 2020)[18] describes the performance of this system in detail and concludes that *' The trend toward individual quota and discard bans presents a challenge for mixed fisheries: how to avoid widespread under-utilization of quota due to choking effects of individual species for which quota is exhausted. Iceland's demersal fishery has met this challenge using the most elaborate set of balancing mechanisms in the world……The absence of persistent overfishing of individual stocks is attributed to limits that have been tightened over time and are very strict for the primary target species. These results highlight the potential for balancing mechanisms to facilitate sustainable exploitation of distinct interconnected resources and the importance of adapting implementation to local circumstances.'*

10 https://www.ices.dk/Pages/default.aspx
11 https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2021/NWWG_publication%20with%20multiple%20files/NWWG%202021_8%20Icelandic%20saithe.pdf
12 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2019/WKICEMSE/WKICEMSE%20Report%202019.pdf
13 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/
14 https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2019/Special_Requests/iceland.2019.08.pdf
15 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/
16 https://www.althingi.is/lagas/nuna/2006116.html
17 https://www.sciencedirect.com/science/article/pii/S0308597X16302238
18 Oostdijk & al: www.pnas.org/cgi/doi/10.1073/pnas.2008001117

Control of landings

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

General fishing permits are of two types, a general fishing permit with a catch quota and a general fishing permit with a hook-and-line catch quota. In addition, parts of the total TAC is set aside for special purposes (for example Strandveidar[20], Bygdakvoti[21]), mostly to support local communities and small scale fisheries.

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

Protective measures

These include area closures (temporary and permanent) 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 2019[23]. The Directorate has recently launched a map solution (Hafsjá) to inform about all closures (permanent and short term) as well as other information (Figure 1)[24].

19 https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/20213
20 https://www.fiskistofa.is/fiskveidistjorn/umfiskveidistjornunarkerfid/strandveidar/
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24 http://atlas.lmi.is/mapview/?application=haf

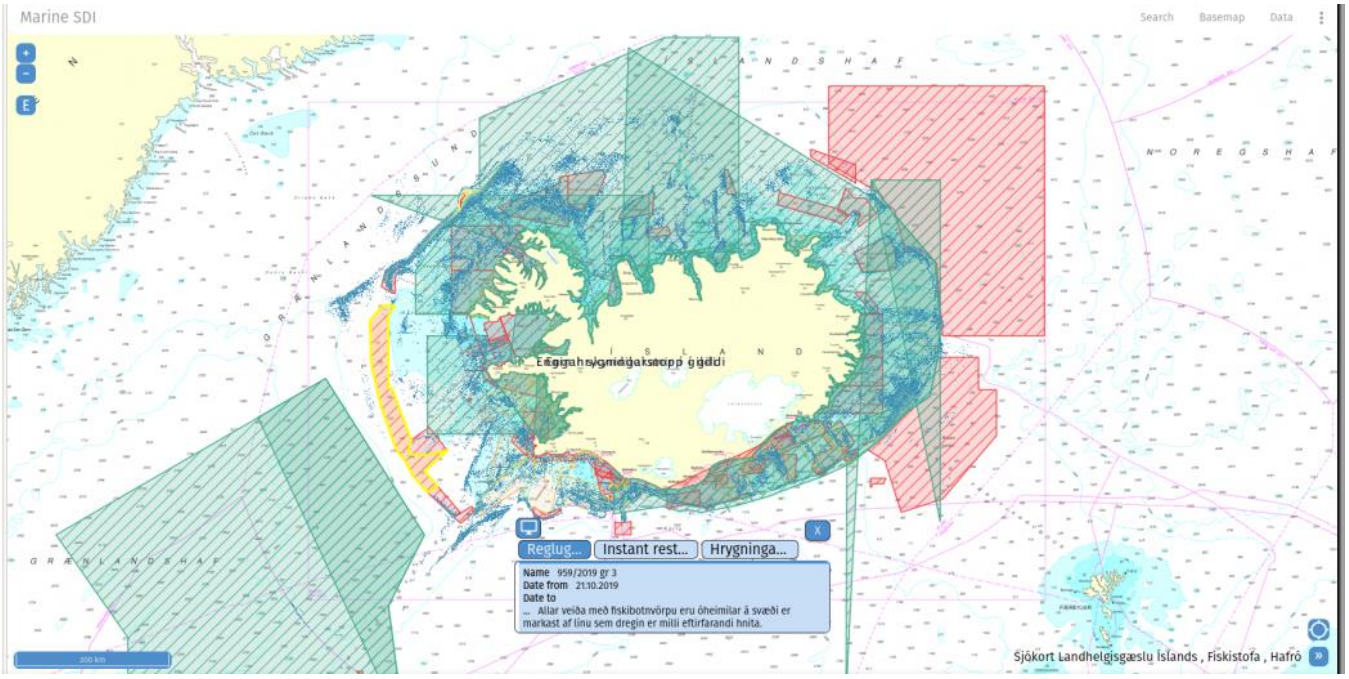


Figure 1. Screenshot of an example of the map in Hafsjá. The colored fields are various closures. One (with yellow outline in the West) has been marked, and the label at the bottom gives details of that regulation. The small dots are location of catches (all gears in this example).

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 3 weeks. They are published on the website of the Directorate, and shown in the Hafsjá map.

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

Discards are prohibited in Iceland.[26] Discards are not included in the assessment and are considered to be small. To some extent they are monitored, mostly for cod and haddock. Discards of saithe have not been monitored, but as the catches of saithe are well below the TAC, there is no strong incentive for discarding it.

International relations

Policies incorporate a number of International Agreements and declarations [27], 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

25 Mesh size regulations: https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/4032
26 https://www.althingi.is/lagas/nuna/1996057.html
27 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/international-policy/

Commission (NEAFC)[28], the Northwest Atlantic Fisheries Organization (NAFO)[29], and the North Atlantic Marine Mammal Commission (NAMMCO)[30]. Icelandic scientists have been involved in many international projects arranged by these organizations and in co-operative projects with research institutes and universities.

7.2 Stock status update

Stock identity

Saithe in Icelandic waters is regarded as a local stock and managed exclusively by Iceland. Saithe is partly demersal and partly pelagic, and is known to be more migratory than typical demersal stocks. Tagging studies has indicated some exchange between saithe stocks, in particular immigration of occasional year classes of North-East Arctic saithe. The biggest immigration episode (age 7 in 1991) is included in the stock assessment.

Assessment data. The observations that go into the assessment is catches in numbers at age and an age-disaggregated index from the bottom trawl survey in the spring.

Catch data. In Iceland, the fishery for saithe is nowadays almost exclusively conducted with bottom trawl (>90% of total catches).

The sampling of catches[31] is fully computerised and directly linked to the daily landings statistics available from the Directorate of Fisheries. The sampling design is based on getting a certain number of samples per tonnes landed stratified by area landed, gear and time. For each fleet/gear and each landing stratum there is a specific target of amount landed; once the cumulative daily landings value pass the target value an automatic request is made to the sampling team for a sample to be taken. For the trawl fisheries, this seems to work well.

The samples used to derive catch in numbers are both taken by observers at sea and from shore samples. The trawlers that freeze the catch account for majority of sea samples while all shore samples are from fresh fish trawlers. The number of age samples was well over 100 per year until 2016, but has decreased towards 50 per year after that. Since 2013 the number of aged fishes per sample has been 25 and the number of fish aged annually has reduced to 1500–2000[32]. Sampling effort was low in 2020, mostly due to Covid (41 samples, 1012 fish aged).

All Icelandic catches of saithe (as well as all other commercial fish) has to be landed in authorized ports and weighed by authorized weighers.[33] Almost all saithe is landed gutted and the weights are rescaled to un-gutted by dividing by 0.84. The exact value of the scaling factor may be lower, but as this is only a scaling, it is not critical. These landings are reported to the Directorate and are the primary source of catch data.

Discards are prohibited in Iceland. and are generally assumed to be minor, although direct measurements of discards is problematic and incomplete. Discards are not included in the assessment.

Survey data. There is a spring groundfish survey and an autumn groundfish survey, both covering the whole

28 http://www.neafc.org/
29 http://www.nafo.int/
30 http://www.nammco.no/
31 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2015/WKICE%202015/wkice_2015_final.pdf
32 https://www.hafogvatn.is/static/extras/images/03-saithe_tr1259382.pdf. see Table 2
33 ttps://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/20213

Icelandic EEZ. (Figure 2) These surveys are more extensive than most surveys that are used around the world for routine assessments (530 stations in the spring survey, 380 stations in the autumn survey) There are only minor changes from year to year in the coverage. An extensive survey protocol is available[34].

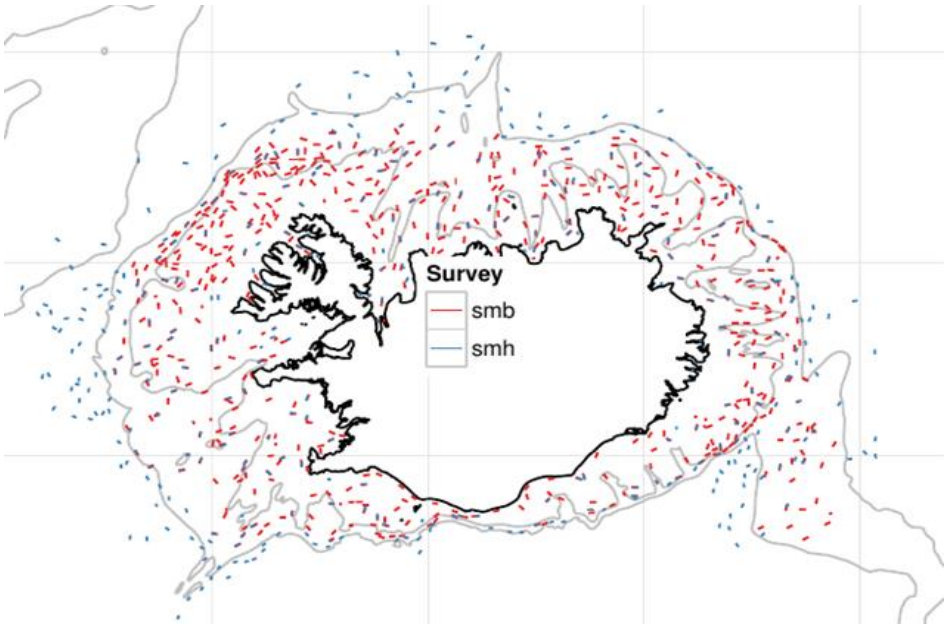


Figure 2. Stations in the Spring groundfish survey (and Autumn groundfish survey (blue).

The surveys are used for assessments of most demersal stocks in Iceland. For saithe, only the spring survey is used, as that covers the distribution of saithe better and has a larger number of stations.

Saithe is among the most difficult demersal fishes to get reliable information from by bottom trawl surveys. In the spring survey, which has 500–600 stations, a large proportion of the saithe is caught in relatively few hauls and there seems to be considerable inter-annual variability in the number of these hauls.

Assessment method

The saithe is assessed with a forward-running separable statistical catch at age model, allowing changes in selectivity to occur in specified years. It has been used since a benchmark in 2010[35] . It is fitted to commercial catch at age data and a survey index from the Icelandic bottom trawl survey in the spring. The code has been extended over the years, and is now labelled 'Muppet'[36](Multi Use Pre Programmed Ecosystem Toolbox), but the method is largely unchanged. A description of the method, as used for saithe, as well as a full description of the preparation of the data used for tuning and as input is provided in the stock annex for saithe[37]. The model is set up so that both stock assessment and predictions are done at the same time. Every year a number of other models have been run for comparison and even though the adopted assessment is based on the survey in March, the signal seen in the other surveys is also investigated.

34 https://www.hafogvatn.is/static/research/files/fjolrit-156.pdf
35 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2010/WKROUND%202010/final_wkround_2010.pdf
36 https://github.com/Hafro/Muppet_HCR/
37 https://www.ices.dk/sites/pub/Publication%20Reports/Stock%20Annexes/2019/pok.27.5a_SA.pdf

The assessment was benchmarked again in 2019 [38], but no changes were made to the method. There has been a management plan in effect for saithe since 2013. It was revisited and revised in 2019, together with the benchmark of the assessment.

Assessment performance

The data outlined above are in principle considered relevant and sufficient for assessing the stock using the *Muppet' software for saithe, although, as saithe typically is difficult to measure in surveys, there is relatively high variances and poor internal consistency (Figure 4). There is some clusters in the catch residuals (Figure 3) and more so in the survey residuals (Figures 4 and 5). The changes in fishing practices over the last decade may also contribute to the uncertainty, as it leads to changes in the selection at age in the fishery. There is also some retrospective deviations (Figure 6), although the main features (recent stock increase to far above the reference points), low harvest rate, recruitment peak in 2015 and low recruitment in 2018) are consistent.

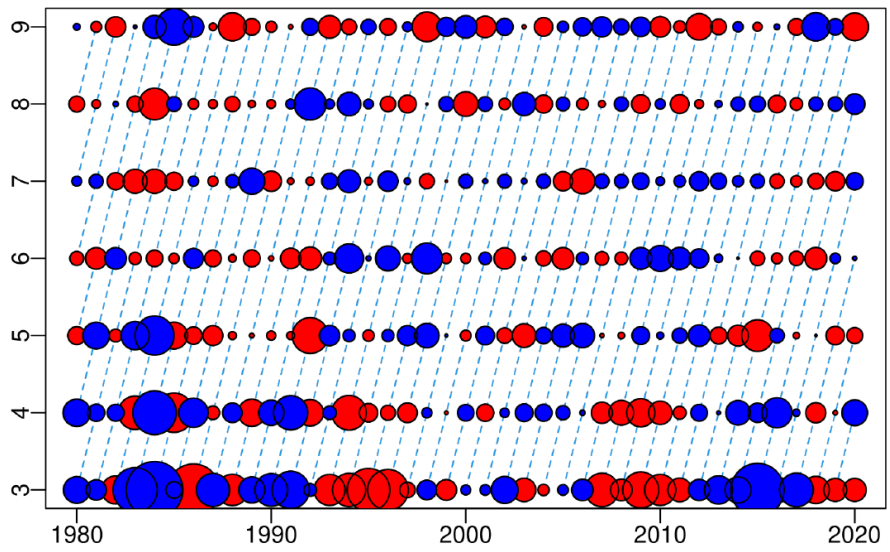


Figure 3. Catch residuals from the model of the catch at age. Blue: measured values above the model fit, Red: measured values below the model fit.

38http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2019/WKICEMSE/WKICEMSE%20Report%202019.pdf

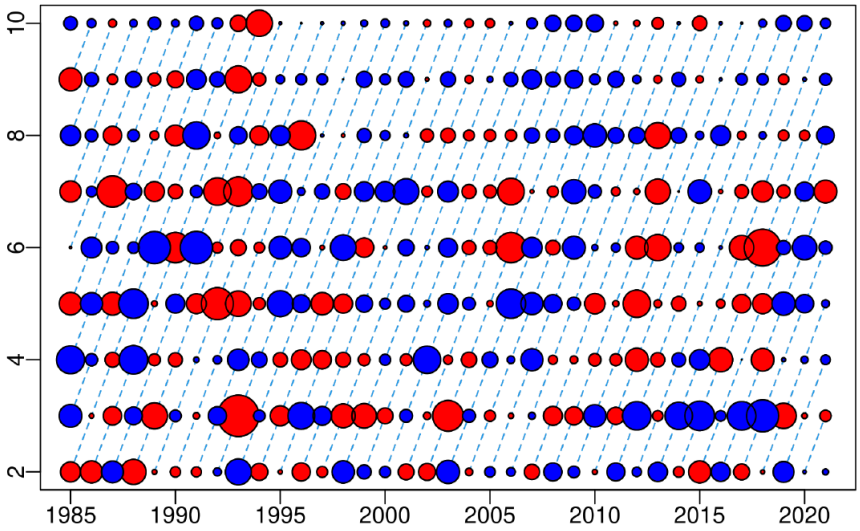


Figure 4. Survey residuals from the model fit to the abundance indices in the spring survey by year and age (blue – measured values above the model fit, red – measured values below the model fit.

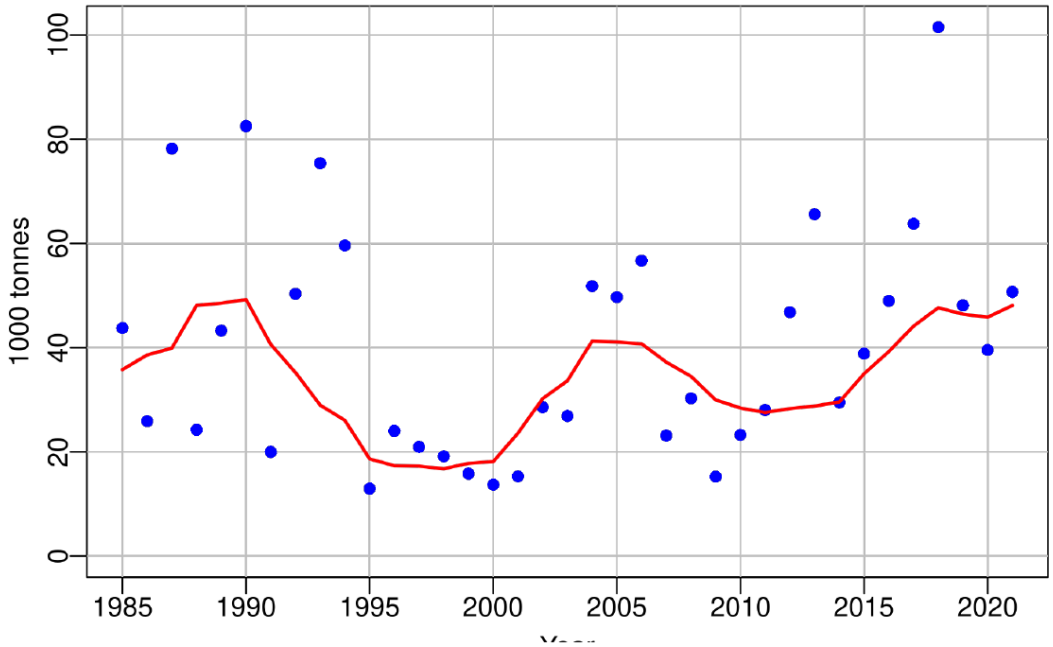


Figure 5. Observed aggregated age-based survey indices (point) and modelled indices (lines) - spring survey.

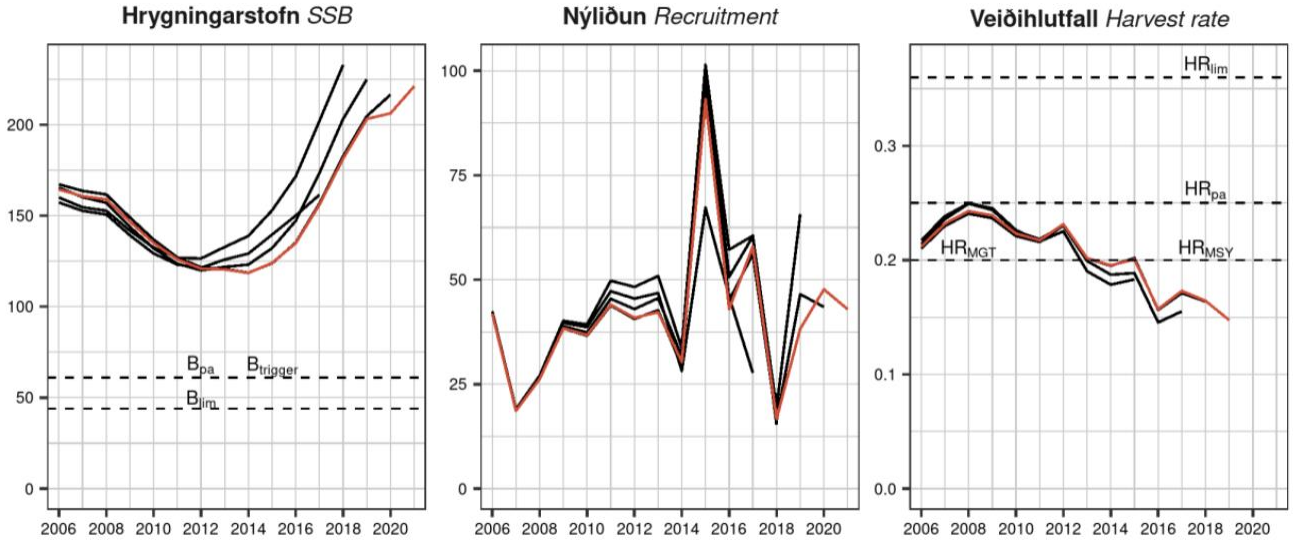


Figure 6. Current assessment (red line) compared with previous estimates (2017–2020), and status against reference points.

Examinations of a wider range of data with a variety of models led the MFRI to conclude[39] that the reduction in CPUE, TAC not caught, gillnet survey showing decrease, lead to the perceptions that TAC s are too high and that overestimates of biomass is likely. As saithe is less attractive than some other species, that may lead to some paradoxic effects like increased catch of some other species through the transfer system, covering the excess catches with quotas of saithe.

The outcome of this year's assessment is shown in Figure 7. There were some years with very strong recruitment in the middle of the decade which is now followed by a strong increase in the spawning biomass to far above the reference points. Both because of that, and because the catches are lower than permitted according to the harvest rule, the harvest rate has declined and is now well below the target.

39 https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2021/NWWG_publication%20with%20multiple%20files/NWWG%202021_8%20Icelandic%20saithe.pdf
https://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/Fisheries%20Resources%20Steering%20Group/2021/NWWG_publication%20with%20multiple%20files/NWWG%202021_8%20Icelandic%20saithe.pdf

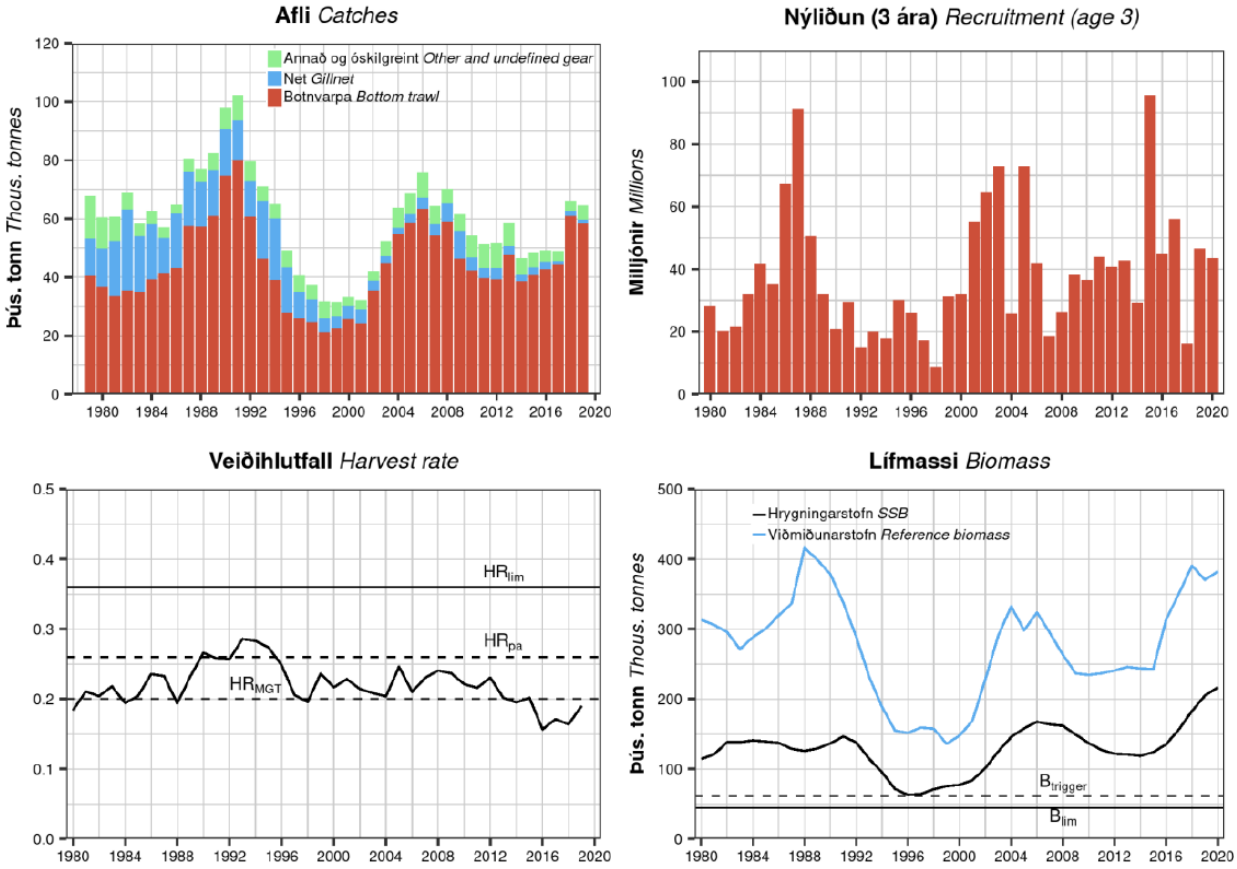


Figure 7. Main results of the assessment.

Reference points and harvest rule

Revised reference points were defined at the benchmark/management plan evaluation in 2019[40]. They were approved by ICES and adopted by Icelandic authorities. Compatible reference points are incorporated in the management plan. The current values are tabulated in Table 5, taken from the MFRI advice[41].

40 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2019/WKICEMSE/WKICEMSE%20Report%202019.pdf

41 https://www.hafogvatn.is/static/extras/images/03-saithe1259383.pdf

Table 5. Reference points for Icelandic saithe.

Nálgun *Framework*	Viðmiðunarmörk *Reference point*	Gildi *Value*	Grundvöllur *Basis*
Aflaregla *Management plan*	MGT $B_{trigger}$	61 000 t	B_{pa}
	HR_{MGT}	0.2	Aflaregla *Management plan (*ICES 2019)
Hámarksafrakstur *MSY approach*	HR_{MSY}	0.2	Slembireikningar *Stochastic simulations* (ICES 2019)
	MSY $B_{trigger}$	61 000 t	Hrygningarstofn sem er náð í 95% tilfella í slembireikningum með veiðihlutfall = HR_{MSY} , $B_{trigger}$ = 0 og enga sveiflujöfnun. *Spawning stock reached in 95% of cases in stochastic simulations with harvest rate = HR_{msy} , $B_{trigger}$ = 0 and no catch stabilizer.*
Varúðarnálgun *Precautionary approach*	B_{lim}	44 000 t	B_{pa}/1.4
	B_{pa}	61 000 t	B_{loss} er notað sem B_{pa} þar sem veiðidánartala hefur aldrei verið há, né hefur hrygningarstofn minnkað mikið og ekkert samband er á milli nýliðunar og hrygningarstofns *B_{loss} is used as B_{pa} as fishing pressure has never been high for this stock, the spawning stock not depleted significantly, and no relationship is seen between spawning stock and recruitment*
	HR_{lim}	0.36	Veiðihlutfall sem leiðir til þess að hrygningarstofn er yfir B_{lim} með 50% líkum *Equilibrium HR which will maintain the stock above B_{lim} with a 50% probability*
	HR_{pa}	0.25	Slembireikningar, það veiðihlutfall sem leiðir til þess að hrygningarstofn sé stærri en B_{lim} með 95% líkum með $B_{trigger}$ = MSY $B_{trigger}$ og enga sveiflujöfnun. *Stochastic HCR evaluation, SSB 95% of the time over B_{lim} with $B_{trigger}$ = MSY $B_{trigger}$ and no catch stabilizer.*

The lowest estimate of SSB in the time series (Bloss) was 61000 tonnes (in 1996 as estimated in the benchmark assessment in 2019) was used as a starting point for defining reference points. It's value was close to the value obtained in 2013 and not changed. However, the usage now was changed from Blim to Bpa. This was done following ICES guidelines for stocks that are lightly exploited with no indication of recruitment failure. Blim was then set by dividing Bpa with the standard factor for the ratio between Blim and Bpa: Blim = 61000/1.4 = 44000 tonnes.

Mortality reference points were defined in terms of harvest rate (HR) since the management plan uses harvest rate rather than fishing mortality. The harvest rate for saithe is defined as Biomass of fish 4 years and older, calculated using the catch weights. MSY reference points were calculated by stochastic simulations and resulted in HRMSY = 0.20, which represents the HR leading to maximum yield on average. The precautionary harvest rate reference points were derived from the biomass reference points: HRlim = 0.36 as the exploitation that leads to Blim with 50% probability. The precautionary HRpa = 0.25 is now set at the value that makes the 5-percentile of the long term distribution of SSB equal to Blim, when applying it as a fixed HR, but reduced at SSB below Btrigger. These values have changed slightly since the evaluation in 2019, and are now in line with current ICES standards.

Btrigger is equal to Bpa. The justification for that is not well documented. According to MFRI (table above), this is the SSB representing the 5th percentile of SSB when fishing at HRMSY (without trigger). According to ICES, the outcome of that calculation was slightly lower than Bpa. Then, according to ICES standards, Bpa is used for MSY Btrigger. These inconsistencies in definitions and pa-values have no effect on practical management, which is directed by the harvest rule.

Harvest rule

The management plan prescribes an exploitation with a target harvest rate of 0.20 (TAC/Reference biomass), where the reference biomass is the biomass of fish 4 years and older at the assessment step, a filter rule setting the final TAC midway between the B*Target HR and the previous TAC, and a safety mechanism which reduces the target HR when SSB < Btrigger =61000 t.

The rule is as follows:[42]

If $SSB_{y} \geq B_{trigger}$

$$Tac_{y/y+1} = \frac{Tac_{y-1/y} + 0.2 \times B_{4+,y}}{2} \quad (1)$$

If $SSB_{y} \leq B_{trigger}$

$$Tac_{y/y+1} = \alpha \times Tac_{y-1/y} + (1-\alpha) \times \frac{SSB_{y}}{B_{trigger}} \times 0.2 \times B_{4+,y} \quad (2)$$

$$\alpha = 0.5 \times \frac{SSB_{y}}{B_{trigger}} \quad (3)$$

Where $Tac_{y/y+1}$ is the TAC for the fishing year starting 1 September in year y ending 31 August in year $y+1$. $B_{4+,y}$ the biomass of age 4 and older in the beginning of the assessment year compiled from catch weights. The latter equation shows that the weight of the last years Tac does gradually reduce from 0.5 to 0.0 when estimated SSB changes from $B_{trigger}$ to 0.

The official formulation[43] is slightly different, but there probably is a mistake in that formula.

This rule has a catch stabilizer as the TAC is set midway between the harvest rate times the biomass and the TAC in the previous year. The stabilizer is still used when SSB is below the trigger value, but with less impact of the previous TAC.

The harvest rule, which was introduced in 2013 was re-evaluated in 2019. The only change was that the MGT Btrigger was lowered from 65 000 tonnes to 61 000. It was tested by simulations to ensure a low (<5%) probability that it would lead SSB below B_{lim}. The testing tool was the same software as used for the assessment, used as a forward projecting bootstrap procedure, without assessment feedback but taking into account uncertainty in process, in particular recruitment and assessment uncertainties, both including autocorrelations. No implementation error was assumed.

42 https://www.hafogvatn.is/static/extras/images/03-saithe_tr1206933.pdf

43 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/

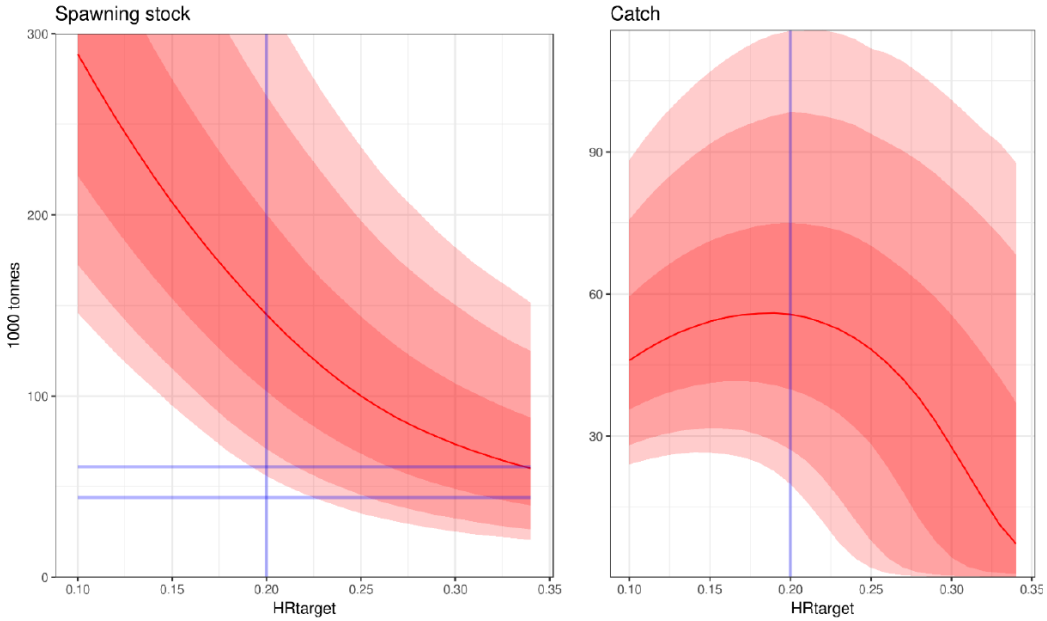


Figure 8. Equilibrium catch curve (right panel) and corresponding SSB (left panel) as a function of harvest rate (HR). In both panels, the solid red curves indicate the median of the distribution and the ribbons 5, 10, 25, 75, 90 and 95 percentiles. The vertical line is HRMGT (0.2) and the horizontal lines Bpa and Blim.

According to these simulations, the harvest rate leading to maximum long-term yield (H_{MSY}) is 0.19 With the harvest rate of 0.20, which has been the rule since 2013, the Bpa is near the 5 – percentile in the distribution of SSB, while the Blim is even less likely (Figure 8). As an additional safety precaution, the rule is to reduce the harvest rate if SSB goes below the trigger value which is equal to the Bpa.

This risk evaluation assumes that the TAC is set according to the target harvest rate. If the subsequent estimate of realized harvest rate exceeds that, the obvious recipe would be to apply the rule next year.

A long-term target for the stock biomass is not defined explicitly, as the harvest strategy is defined in terms of mortality. The expected long-term yield by following the rule was tested by the simulations and found to be near the maximum obtainable. The existing rules, together with strong mechanisms for implementation and enforcement, are regarded as sufficient to protect against overfishing. In addition there are supportive measures (area closures, gear restrictions, discard ban, strict landings control and control at sea) that contribute to keeping exploitation under control.

At present, the saithe biomass is well above the limit and trigger values and the harvest rate below the target.

Research results are made public in a timely and readily understood fashion

The assessment is normally done by the ICES North-Western Working Group (NWWG). Then ICES provide advice based on the results from NWWG. Once released, the advice and the NWWG report are available at the ICES website. MFRI provides its own assessment and advice, which for practical purposes normally does not deviate from that of ICES. MFRI provides an overview of the state and the advice for all major Icelandic stocks on its

website[44]. The final advice to Icelandic authorities is provided by MFRI. The MFRI advice follows the advice from ICES.

7.3 Landings update

The yearly catches have fluctuated over the decades, but have been relatively stable near 50 000 tonnes in the last 8-10 years.

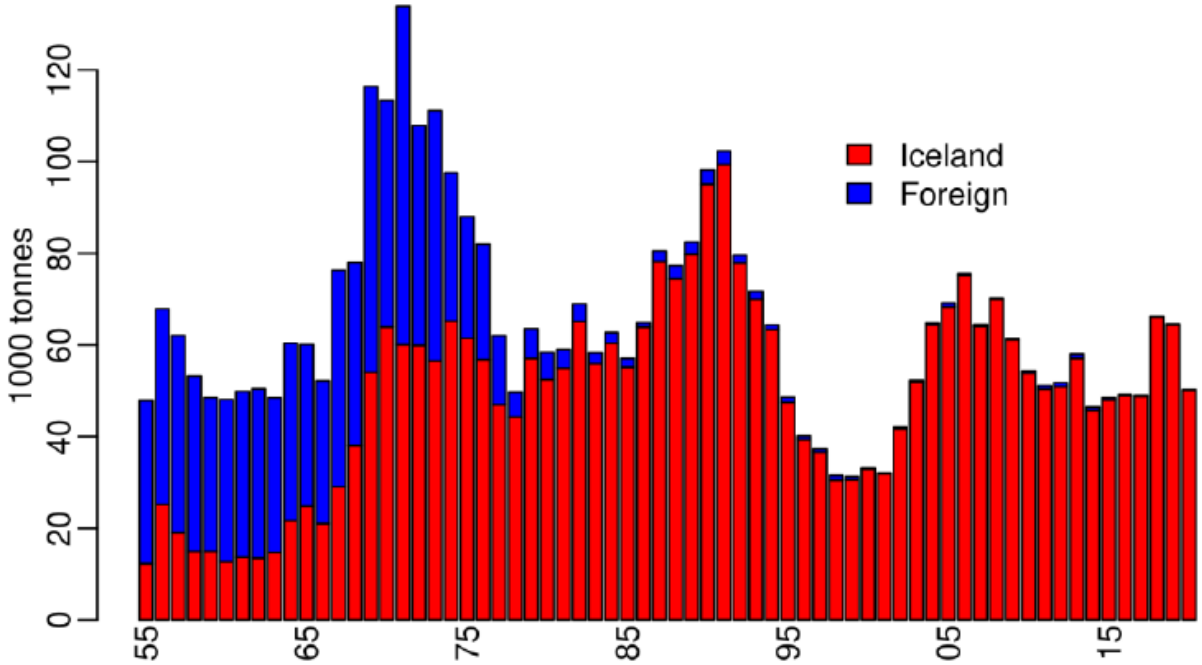


Figure 9. History of catches of saithe.

The quota has increased in the last 5 years as the stock biomass has increased. This Increase in quota has not led to increased catches. In the last 3 fishing years the catches have been well below the quota (Figure 10). Accordingly, an increasing fraction of the quota is not utilized. Some is used to cover landings of other species, some is just unused.

44 https://www.hafogvatn.is/is/veidiradgjof

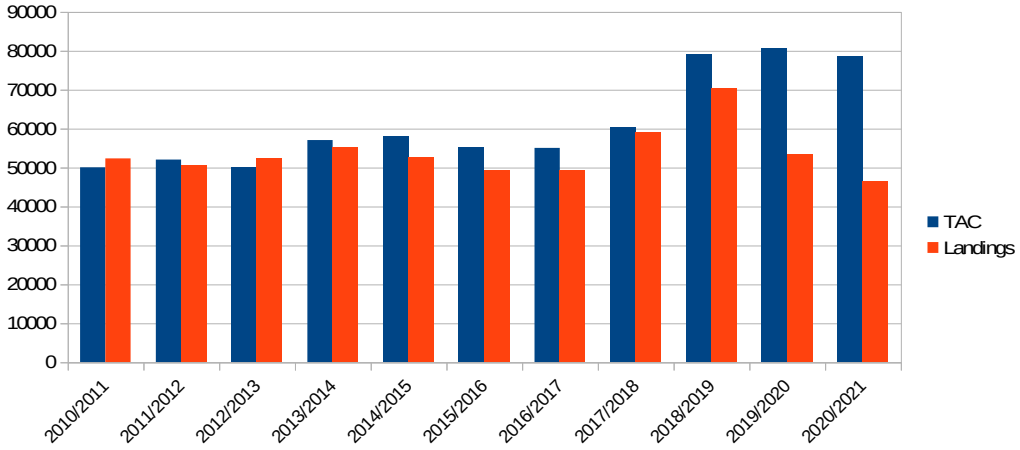


Figure 10. TAC and landings.

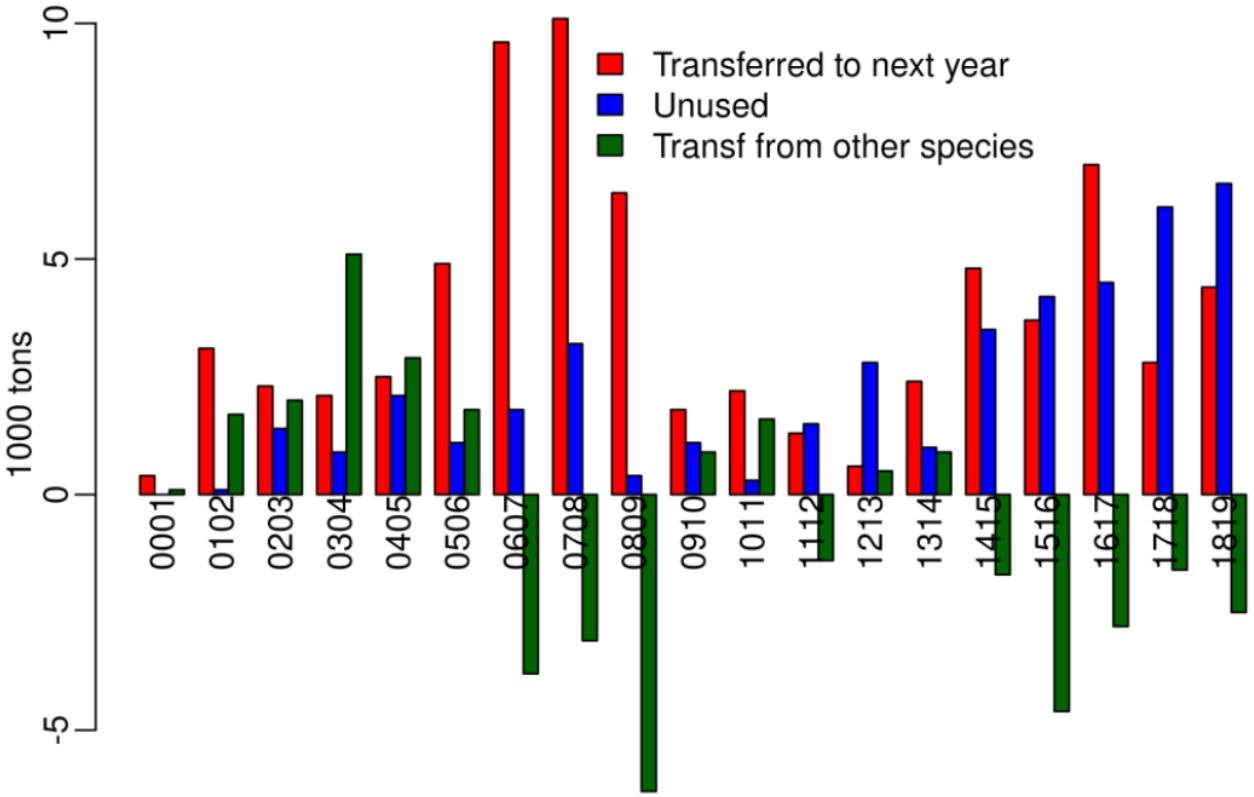


Figure 11. Quota balance for saithe. Transfer from other species means that parts of the saith quota is used to cover catches of other species.

Saithe is mostly caught in the South and West. The fishing areas for saithe (Figure 12) have changed towards a larger contribution from the North-West, which are dominating areas for cod fishery. This may to some extent reflect the change from gillnet to longline, and is not necessarily caused by altered distribution of the fish.

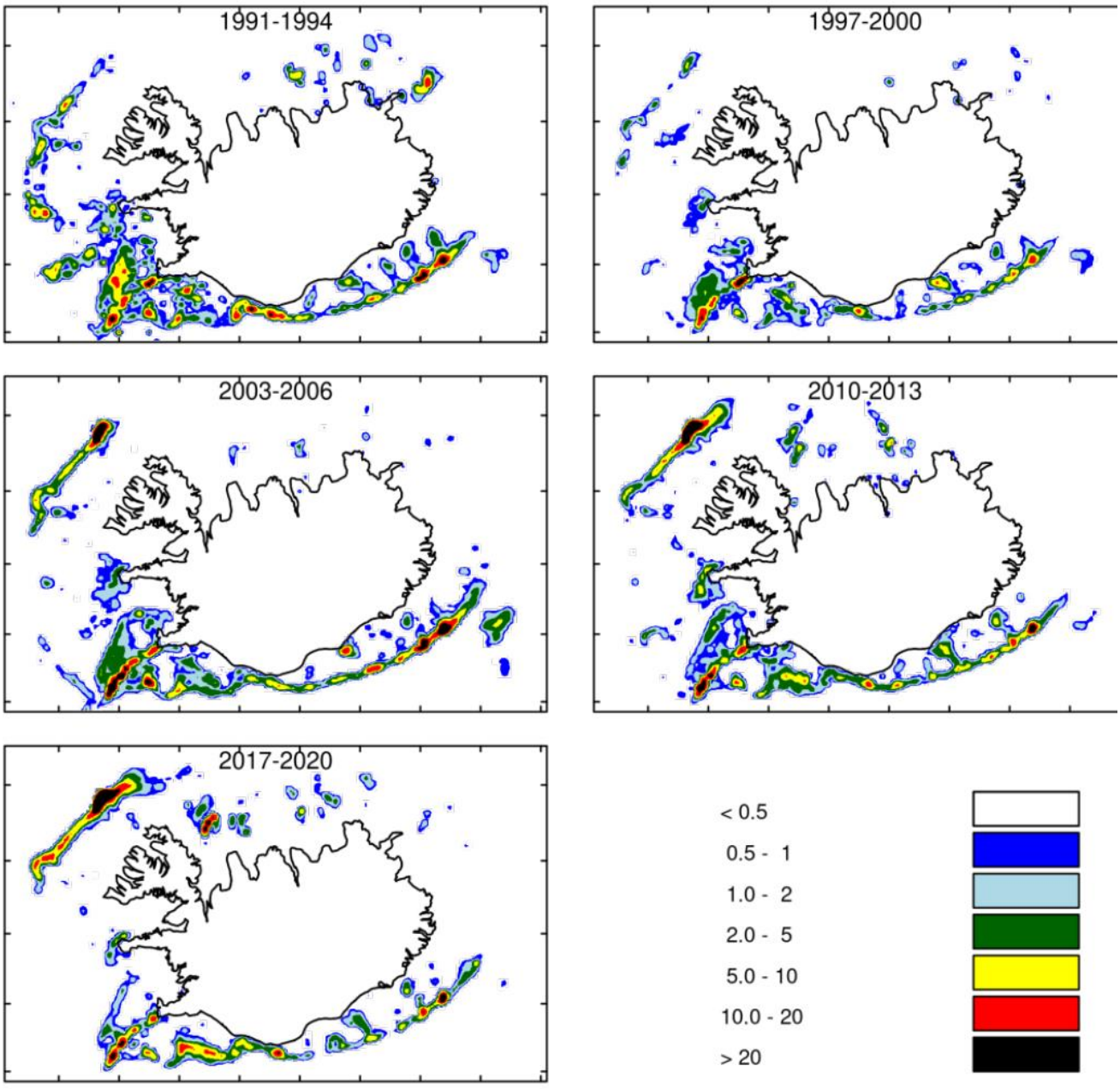


Figure 12. Spatial distribution of saithe catch as tonnes per square nautical mile per year

Saithe is nowadays caught almost only with trawl, and since the late 1990ies, almost exclusively by Icelandic vessels. Previously, the gillnet fleet was more important, but as these vessels changed to long-lines they did not catch saithe any more. The reduction in the gillnet fleet was driven by cod and haddock fisheries, where it became economically better to operate longliners that supply fish evenly throughout the year. The effect is that the demersal fleet as a whole has become less directed towards saithe.

Previously, gill nets were important as well but now only catches a very small amount (around 2-3%). Many

gillnetters have been converted to long-liners, and they do not get saithe. Other gears such as handline, danish seine and nephrops trawl, collectively contribute to around 6% total catches on average.

The location of catches has shifted from mostly South-West to North-West since 2015. (Figure in Landings section). The area where saithe is caught now has since early in the 21st century been the most important cod fishing ground for trawlers.

Some trawlers land the fish fresh, while others freeze it on board. For saithe, the recent trend is that more vessels land it fresh, but over the years, this has varied (Figure 13).

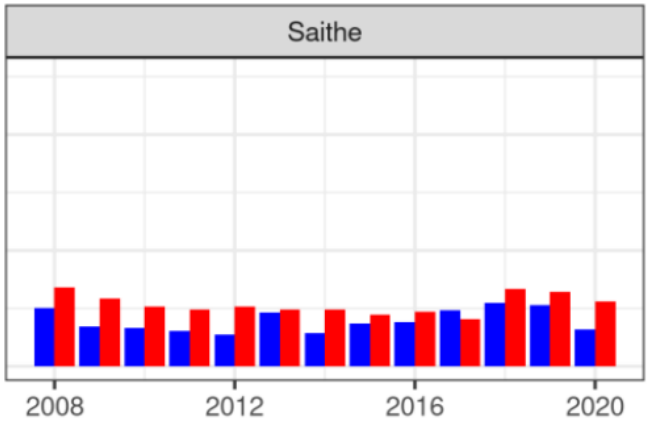


Figure 13. Catch by trawlers divided between those that freeze the catch (blue) and those that do not (red). Number of trawlers landing more than 500 tonnes has been reducing gradually from 42 in 2008 to 33 in 2020. Freezing trawlers landing > 500 tonnes were 26 in 2008 but 9 in 2020.

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)[45], the Fisheries Management Act (no. 116/2006) [46], the Act on Fishing in Iceland's Exclusive Economic Zone (no. 79/1997), the Act concerning the Treatment of Commercial Marine Fish Stocks (no. 57/1996) and the Act on a Special Fee for Illegal Marine Catch (no. 37/1992). Accordingly, it issues fishing permits to vessels and allocates catch quotas, imposes penalties for illegal catches, supervises the transfer of quotas and quota shares between fishing vessels, monitors vessels using the VMS system e-logbooks, controls the reporting of data on the landings of individual vessels and monitors the weighing of catches[47]. 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.

[45] https://www.althingi.is/lagas/149a/1992036.html
[46] https://www.ecolex.org/details/legislation/fisheries-management-act-1990-lex-faoc003455/
[47] http://www.fiskistofa.is/english/about-the-directorate/

A full list of regulations which was harmonised and streamlined starting in 2019 is available on the Ministry's website[48] (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 1996[49]). Provisions of the Act on a Special Fee for Illegal Marine Catch[50] are also applied as appropriate. Penalties range from the issue of reprimands by the Directorate of Fisheries and the suspension of commercial fishing permits to fines and, in cases of serious or repeated deliberate violation, imprisonment for up to six years (Article 24 and 25 of Act No. 116/2006).

Control of discarding of fish is provided for by the Treatment of Commercial Marine Stocks Act No. 57 1996, which prohibits discarding and fishing without sufficient quota. The Act requires the Directorate of Fisheries to monitor and publish information on catches of the fleet (Articles 2-3). Furthermore, the Act stipulates that all fish caught within the Icelandic EEZ, or during trips where a proportion of fishing activities take place in the EEZ, must be landed in an officially recognised port. Fiskistofa also performs check at sea to check for differences in catches of certain vessels when the Fiskistofa inspector in on beard and when not, to detect discards. Some findings have been published in 2019[51] and 2020[52].

Within two hours of landing catches are officially separated, weighed and recorded by accredited weighing stations and reported against the appropriate quota allocation following provisions outlined in the Act No 57, 1996 concerning the Treatment of Commercial Stocks, and Regulation No. 745/2016 on Weighing and Recording of Marine Resources[53].

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 298/2020[54]. The App also called Afladagbókina or catch diary[55] [56]automatically records the location of the boat during fishing and the captains then records the catch, its condition and by-catch, in a very simple way. The app replaces paper logbooks in the small boat sector, with an electronic catch recording system.

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

[48] https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2021/09/23/Stjorn-fiskveida-2021-2022-Log-og-reglugerdir/
[49] https://www.althingi.is/lagas/149a/1996057.html
[50] https://www.althingi.is/lagas/149a/1992037.html
[51] http://www.fiskistofa.is/umfiskistofu/frettir/aflasamsetning-a-botnvorpu-og-dragnotarveidum
[52] http://www.fiskistofa.is/umfiskistofu/frettir/aflasamsetning-i-thorskanetum-og-botnvorpu
[53] https://www.stjornartidindi.is/Advert.aspx?RecordID=884be309-64a5-4367-9e4d-f5e7216b6f40
[54] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887
[55] http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla
[56] https://www.mbl.is/200milur/frettir/2020/08/31/oll_aflaskraning_rafraen_fra_og_med_morgundeginum/

facilities. This is known as a 'Home-weighing license'. Fish markets can also be authorised to weigh catches by the Directorate.

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

A December 2018 report from the Icelandic National Audit Office (NAO)[57] on certain aspects of the Icelandic enforcement system highlighted that more quantitative data are needed to substantiate the conclusions that discards are low and that there are few irregularities in connection with re-weighing of catches after de-icing. Although available evidence (e.g. data from scientific cruises held up against information reported by the vessels) still indicates that discards are low and re-weighing irregularities not significant, the Directorate of Fisheries has recently placed new staff to control re-weighing at processing plants at risk and has started to publish information on its website showing catch composition reported by fishing vessels on trips with and without an inspector on board, with a view to roll this out more widely to several fishing fleets in Iceland. During the 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 violators[58].

As a result of this process new Regulation has been put in place which essentially places additional Fiskistofa surveillance at the operators cost, for those that do not comply. This is Regulation 990/2020[59] on (7th) 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.[60].

Acts/Laws and Regulations may be accessed by searching by Act/Law/Regulation No./Year (e.g. 116/2006) at http://www.althingi.is/lagasafn/ (for Acts/Laws) or https://www.reglugerd.is/ (for Regulations). In addition to

[57] https://rikisendurskodun.is/wp-content/uploads/2019/01/Eftirlit-Fiskistofu-Stjornsysluuttekt.pdf
[58] http://www.fiskistofa.is/umfiskistofu/frettir/hlutfall-kaelimidils-mai-til-agust
[59] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/22140
[60] http://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2020.pdf

their being easily accessible and searchable online laws and regulations are also effectively disseminated through an online law gazette which provides the most up to date versions of the legislation (i.e. incorporates latest amendments)[61].

The Fisheries Directorate website also prominently displays announcements relating to the management of the fishery including, for example, in relation to allocation of quota, opening and closure of fisheries, license revocations, reminders about legal requirements etc.[62]

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

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

Temporary/sudden closures (generally 2 weeks triggered by high juvenile abundance on fishing grounds) are announced by the Coastguard on VHF radio on a specified wavelength and on the radio before the news and weather (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 6. 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.

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

Table 7. 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
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 8. Fiskistofa suspected violations in 2020. Source: Fiskistofa 2020 Annual Report[65].

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
Framhjálöndun / landing	6
Afladagbók / logbook	40
Vanskil afladagbókar / submitting logbook late	470

[65] http://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2020.pdf

Veiðar án aflaheimilda / Fishing with insufficient catch quotas	6
Mál vegna umframafla / 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
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 retuned 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 9. Fiskistofa penalties and follow up for suspected violations in 2020**.** Source: Fiskistofa 2020 Annual Report[66].

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
framhjálöndun / 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

[66] http://www.fiskistofa.is/media/arsskyrslur/Arsskyrsla_Fiskistofu_2020.pdf

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
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 ólögmæts 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 7) and none based on Fisheries inspections by ICG. The overall number of inspections since 1988 is shown below.

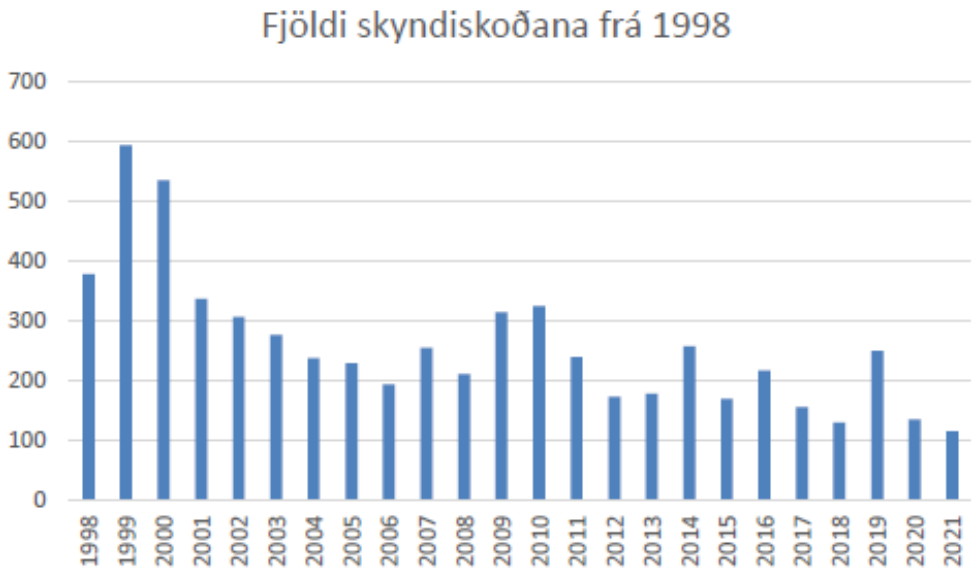


Figure 14. Overall number of ICG inspection from 1988 to 2021**.** Source: provided by the ICG during the remote audit, November 2021.

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

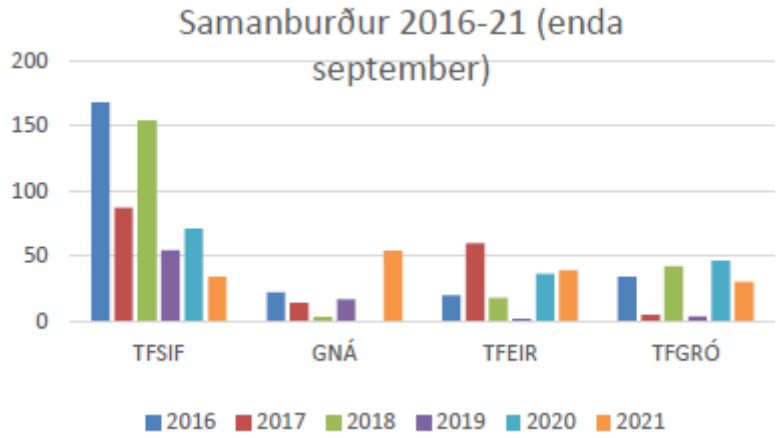


Figure 15. Air surveillance by four different Icelandic assets from 2016 to 2021. Samtals is the total. Source: provided by the ICG during the remote audit, November 2021.

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.

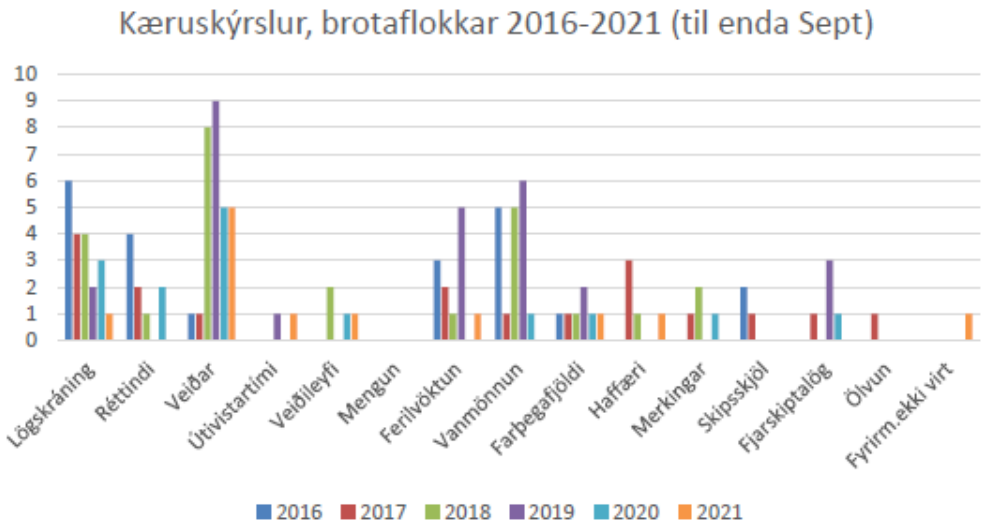


Figure 16. Overview of ICG infringement reports in 2016-2021. Source: provided by the ICG during the remote audit, November 2021.

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, 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.

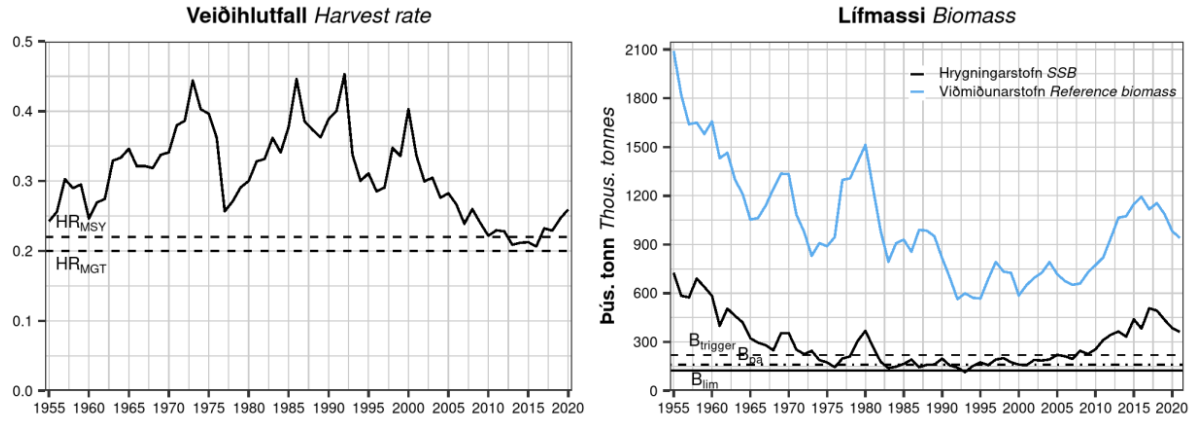
7.5 Bycatch, habitat and ecosystem update

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 re-assessment[67]. A status update on each of these species is provided below. However, in summary we can determine that the saithe fishery continues not to have negative effects on any of the listed species, with the exception of spotted wolffish, itself the subject of an active non-conformance and corrective action.

[67] https://www.responsiblefisheries.is/media/1/icelandic-saithe-re-assessment-report-final-03-feb-2020.pdf

Table 10. Status of bycatch and associated species in the saithe target and non-target fisheries.

Status of bycatch and associated species in the saithe target and non-target fisheries as identified during the re-assessment from historic average catches for each relevant gear type. All data and information is derived from the MFRI Advice page[68] for each individual species.
ÞORSKUR – *COD* (*Gadus morhua*)[69] 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 refence biomass in 2020 is thus estimated 20% lower in this year's assessment compared with last year's assessment.  **Figure 17.** Icelandic cod harvest rate and biomass.
ÝSA – HADDOCK (*Melanogrammus aeglefinus*)[70] The spawning-stock biomass (SSB) has decreased since 2008, but stabilized above MSY Btrigger in recent years. MFRI and ICES assesses that fishing pressure 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 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.

[68] https://www.hafogvatn.is/en/harvesting-advice
[69] https://www.hafogvatn.is/static/extras/images/01-cod1259506.pdf
[70] https://www.hafogvatn.is/static/extras/images/02-haddock1259378.pdf

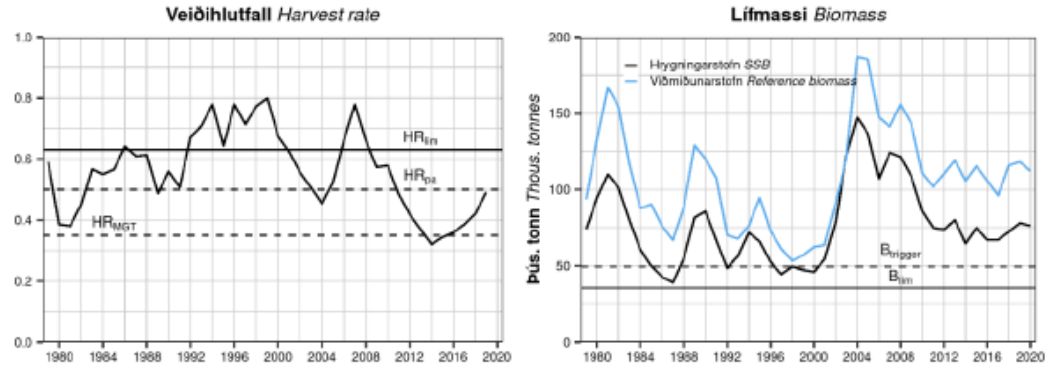


Figure 18. Icelandic haddock harvest rate and biomass.

GULLKARFI – GOLDEN REDFISH (*Sebastes norvegicus*)[71]

MFRI and ICES assesses that fishing pressure on the stock is above FMSY and below Fpa and Flim, and that spawning-stock size is above MSY Btrigger, Bpa, and Blim.

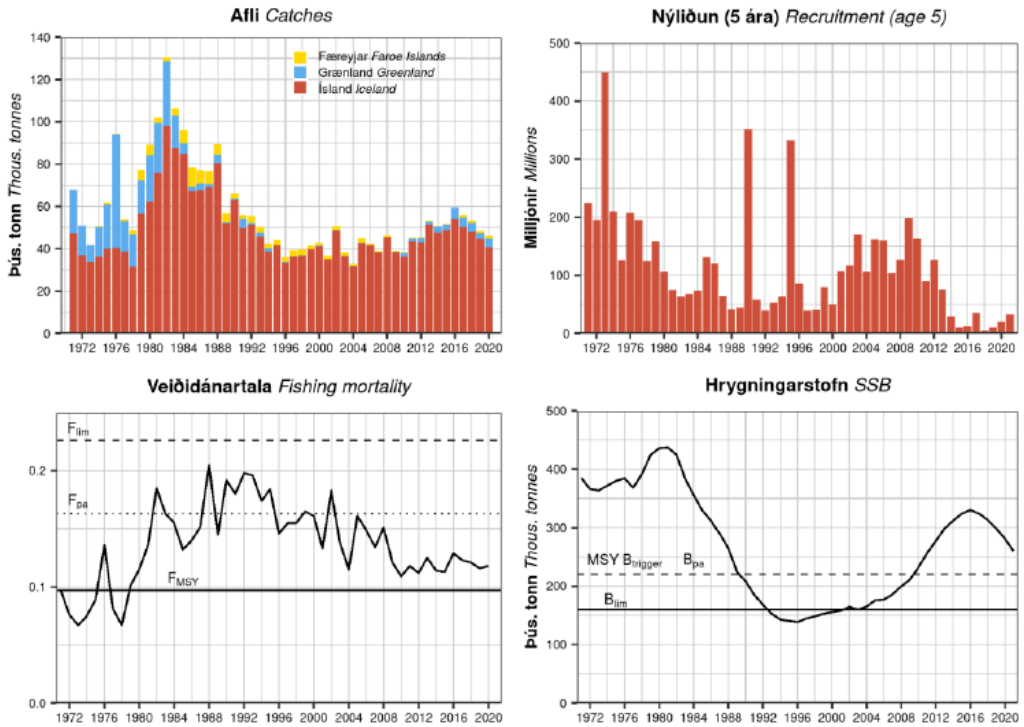


Figure 19. Icelandic golden redfish harvest rate and biomass.

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

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

[71] https://www.hafogvatn.is/static/extras/images/04-goldenredfish1259391.pdf
[72] https://www.hafogvatn.is/static/extras/images/05-demersalsmentella1259395.pdf

is very limited and cause for caution. Catches in the previous 5 years have generally been in agreement with advice and TAC.

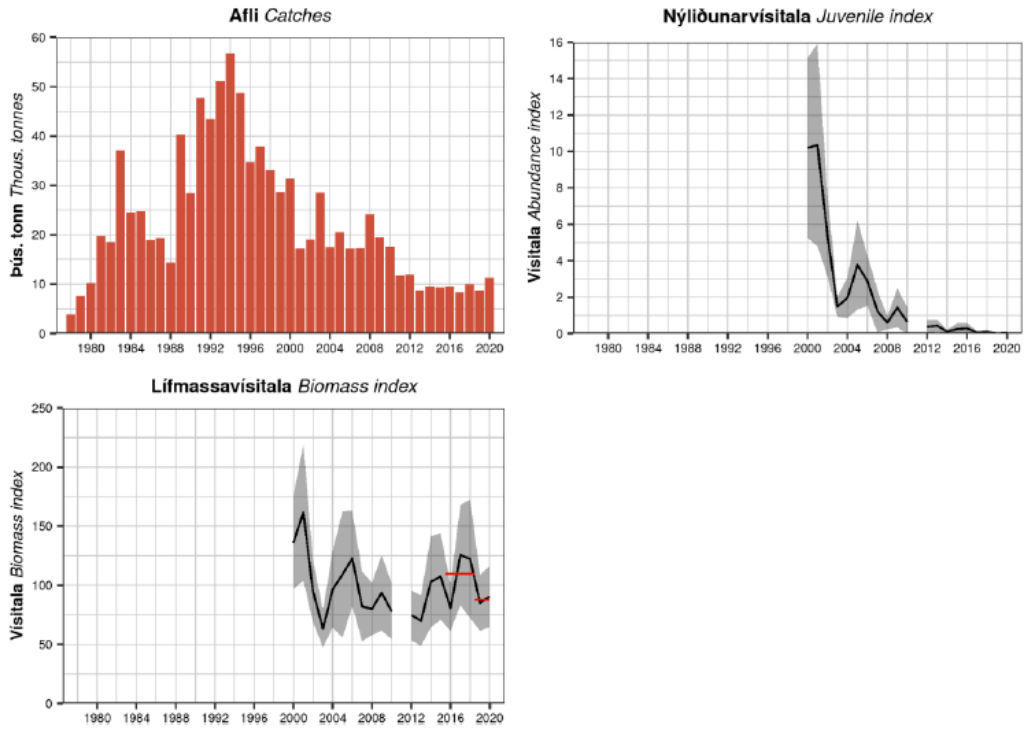


Figure 20. Catches, and IS-SMH juvenile (≤30 cm) and biomass indices. Grey areas represent 95% CI. Red horizontal lines indicate average biomass indices for 2016–2018 and for 2019–2020 used in the advice calculations.

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

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

[73] https://www.hafogvatn.is/static/extras/images/08-greenlandhalibut1259406.pdf

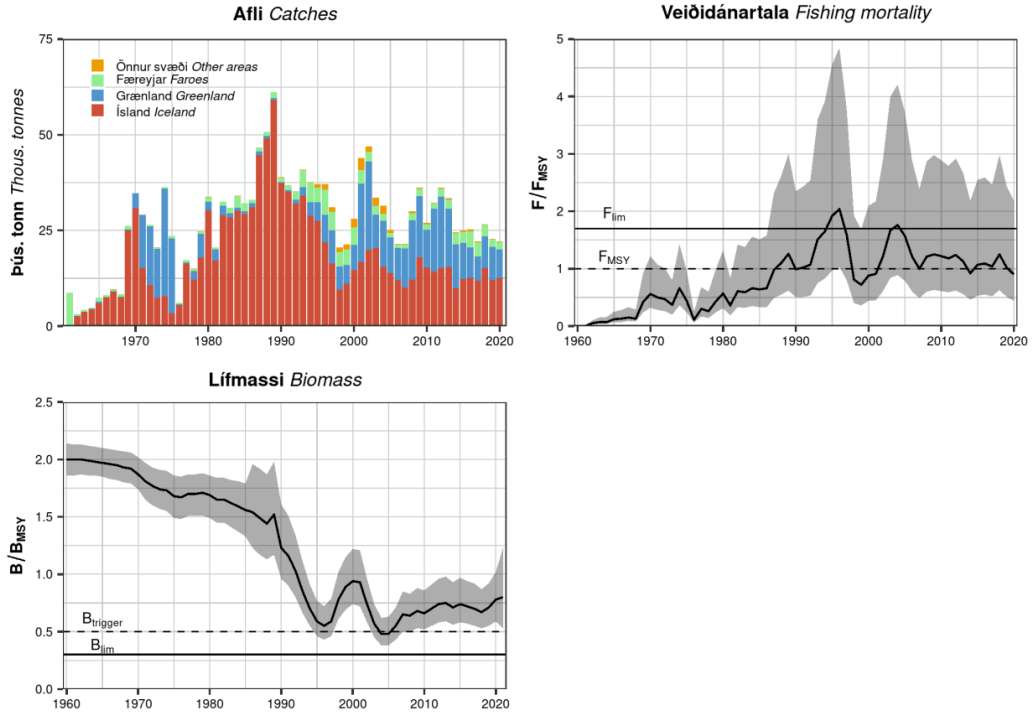


Figure 21. Greenland halibut harvest rate and biomass.

LANGA – LING (*Molva molva*)[74]

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.

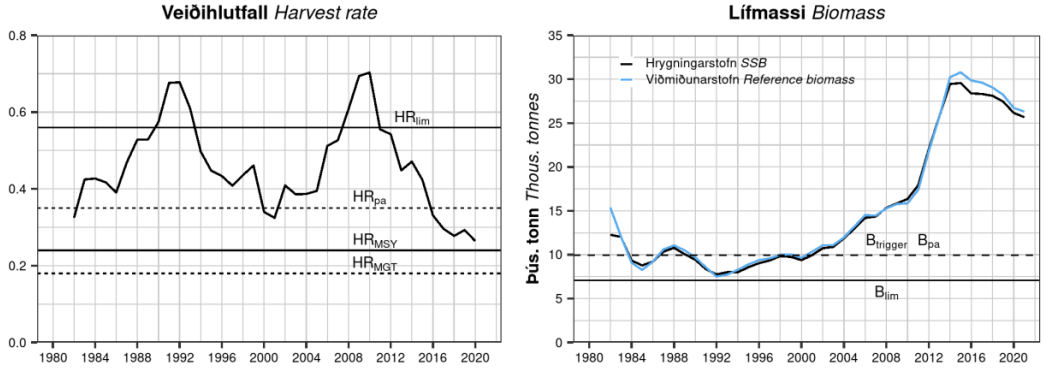


Figure 22. Ling harvest rate and biomass.

MAKRÍLL – MACKEREL (*Scomber scombrus*)[75]

[74] https://www.hafogvatn.is/static/extras/images/17-ling1259442.pdf
[75] https://www.hafogvatn.is/static/extras/images/makrill_20211278360.pdf

The spawning-stock biomass (SSB) is estimated to have increased since 2007, reaching a maximum in 2014, and has been declining since then. It has, however, remained above MSY Btrigger since 2008. Fishing pressure on the stock is below FMSY and spawning-stock size is above MSY Btrigger, Bpa, and Blim.

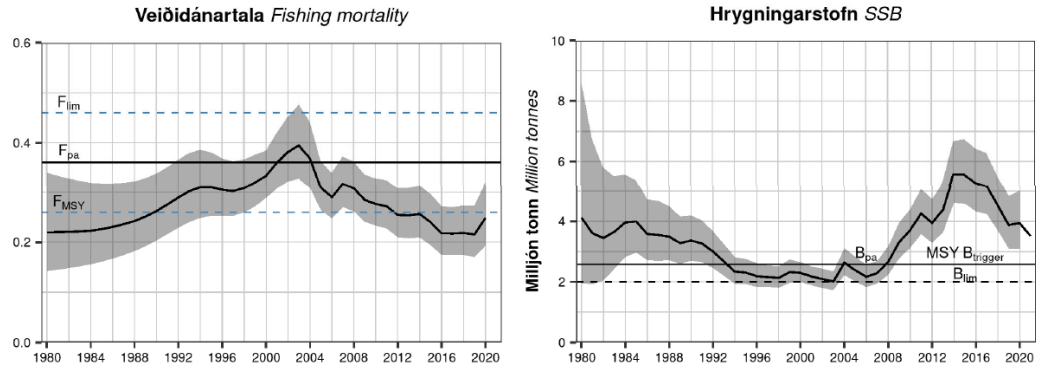


Figure 23. Mackerel harvest rate and biomass.

TINDASKATA – STARRY RAY (*Amblyraja radiate*)[76]

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 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.

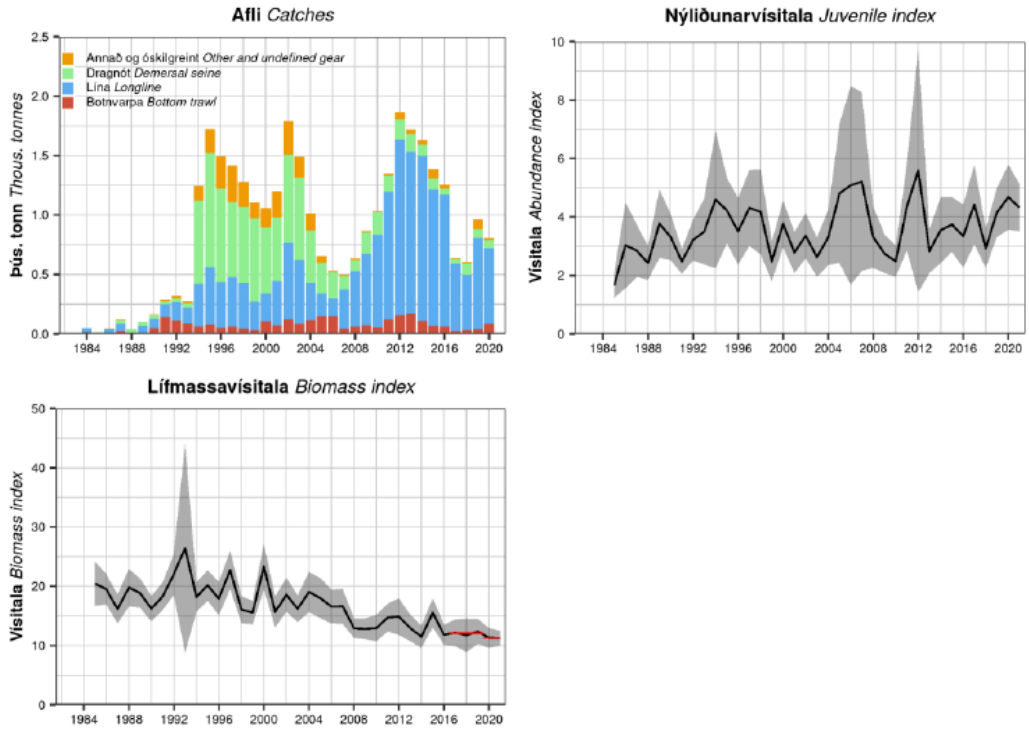


Figure 24. Starry skate harvest rate and biomass.

[76] https://www.hafogvatn.is/static/extras/images/24-starryray1259469.pdf

STEINBÍTUR–ATLANTIC WOLFFISH (*Anarhichas lupus*)[77]

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.

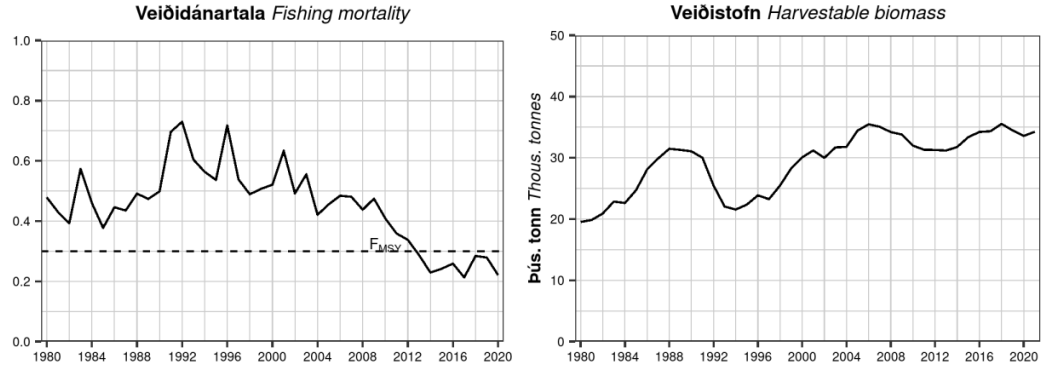


Figure 25. Atlantic wolffish harvest rate and biomass.

HLÝRI – SPOTTED WOLFFISH (*Anarhichas minor*)[78]

Because the stock is depleted and Icelandic catches were consistently above recommended TAC and above TAC in the two most recent fishing seasons, a minor non-conformance was raised in 2019.

Spotted wolffish. Recommended TAC, national TAC, and catches (tonnes).

Fiskveiðiár *Fishing year*	Tillaga *Rec. TAC*	Aflamark *National TAC*	Afli *Catches*
2012/13	900	-	2042
2013/14	900	-	2250
2014/15	900	-	1655
2015/16	900	-	1913
2016/17	1128	-	1587
2017/18	1080	-	1528
2018/19	1001	1001	1383
2019/20	375	375	
2020/21	314		

NC#2 Clause 3.1.1: There is insufficient evidence that adverse impacts of the saithe fishery on the following ecosystem components:

1) **Spotted wolffish, and;**
2) **Common loon**

are being considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.

Updates and corrective actions are shown below.

As spotted wolffish are mainly caught as bycatch, catches have been above recommendations, and biomass indices are now at historically low levels, MFRI recommends in their advice that fishermen will be allowed to release spotted

[77] https://www.hafogvatn.is/static/extras/images/15-atlanticwolffish1259434.pdf
[78] https://www.hafogvatn.is/static/extras/images/16-spottedwolffish1259438.pdf

wolffish caught beyond set TAC. 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.

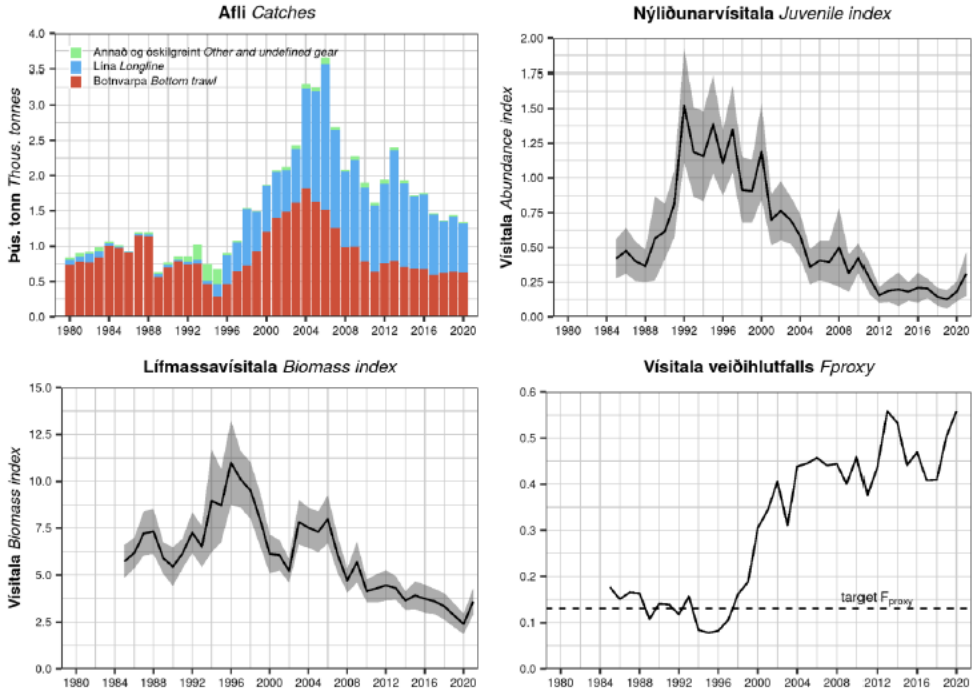


Figure 26. Spotted wolffish catches, juveniles index, harvest rate and biomass.

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

As a result of this, the MFRI gave a landings advice for the 2020/21 season and suggested that fishers would be allowed to discard spotted wolffish as per Regulation 1256/2020[80] which now allows fishers 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 season[81]. As per article 1 of this regulation, if spotted wolffish is released, the type and estimated quantity in kilograms released shall be recorded in an electronic catch logbook or the smart device program. Hence the amount caught and landed and the amount caught and released will be recorded. In addition, the MFRI is in the process of measuring the survival of spotted wolffish in Icelandic waters and,

[79] Grant, S.M., and Hiscock, W. 2014. Post-capture survival of Atlantic Wolfish (Anarhichas lupus) captured by bottom otter trawl: Can live release programs contribute to the recovery of species at risk? Fish. Res. 151: 169-176. https://www.sciencedirect.com/science/article/abs/pii/S0165783613002816
[80] Reglugerð um (2.) breytingu á reglugerð nr. 468/2013, um nýtingu afla og aukaafurða.
[81] https://www.hafogvatn.is/static/extras/images/16-spottedwolffish1259438.pdf

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.

The Icelandic fishing season started on the 1st of September and ends on the 31st of August each year. The current landed catch of spotted wolffish as per 2021-22 season that started is 250 tonnes. It is expected that some percentage of the total spotted wolffish caught will be released alive and recorded as such in this season, to avoid landed harvest above the current 2011/22 TAC of 377 tonnes. The 2021/22 season will be the first full fishing season where the full effect of this regulation will be recorded.

Status: Open, Corrective Actions in place to be reviewed annually in subsequent audits. Corrective actions are deemed to be on track and the measure currently in place are considered to be in line with responsible management.

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.

GULLLAX – GREATER SILVER SMELT (*Argentina silus*)[82]

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

Figure 27. Greater silver smelt harvest rate and biomass.

SKARKOLI – PLAICE (*Pleuronectes platessa*)[83]

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

[82] https://www.hafogvatn.is/static/extras/images/23-greatersilversmelt1259465.pdf
[83] https://www.hafogvatn.is/static/extras/images/09-plaice1259410.pdf

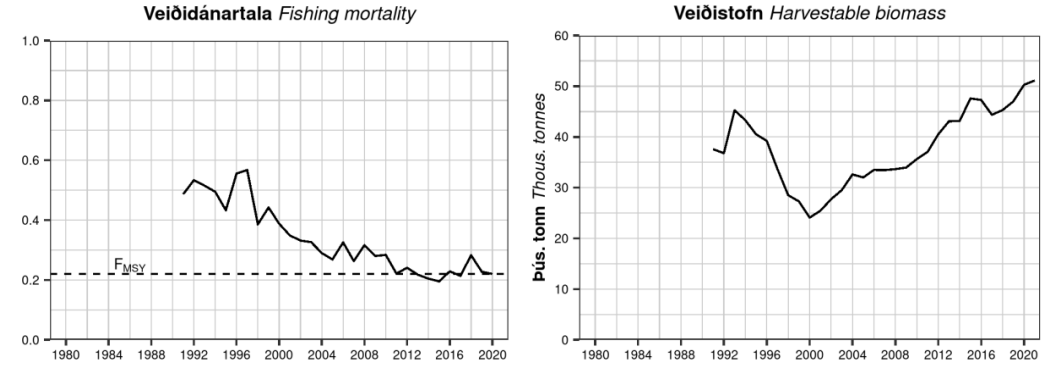


Figure 28. Plaice harvest rate and biomass.

ÞYKKVALÚRA – LEMON SOLE (*Microstomus kitt*)[84]

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.

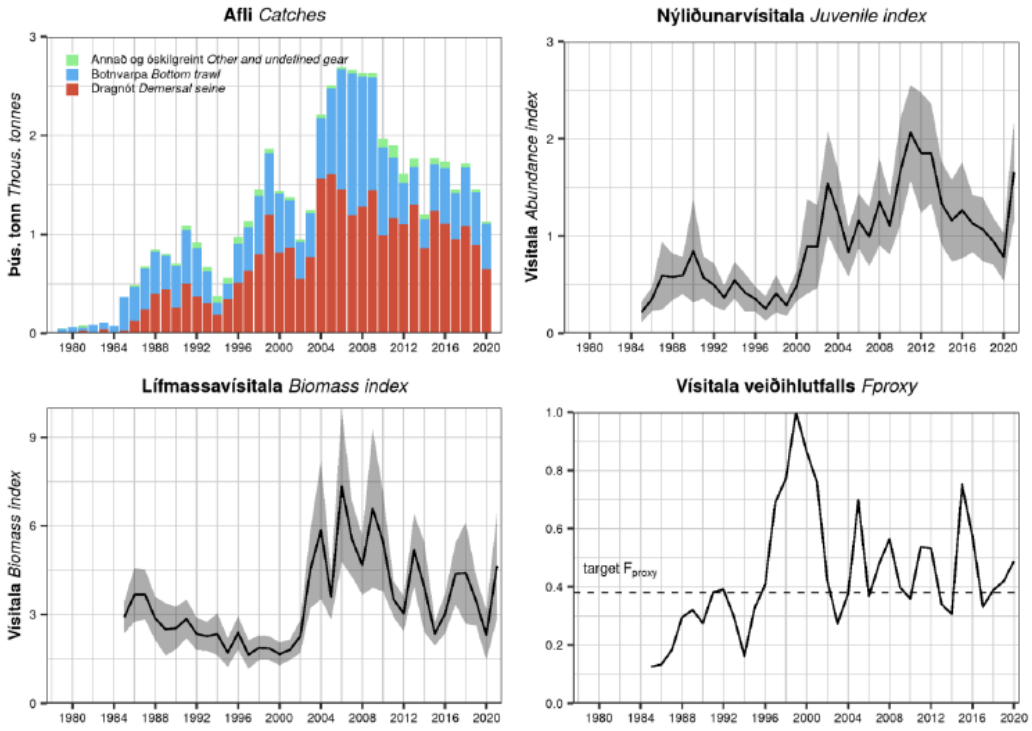


Figure 29. Lemon sole harvest rate and biomass.

LANGLÚRA – *WITCH (Glyptocephalus cynoglossus)*[85]

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 Fproxy reference point.

[84] https://www.hafogvatn.is/static/extras/images/10-lemonsole1259413.pdf
[85] https://www.hafogvatn.is/static/extras/images/11-witch1259417.pdf

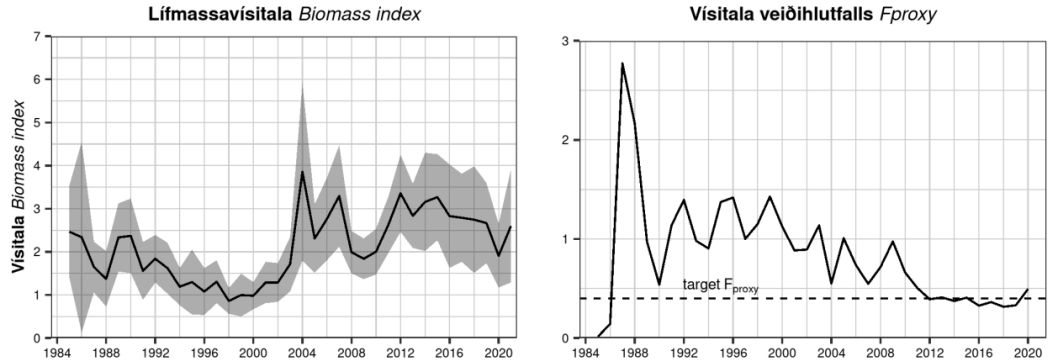


Figure 30. Witch harvest rate and biomass.

KEILA – TUSK (*Brosme brosme*)[86]

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 HRmsy. Recruitment in 2012–2014 was low, but has increased since then and was high in the past 3 years.

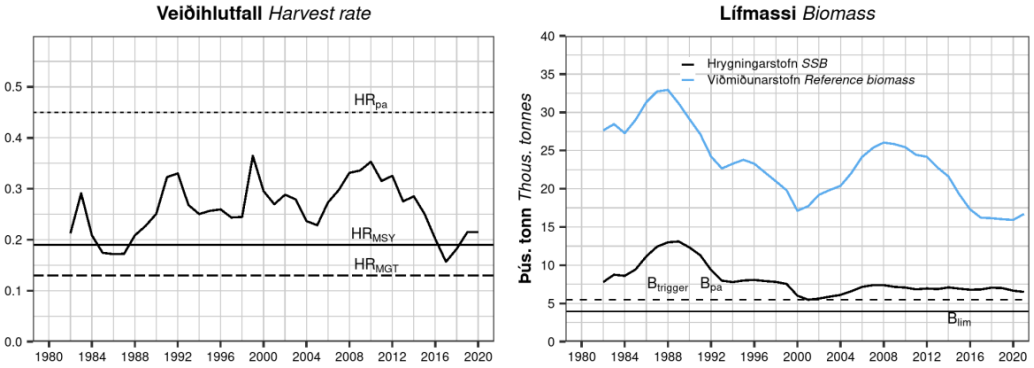


Figure 31. Tusk harvest rate and biomass.

SANDKOLI – DAB (*Limanda limanda*)[87]

IS-SMB biomass index has remained low since 2004, as compared to the years 1985–2003. Survey recruitment index from IS-SMB is considered inadequate to provide information on recruitment because the survey does not cover the main nursery areas in shallow water. A new survey in shallow waters that started in 2017 will provide important recruitment information for this species in the future. Catches have generally been within advice since 2014/15.

[86] https://www.hafogvatn.is/static/extras/images/19-tusk1259450.pdf
[87] https://www.hafogvatn.is/static/extras/images/13-dab1259425.pdf

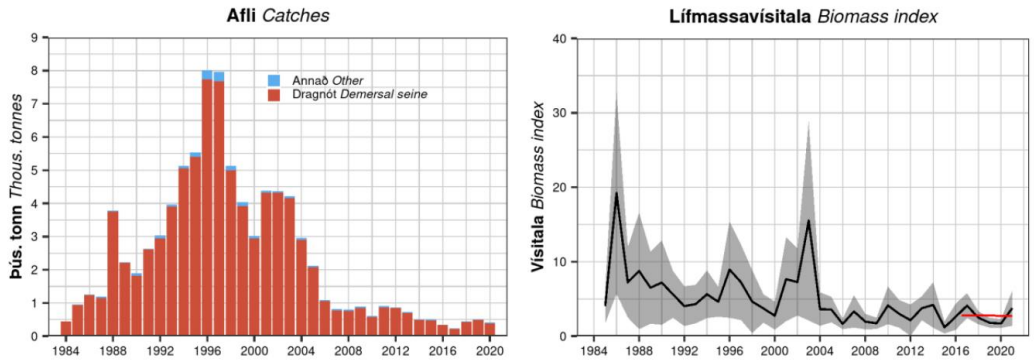


Figure 32. Dab harvest rate and biomass.

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

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 List[88] (population trend unknown, last assessed in 2020). They are also classified as Least Concern in the Icelandic National Redlist (based on a 2016 assessment)[89]. Annual estimates of harbour porpoise by-catch have decreased in recent years as gillnet effort has decreased, from a high of 7,300 animals in 2003 to about 1600 animals in 2009–2013[90] 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)[91] 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

[88] https://www.iucnredlist.org/species/17027/50369903
[89] https://www.ni.is/node/27406
[90] 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
[91] https://nammco.no/wp-content/uploads/2019/02/final-report_hpwg-2019.pdf

The MFRI 2021 advice for harbour seals[92] 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

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

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

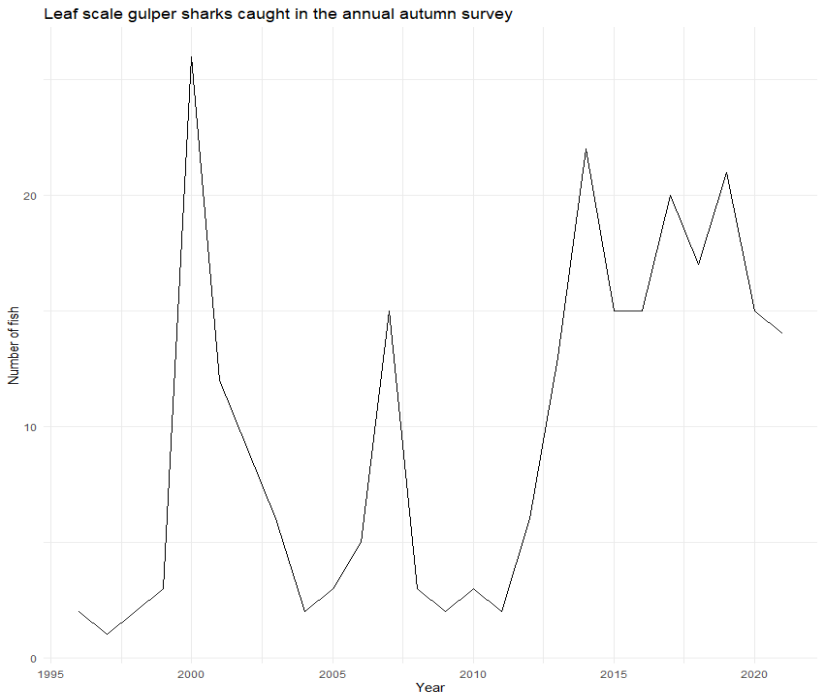


Figure 33. Leaf scale gulper shark caught in the annual autumn survey, from 1995 to 2021.

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.

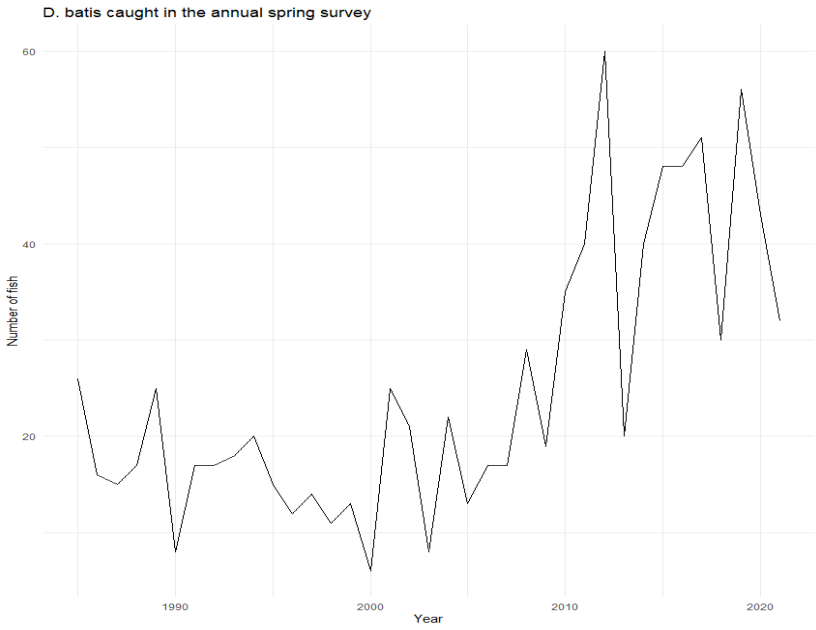


Figure 34. D. batis caught in the annual spring survey, from 1985 to 2021.

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

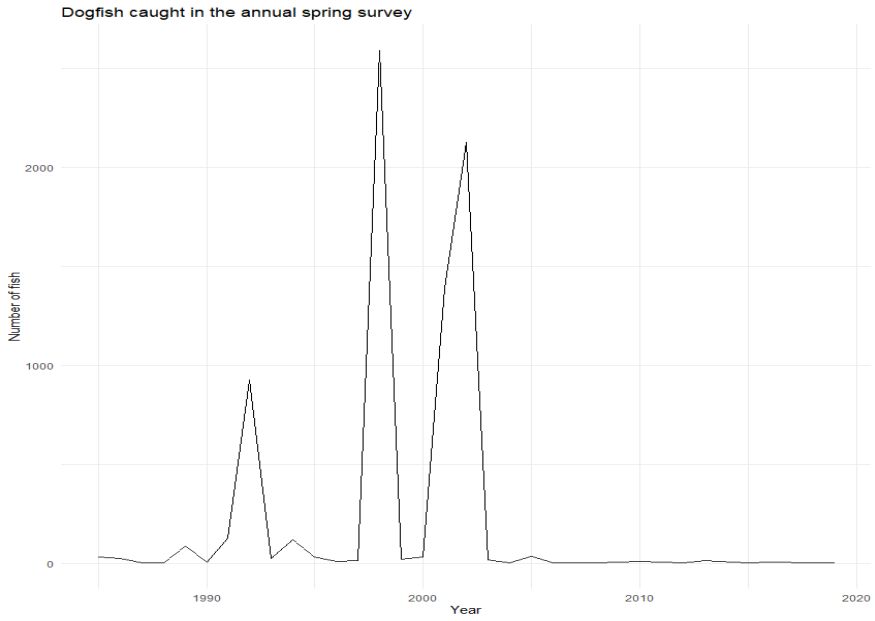


Figure 35. Dogfish caught in the annual spring survey, 1985 to 2021.

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

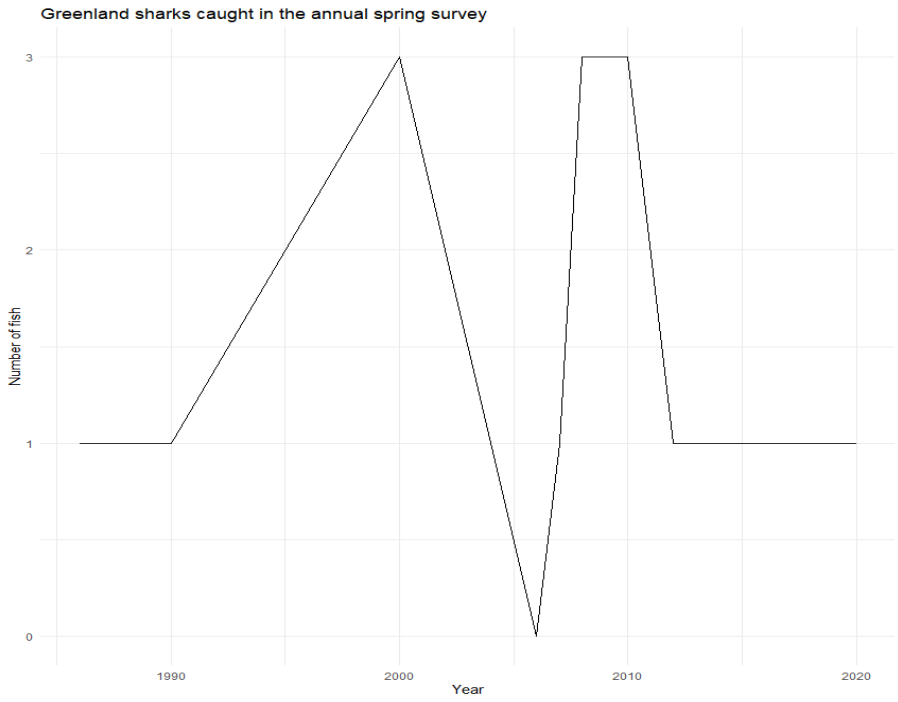


Figure 36. Greenland shark caught in the annual spring survey.

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 report[93] 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 km^2 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.

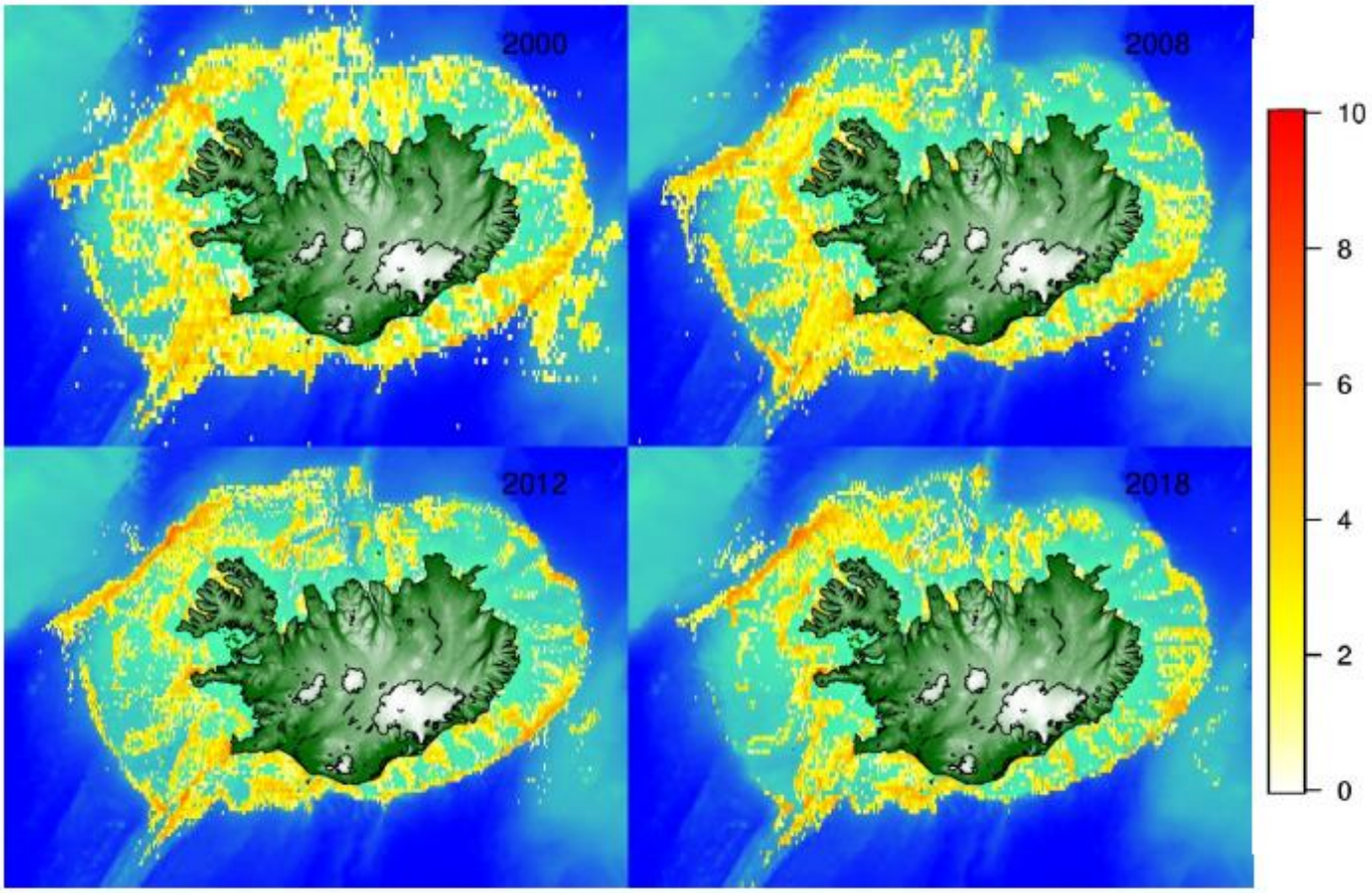


Figure 37. Spatial distribution of bottom-trawl effort (1000 kW hr) based on logbooks from trawl fishery targeting demersal fish, shrimp, and Norway lobster in 2000, 2008, 2012, and 2018.

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

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.

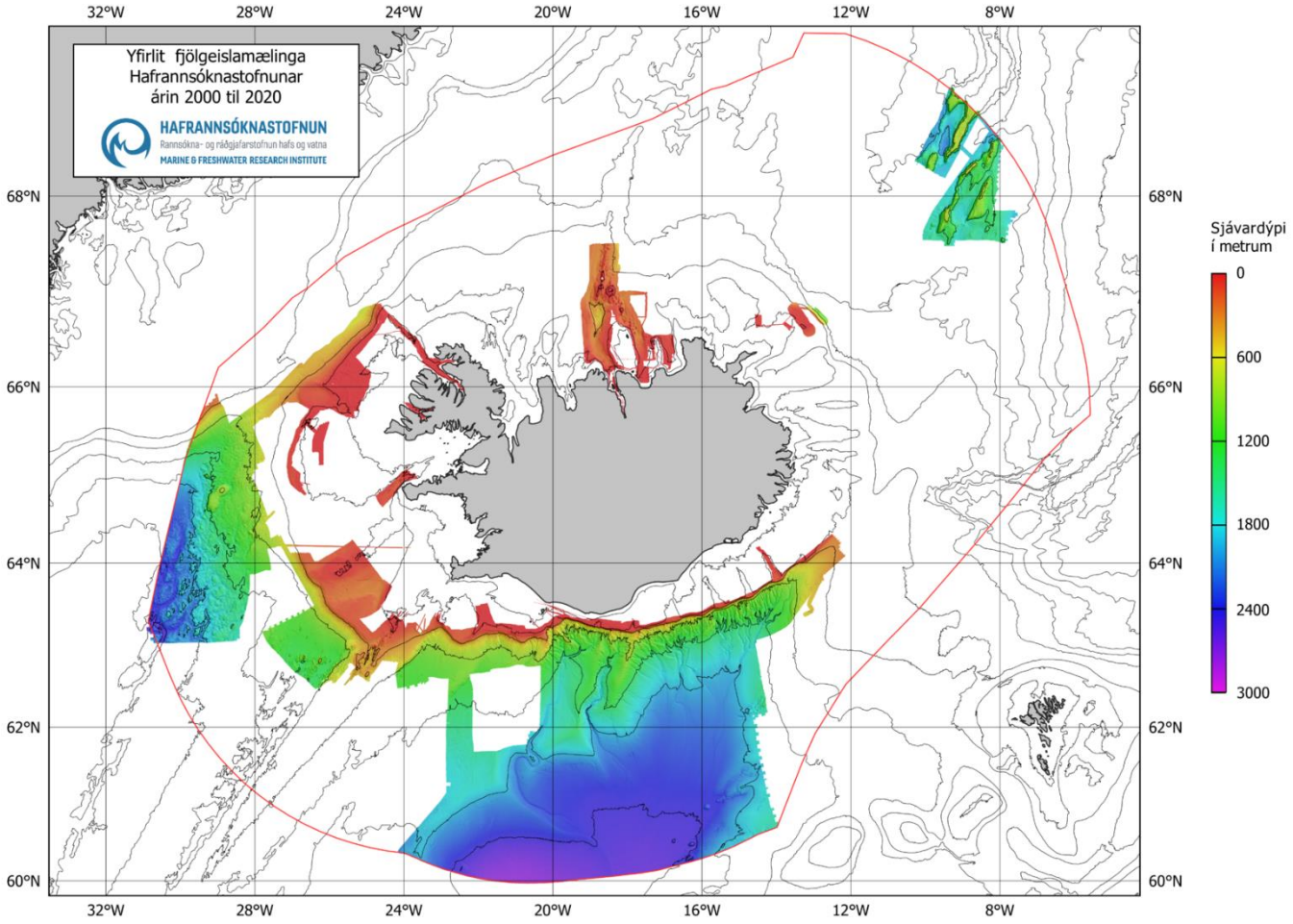


Figure 38. MFRI overview of seabed mapping in Icelandic waters between 2000 and 2020. Source: https://www.hafogvatn.is/en/research/seabed-mapping.

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)[94]. 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)[95] based on the findings of the Novasarc work. The group that produced this publication has received an additional funding to develop this work further including managemental aspects in 2021. The MFRI highlighted during the November 2021 site visits that Novasarc II is now ongoing and will concentrate on updating predictive models and discuss the output for managemental purposes.

Benthos recorded in the MFRI survey

Recording of benthic animals as a bycatch in the autumn MFRI trawl took place for the fifth time in 2020 ((Jakobsdóttir et al. 2020[96]) (Figure 39). 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.

[94] http://norden.diva-portal.org/smash/get/diva2:1304079/FULLTEXT02.pdf
[95] https://www.frontiersin.org/articles/10.3389/fmars.2020.00131/full
[96] 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

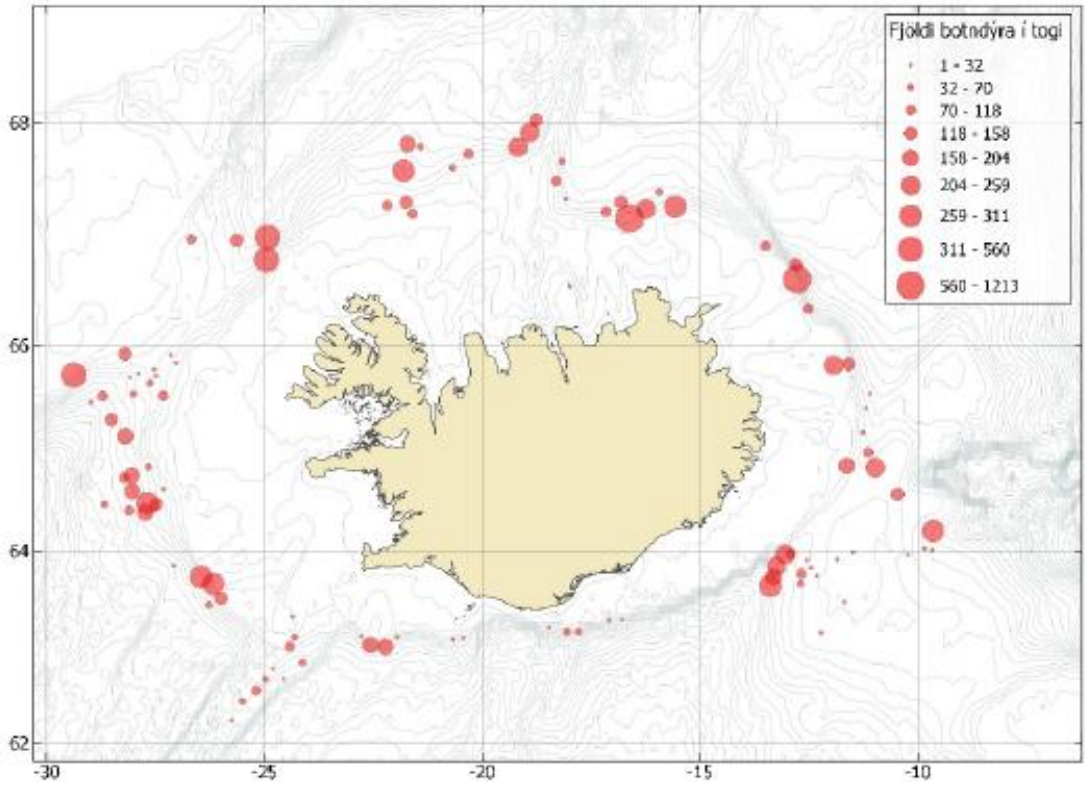


Figure 39. Benthos recorded in the autumn Icelandic autumn groundfish survey in 2020. Number (kg) per tow.

The Ministry of Industry and Innovation has begun work on formulating a protection policy for vulnerable bottom ecosystems (or vulnerable marine ecosystems) within the Icelandic economic zone to shape procedures for the protection of fragile benthic ecosystems based on international standards criteria that Iceland is signatory to. This includes defined demersal fishing areas and protected areas. Therefore, the Ministry requested that the Marine Research Institute compile information in addition to evaluating five aspects of fragile benthic ecosystems, reported on by Ólafsdóttir et al. 2021[97]. 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.

[97] 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.

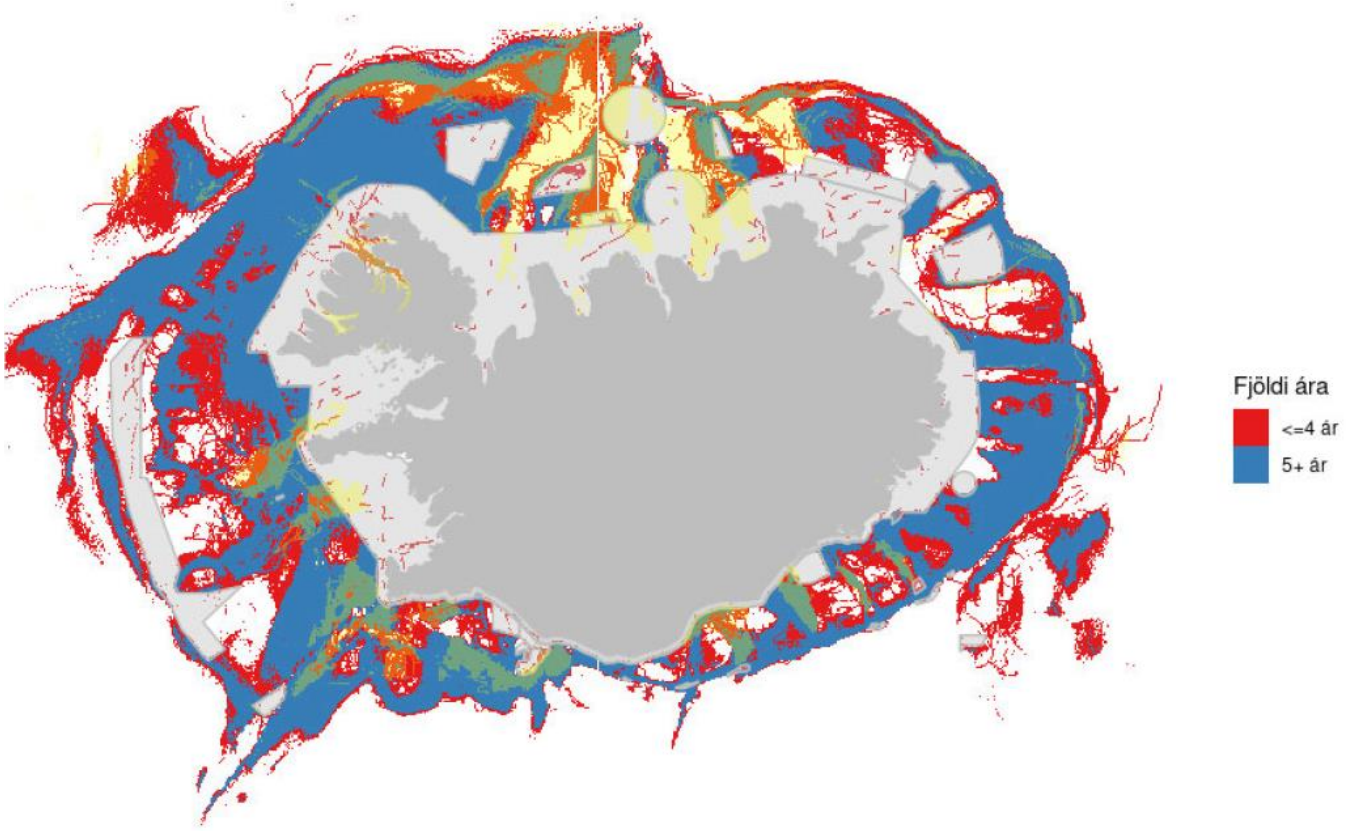


Figure 40. Long term closures and selected fishing distribution around Iceland between 2009-2019.

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.

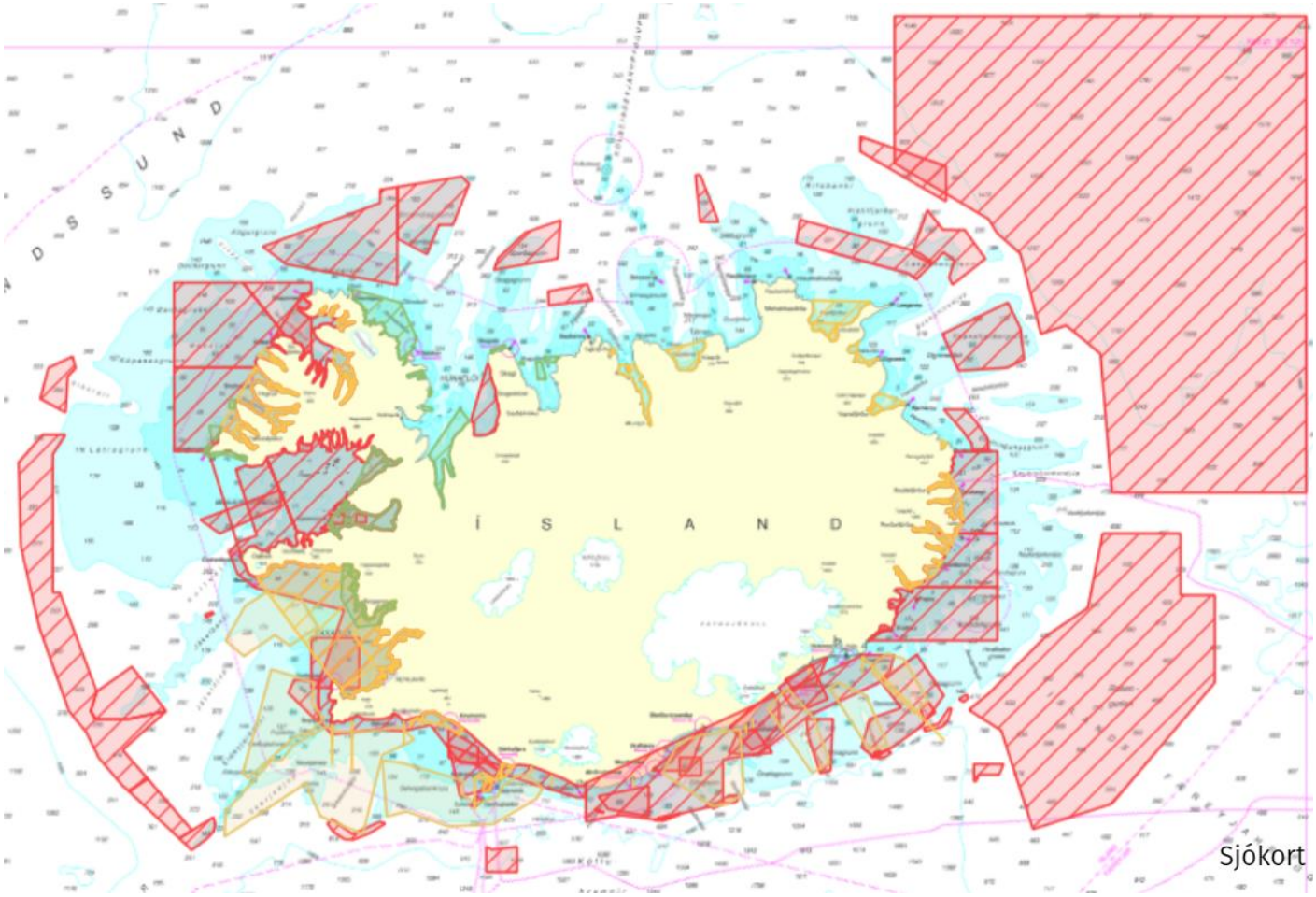


Figure 41. Regulatory long-term closures in Iceland, all gear types. Red closures tend to be bottom trawl and sometime all gear closures. Yellow/orange boxes with internal lines near the coast (East, West and North West) are longline closures. Open yellow/orange boxes south and southeast of Iceland are 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.

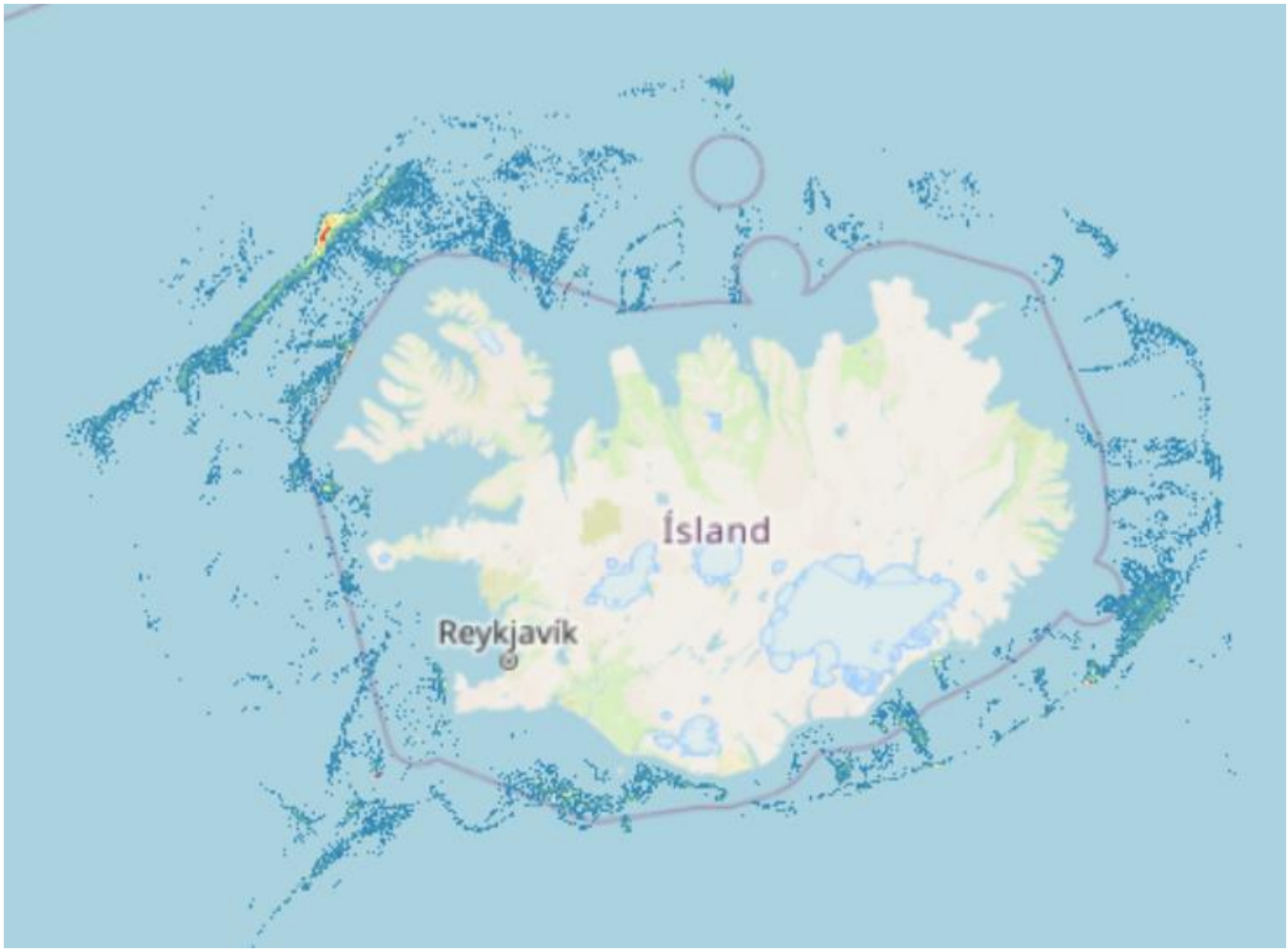


Figure 42. Bottom trawl effort in Iceland. Red areas indicate highest effort, yellow areas indicate medium effort, while blue dots indicate lower effort. Source: Atlas/GIS website managed by Fiskistofa at http://atlas.lmi.is/mapview/?application=haf .

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

7.5.1.2 Foodweb considerations

The MRI has studied Icelandic cod and its place/relationship in the ecosystem.

Capelin is a key forage species in the ecoregion, and promotes an important energy transfer into the ecosystem. Capelin feeds mainly on copepods and euphausiids, and it is one of the most important prey for several predators, e.g. cod, haddock, saithe, Greenland halibut, seabirds, and marine mammals[98]. The Capelin stock appears to be quite abundant as per the 2021 stock assessment.

[98] https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2020/2020/FisheriesOverview_IcelandicWaters_2020.pdf

Icelandic capelin's status was assessed by the MFRI again in 2021[99]. According to the 2021 acoustic autumn survey, the SSB is estimated 1 833 000 tonnes. The harvest control rule (HCR) aims at leaving at least 150 000 tonnes (Blim) of mature capelin at the time of spawning in March with 95% probability. Model projections show that with maximum catch of 904 200 tonnes during the fishing season 2021/2022, the HCR goal will be achieved. The index of immature capelin (age 1 and 2) was the third highest in the time series. The final TAC advice is based on a model which takes into account uncertainty in surveys and predation from cod, haddock, and saithe on capelin, to ensure that the advised catch will result in a less than 5% chance of SSB going below Blim. The procedure for setting the initial TAC is designed to ensure a low risk of advised catch being higher than the final TAC (ICES, 2015). Capelin catches, biomass and juvenile abundance (index) are shown in the figure below.

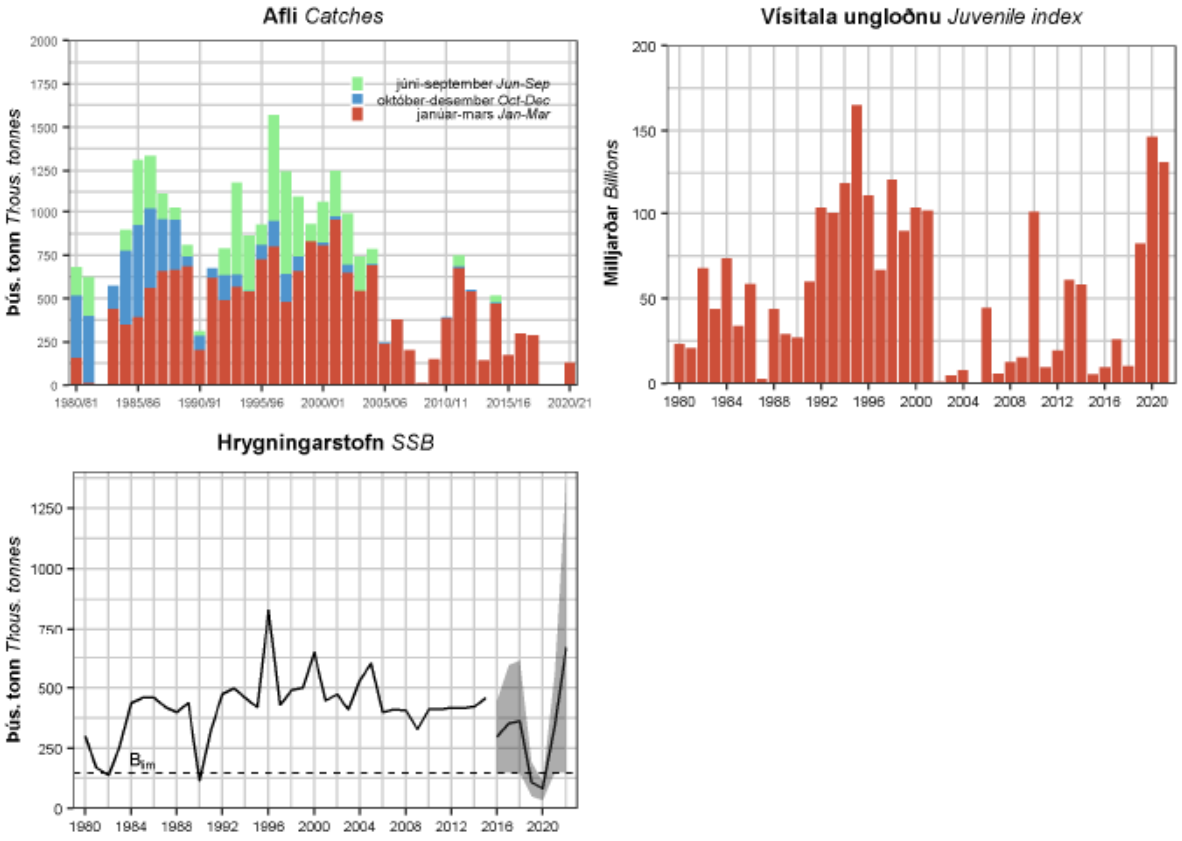


Figure 43. Capelin. Catches, acoustic index for immatures from autumn surveys, and SSB at spawning time (with 90% confidence limits since 2016). The SSB value for 2016 and onwards is not directly comparable to historical values because it is based on different assumptions about natural mortality.

[99] https://www.hafogvatn.is/static/extras/images/lodnahaust20211278547.pdf

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

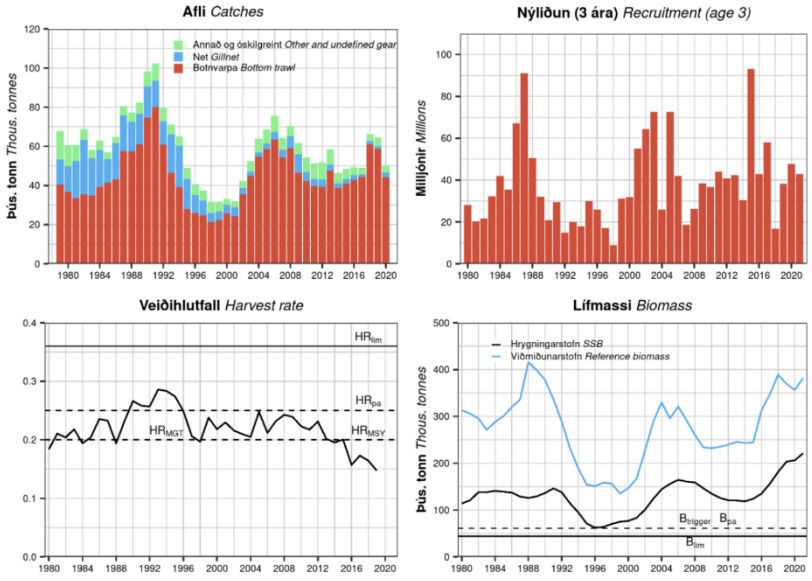
This section includes a brief update on changes in the fishery relevant to the fundamental clauses of the IRF Fishery Standard and a statement of continuing consistency (or not) to those fundamental clauses.

Section 1. Fisheries Management

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

1.1	Fisheries Management System and Plan for Stock Assessment, Research, Advice and Harvest Controls including: – The fisheries management system – The fisheries management plan
Summary of relevant changes:	The fisheries management consists of a network of organisations and agencies with a legal basis in terms of a suite of laws and regulations. The Ministry of 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 organize and approves assessment and management plan evaluation. The legal basis for the management is a suite of laws and regulations. Laws are given by the Parliament (Althingi), regulations are given by the Ministry. The main regulations are quota regulations of the catches in an ITQ system, technical regulations (gear standards, mesh sizes etc), area closures (permanent and temporary, including short term closures), landing obligations in authorized ports where the catches have to be weighed by authorized staff and a discard ban. There are rules for minimum landing size – smaller fish has to be landed but the fisher gets only a fraction of the payment). There are a range of special regulations for small coastal boats and regulation of tourist fishery (which also has quotas). 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. All catches have to be accounted against quotas, and there is an active marked or selling and buying quotas as needed. For most stocks, including saithe, quotas can be transferred between years and between species, within certain bounds. The management plan includes the measure noted above. It has a harvest rule for deriving the total quota from a stock assessment, updated ad endorsed by ICES in 2019. The plan includes reference points for biomass and exploitation rate. Such plans are generally developed by Iceland, mostly by the MFRI, and evaluated and endorsed by ICES.
References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

7.6.2 Clause 1.2 Research and Assessment

1.2 Research and Assessment	
Summary of relevant changes:	Saithe is regarded as a local Icelandic stock and assessed as such. The assessment is based on catches in numbers at age. The total amounts landed is provided by the Directorate according to the landings reported by landing sites There is a well-organized system for sampling of catches. In addition, data from the spring bottom trawl survey (amounts caught and biological sample) are used. The saithe is assessed with a forward-running separable statistical catch at age model, allowing changes in selectivity to occur in specified years. It has been used since a benchmark in 2010[100] It is fitted to commercial catch at age data and a survey index from the Icelandic bottom trawl survey in the spring. The code has been extended over the years, and is now labelled 'Muppet', but the method is largely unchanged. The assessment method was again examined and approved without changes by ICES in a benchmark process in 2019, and has remained unchanged since then. Saithe is known to be difficult to assess because of noisy and inconsistent data. Accordingly, there is some retrospective error and clustered residuals. Nevertheless, there is no doubt that the stock is in a good shape. In recent years, the stock has increased partly due to some strong year classes and partly to catches being well below the quotas. Parts of the remaining saithe quota is used for accounting for catches of other species, parts are transferred to next year, and some is just left unused. The main results of this year's assessment are shown below.  **Figure 44.** Main results of the 2021 assessment for saithe.

100 http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2010/WKROUND%202010/final_wkround_2010.pdf

1.2	Research and Assessment	
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.	

7.6.3 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 harvest rate of 0.20, which represents a HR leading to near MSY, and well below the range defined by precautionary reference points. These reference points, that are tabulated below, were established by ICES at the benchmark process in 2019 and adopted by Icelandic authorities. They have been slightly amended in 2021 to bring them in line with current ICES standards. This has not changed the relation of the reference points to the harvest rule, which remains unchanged.

Table 11. Precautionary and management reference points

Nálgun *Framework*	Viðmiðunarmörk *Reference point*	Gildi *Value*	Grundvöllur *Basis*
Aflaregla *Management plan*	MGT $B_{trigger}$	61 000 t	B_{pa}
	HR_{MGT}	0.2	Aflaregla *Management plan (ICES 2019)*
Hámarksafrakstur *MSY approach*	HR_{MSY}	0.2	Slembireikningar *Stochastic simulations (ICES 2019)*
	MSY $B_{trigger}$	61 000 t	Hrygningarstofn sem er náð í 95% tilfella í slembireikningum með veiðihlutfall = HR_{MSY} , $B_{trigger}$ = 0 og enga sveiflujöfnun. *Spawning stock reached in 95% of cases in stochastic simulations with harvest rate = HR_{msy} , $B_{trigger}$ = 0 and no catch stabilizer.*
Varúðarnálgun *Precautionary approach*	B_{lim}	44 000 t	B_{pa}/1.4
	B_{pa}	61 000 t	B_{loss} er notað sem B_{pa} þar sem veiðidánartala hefur aldrei verið há, né hefur hrygningarstofn minnkað mikið og ekkert samband er á milli nýliðunar og hrygningarstofns *B_{loss} is used as B_{pa} as fishing pressure has never been high for this stock, the spawning stock not depleted significantly, and no relationship is seen between spawning stock and recruitment*
	HR_{lim}	0.36	Veiðihlutfall sem leiðir til þess að hrygningarstofn er yfir B_{lim} með 50% líkum *Equilibrium HR which will maintain the stock above B_{lim} with a 50% probability*
	HR_{pa}	0.25	Slembireikningar, það veiðihlutfall sem leiðir til þess að hrygningarstofn sé stærri en B_{lim} með 95% líkum með $B_{trigger}$ = MSY $B_{trigger}$ og enga sveiflujöfnun. *Stochastic HCR evaluation, SSB 95% of the time over B_{lim} with $B_{trigger}$ = MSY $B_{trigger}$ and no catch stabilizer.*

Management targets. The management plan has a target harvest rate (HR: TAC as fraction of biomass of fish 4 years and older) of 0.20 This HR leads to almost the maximum long-term yield. In line with ICES technical guidelines the MSY $B_{trigger}$ is set as B_{pa}, the harvest rule prescribes a reduction in harvest rate if SSB goes below a Management Btrigger, that is equal to Bpa and MSY Btrigger of 61 000 tonnes.

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)
	Harvest rule The present harvest rule was approved by ICES and adopted by Iceland in 2019. A similar rule has been in effect since 2013, and the revision in 2019 led only to a minor change (trigger biomass was reduced from 65 to 61 kt). If $SSB_{y} \geq B_{trigger}$ $$Tac_{y/y+1} = \frac{Tac_{y-1/y} + 0.2 \times B_{4+,y}}{2} \quad (1)$$ If $SSB_{y} \leq B_{trigger}$ $$Tac_{y/y+1} = \alpha \times Tac_{y-1/y} + (1-\alpha) \times \frac{SSB_{y}}{B_{trigger}} \times 0.2 \times B_{4+,y} \quad (2)$$ $$\alpha = 0.5 \times \frac{SSB_{y}}{B_{trigger}} \quad (3)$$ Where $Tac_{y/y+1}$ is the TAC for the fishing year starting 1 September in year y ending 31 August in year $y+1$. $B_{4+,y}$ the biomass of age 4 and older in the beginning of the assessment year compiled from catch weights. The latter equation shows that the weight of the last years Tac does gradually reduce from 0.5 to 0.0 when estimated SSB changes from $B_{trigger}$ to 0. The harvest rule as cited in the assessment report by MFRI in 2021[101] is cited above: The official formulation[102] is slightly different, but there probably is a mistake in that formula. **Further protective measures** include area closures and rules for landing of undersized fish. Closed areas can be permanent, which are defined in regulations and remain unchanged from year to year, as well as temporary closures (normally for 2 weeks) of areas where undersized fish are caught. They are mostly directed at cod, but may have some protective effect on saithe as well. The management of temporary closures was moved from MFRI to the Directorate last year. **Changes since last year.** The reference points were slightly amended in 2021, to bring them in line with the present ICES standards. The management plan was revised in 2019 and has not changed since then.
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.

101https://www.hafogvatn.is/static/extras/images/03-saithe_tr1259382.pdf

102 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/

7.6.4 Clause 1.4 External Scientific Review

1.4 External Scientific Review	
Summary of relevant changes:	ICES is regarded as the relevant institution that provides external scientific review. Both the assessment method and the harvest rule (including reference points) were approved by ICES in a benchmark process in 2019. They have remained unchanged, except some minor adjustments to the reference points to bring them in line with recent developments in the ICES standards. Normally, the assessment is conducted by the ICES North-Western Working Group (NWWG), where stakeholder nations participate. In 2020, because of the ongoing Covid 19 epidemic, MFRI made its own assessment and the advice was made by MFRI . In 2021, the normal procedure was resumed. Iceland has broad international scientific cooperation through organisations such as the Northeast Atlantic Fisheries Commission (NEAFC)[103], the Northwest Atlantic Fisheries Organization (NAFO)[104], and the North Atlantic Marine Mammal Commission (NAMMCO)[105]. Icelandic scientists have been involved in many international projects arranged by these organizations and in co-operative projects with research institutes and universities. Saithe is regarded as a domestic Icelandic stock.
References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

7.6.5 Clause 1.5 Advice and Decisions on TAC

1.5 Advice and Decisions on TAC	
Summary of relevant changes:	Stock assessment and advice, including advice on harvest rules, TACs and reference points is provided by ICES. The process involves all relevant nations and the advice is for all areas. The advice is published on the MFRI website once it is ready [106]. 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 practise. The Icelandic saithe stock is a local stock confined to Icelandic waters, and is managed by Iceland alone.
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.

103 http://www.neafc.org/
104 http://www.nafo.int/
105 http://www.nammco.no/
106 https://www.hafogvatn.is/static/extras/images/03-saithe1259383.pdf

Section 2. Compliance and Monitoring

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

2.1 Implementation, Compliance, Monitoring, Surveillance and Control	
Summary of relevant changes:	The Icelandic Directorate of Fisheries, or Fiskistofa[107], 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)[108], the Fisheries Management Act (no. 116/2006) [109], the Act on Fishing in Iceland's Exclusive Economic Zone (no. 79/1997), the Act concerning the Treatment of Commercial Marine Fish Stocks (no. 57/1996) and the Act on a Special Fee for Illegal Marine Catch (no. 37/1992). Accordingly, it issues fishing permits to vessels and allocates catch quotas, imposes penalties for illegal catches, supervises the transfer of quotas and quota shares between fishing vessels, monitors vessels using the VMS system e-logbooks, controls the reporting of data on the landings of individual vessels and monitors the weighing of catches[110]. 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. The Icelandic Coast Guard[111] is responsible for control at sea, both of the catches and the quality of the vessels. It performs sea and air patrols of Iceland's 200-mile exclusive economic zone and 12-mile territorial waters, and monitoring of fishing within the zone in consultation with the Marine and Freshwater Research Institute and Ministry of Industries and Innovation. The Coast Guard operates the Icelandic Maritime Traffic Service within its operations centre which has a key role in ensuring safety at sea, but can also take action if the behaviour of a fishing vessels is unusual. The Fisheries Management Act sets out penalties for the violation of its provisions, or rules adopted by virtue of it, which are provided in detail in the Act Concerning the Treatment of Commercial Marine Fish Stocks (Act No. 57 1996[112]). Provisions of the Act on a Special Fee for Illegal Marine Catch[113] are also applied as appropriate. Penalties range from the issue of reprimands by the Directorate of Fisheries and the suspension of commercial fishing permits to fines and, in cases of serious or repeated deliberate violation, imprisonment for up to six years (Article 24 and 25 of Act No. 116/2006). **Summary of relevant updates in 2021** 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

[107] https://www.fiskistofa.is/umfiskistofu/
[108] https://www.althingi.is/lagas/149a/1992036.html
[109] https://www.ecolex.org/details/legislation/fisheries-management-act-1990-lex-faoc003455/
[110] http://www.fiskistofa.is/english/about-the-directorate/
111 http://www.lhg.is/english
[112] https://www.althingi.is/lagas/149a/1996057.html
[113] https://www.althingi.is/lagas/149a/1992037.html

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 12. 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 7. The number has remained consistent with previous years.

Enforcement by Fiskistofa

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

Based on the latest available 2020 Fiskistofa report, in 2020, 164 cases were suspected of violations. **Error! Reference source not found.** contains information on the number of cases by category.

Error! Reference source not found. also contains information regarding the penalties for suspected v iolations. 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.

2.1	Implementation, Compliance, Monitoring, Surveillance and Control

The Directorate of Fisheries sent 470 letters due to catch logbooks not being retuned 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.

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 6) and none based on Fisheries inspections by ICG. The overall number of inspections since 1988 is shown below.

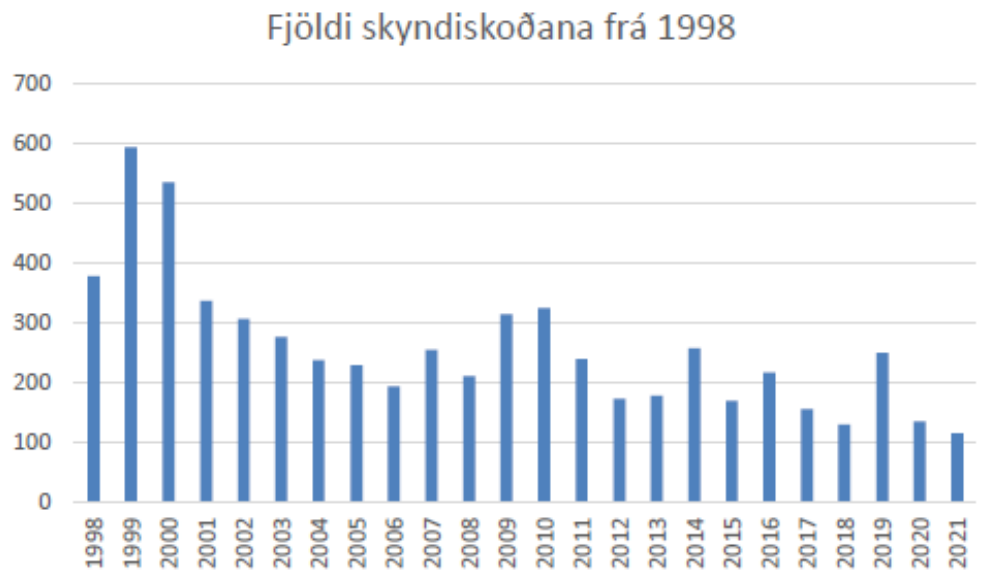


Figure 45. Overall number of ICG inspection from 1988 to 2021**.** Source: provided by the ICG during the remote audit, November 2021.

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

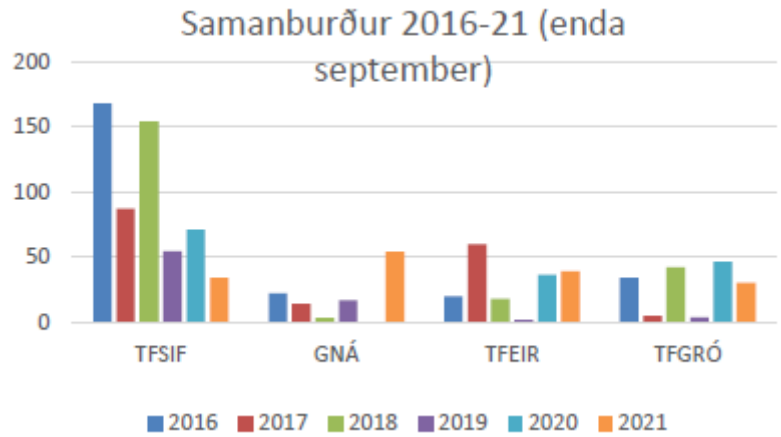


Figure 46. Air surveillance by four different Icelandic assets from 2016 to 2021. Samtals is the total. Source: provided by the ICG during the remote audit, November 2021.

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.

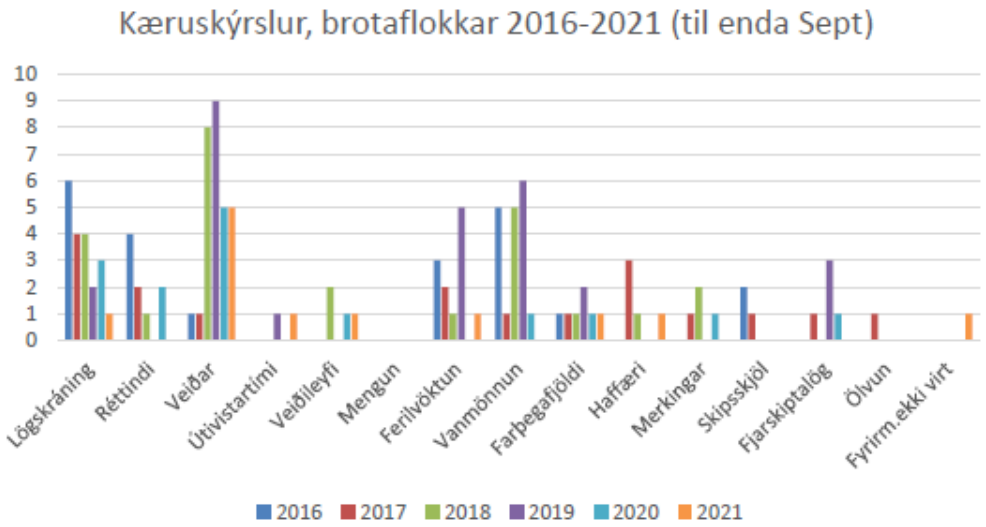


Figure 47. Overview of ICG infringement reports in 2016-2021. Source: provided by the ICG during the remote audit, November 2021.

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:	**Context** Catches and landings in Iceland are monitored and recorded in a number of complementary ways. Logbooks, either electronic (e-logs) or standard paper based, depending on the vessel, record landings at sea and these are verified and standardised through physical weighing at accredited weigh stations in landings ports throughout Iceland. Logbooks are compulsory as required by Regulation No.746/2016[114]. These must be electronic (e-logs). Small vessels used to use paper logbooks until late 2020 when regulation 298/2020[115] implemented the use of an electronic app. The App also called Afladagbókina or catch diary[116] [117] 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: • Ship name, ship registration number and call sign. • Fishing gear, type and size. • Location determination (latitude and longitude) and time when fishing gear is placed in the sea. • Catch by quantity and species. • Harvesting. • Landing. • Seabirds bycatch by species and species. • Marine mammals' bycatch by number and species. Landings must be weighed within 2 hours of landing by an official weigher using calibrated scales. Following allowances for ice the official weight is forwarded to the Directorate where it is compared with the relevant e-logbook entry before an appropriate deduction is made

[114] https://www.stjornartidindi.is/Advert.aspx?RecordID=42a16a67-60a7-4ae7-ad7c-0f53fc254654
[115] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887
[116] http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla
[117] 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)[53].

2021 updates

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 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. Saithe catches are consistently below TAC and advice, as shown in the table below.

Table 13. TACs and actual catches, according to MFRI (source: MFRI, 2021 advice[118]).

Fiskveiðiár *Fishing year*	Tillaga *Recommended TAC*	Aflamark *National TAC*	Afli Íslendinga *Catches Iceland*	Afli annarra þjóða *Catches others*	Afli alls *Total catch*
2010/2011	40 000	50 000	51 600	700	52 300
2011/2012	45 000	52 000	49 700	700	50 400
2012/2013	49 000	50 000	51 300	900	52 200
2013/2014	57 000[1)]	57 000	54 300	700	55 000
2014/2015	58 000[1)]	58 000	52 100	500	52 600
2015/2016	55 000[1)]	55 000	48 900	300	49 200
2016/2017	55 000[1)]	55 000	48 800	300	49 100
2017/2018	60 237[1)]	60 237	58 748	270	59 018
2018/2019	79 092[1)]	79 092	70 150	175	70 325
2019/2020	80 588[1)]	80 588	52 994	227	53 221
2020/2021	78 574[1)]	78 574			
2021/2022	77 561[1)]				

[1)] 20% aflaregla. *20% harvest control rule*

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.

[118] https://www.hafogvatn.is/static/extras/images/03-saithe1259383.pdf

7.6.8 Clause 2.3 Monitoring and Control

2.3	Monitoring and Control including: 2.3.1 Vessel registration and catch quotas 2.3.2 Fishing vessel monitoring and control systems 2.3.3 Catches are subtracted from relevant quotas 2.3.4 Rules are enforced 2.3.5 Analysis is carried out
Summary of relevant changes:	**Context** Commercial vessels participating in the fishery require a permit issued by the Fisheries Directorate. This is a requirement of the Fisheries Management Act No.116/2006. These permits represent the initial legal requirement without which a vessel may not obtain the quota necessary to fish for Icelandic quota stocks. Quotas conform to the overall decision on TAC, through the individual vessel quota share and other allocations. The headline TAC for a species is determined first and all subsequent allocations are in effect subdivisions of that figure. As a result, the allocated catch quotas for a species (when quotas are initially allocated) are assigned in such a way that the combined quotas for that species conform to the currently effective decision on TAC. Catches by vessel are monitored and recorded in near real-time in a central database maintained by the Fisheries Directorate[119]. 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: **1.** Allocated quota (initial allocation of quota from the overall TAC based on no. of shares) **2.** Compensations (quota gained/lost through compensations) **3.** Quota transferred from the previous year (this may be a negative balance) **4.** Quota transferred between vessels (a negative balance indicates an outward transfer of quota (i.e. quota transferred to other vessels) while a positive balance indicates an inward transfer of quota (i.e. quota gained from other vessels) **5.** Allowed catch (the sum of 1 to 4 above) **6.** Catch (vessels landings in the season to date of that species) **7.** Balance (Allowed catch - Catch) **8.** Overfished Specific data on each Icelandic quota species, its allocation to ITQ holders, transfer information, balances and catches to date is available at http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/aflastodulisti.jsp?lang=en. Registered catches are based on information from ports of landing and information on catches exported unprocessed. The catch statistics are published, subject to change, once they have been compared to submitted logbooks and reports from buyers, and are available on the Fisheries Directorate website. Accordingly, information on the size and composition of the fleet of fishing vessels is available and

[119] 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	
		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 fines[120]. 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.

[120] 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 298/2020[121]. The App also called Afladagbókina or catch diary[122] [123] 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/Firskistofa 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 fishermen. A tutorial video on the use of the App was also published on the Fiskistofa

[121] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887
[122] http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla
[123] 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	
		website https://www.fiskistofa.is/ymsaruppl/tilkynningar/afladagbokarapp-myndband and on the Fiskistofa facebook site[124]. 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. **Status:** Open, Corrective Actions in place to be reviewed annually in subsequent audits. Corrective actions are deemed to be on track. A corrective action plan against this non-conformance has been provided under the Non Conformances and Corrective Action Section of this report. Please refer to it for further detail on the non-conformance, the corrective action plan and the corrective evidence supplied during this audit.
References:		Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard		The fishery continues to remain consistent with the standard but please note the open non conformance detailed above.

[124] 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:	**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 in the background section of this report are those that were identified during the re-assessment[125]. In summary we can determine that the saithe fishery continues not to have negative effects on any of the listed species, with the exception of spotted wolffish, itself the subject of an active non-conformance and corrective action. The status of bycatch and associated species has been detailed in **Table 10.** **Endangered, Threatened and Protected (ETP) and vulnerable species interactions** 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 List[126] (population trend unknown, last assessed in 2020). They are also classified as Least Concern in the Icelandic National Redlist (based on a 2016 assessment)[127]. Annual estimates of harbour porpoise by-catch have decreased in recent years as gillnet effort has decreased from a high of 7,300 animals in 2003 to about 1600 animals in 2009–2013[128] 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)[129] 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,

[125] https://www.responsiblefisheries.is/media/1/icelandic-saithe-re-assessment-report-final-03-feb-2020.pdf
[126] https://www.iucnredlist.org/species/17027/50369903
[127] https://www.ni.is/node/27406
[128] 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
[129] https://nammco.no/wp-content/uploads/2019/02/final-report_hpwg-2019.pdf

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	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 seals[130] 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** 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

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

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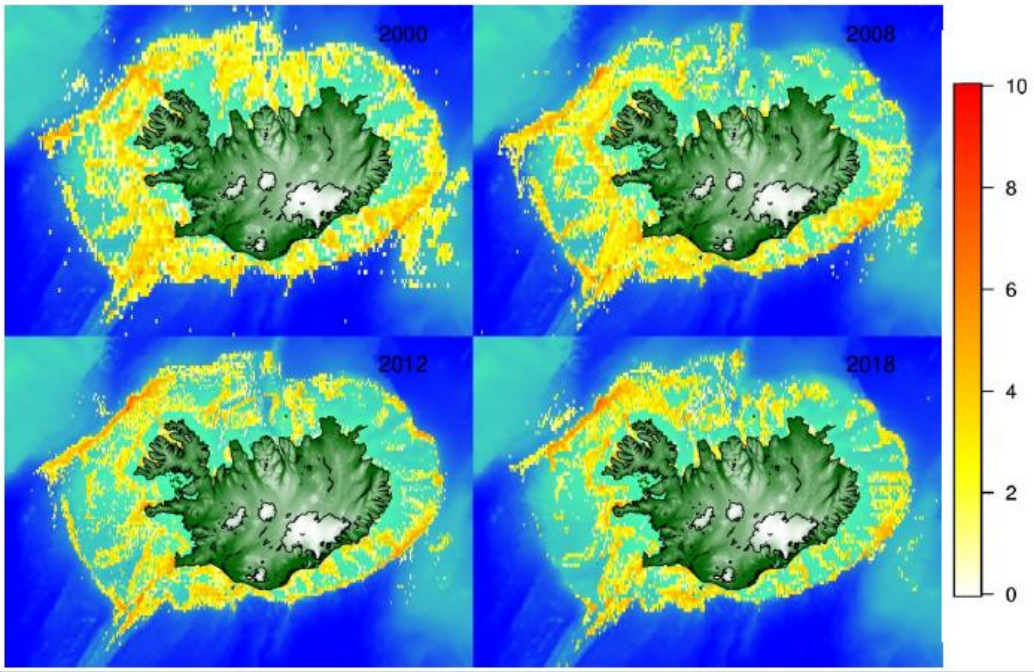
catch in 2019 was 194 t, and 160 t in 2020. Survey abundance is variable but has been on average relatively stable in recent years. Landed catch of dogfish (*Squalus acanthias*) was 1 t in 2019 and 3 t in 2020. Survey trends are very sporadic. Landed catch of Greenland shark (*Somniosus microcephalus*) 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 report[131] 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 km^2 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.



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

Figure 48. 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)[132]. 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)[133] based on the findings of the Novasarc work. The group that produced this publication has received an additional funding to develop this work further including managemental aspects in 2021. The MFRI highlighted during the November 2021 site visits that Novasarc II is now ongoing and will concentrate on updating predictive models and discuss the output for managemental purposes.

Benthos recorded in the MFRI survey

Recording of benthic animals as a bycatch in the autumn MFRI trawl took place for the fifth time in 2020 ((Jakobsdóttir et al. 2020[134]) (Figure 39). 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.

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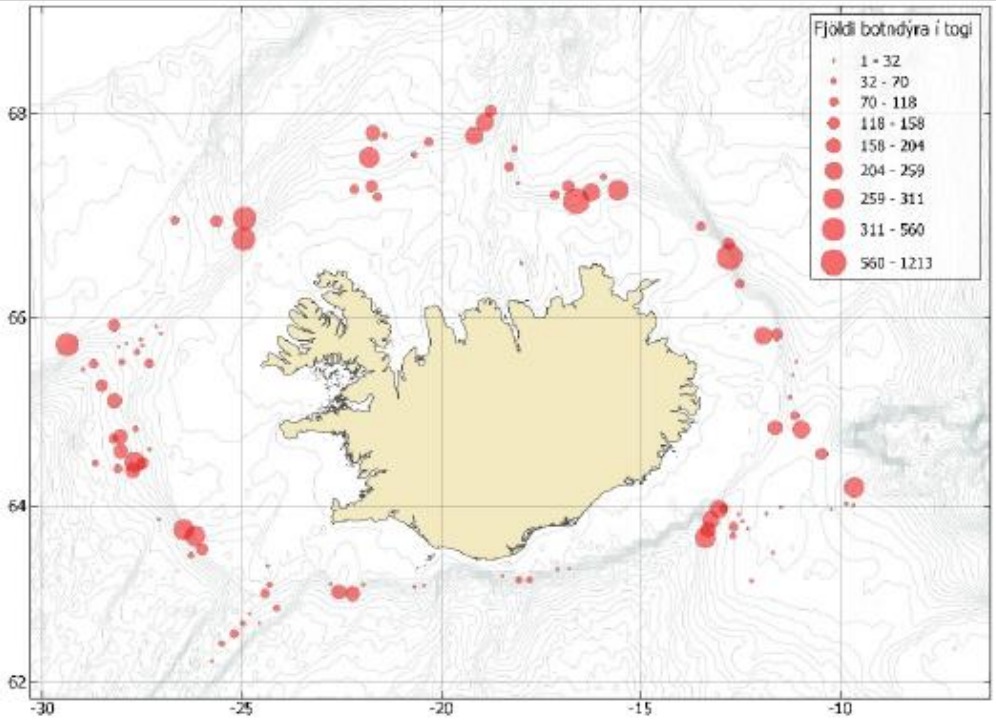

Figure 49. Benthos recorded in the autumn Icelandic autumn groundfish survey in 2020. Number (kg) per tow.

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. 2021[135]. These five aspects are:

6. 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

[132] http://norden.diva-portal.org/smash/get/diva2:1304079/FULLTEXT02.pdf
[133] https://www.frontiersin.org/articles/10.3389/fmars.2020.00131/full
[134] 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
[135] 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

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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.

7. 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.
8. 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.
9. Propose a definition of what can be considered a significant negative effect from bottom fishing gear on fragile bottom ecosystems.
10. 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.

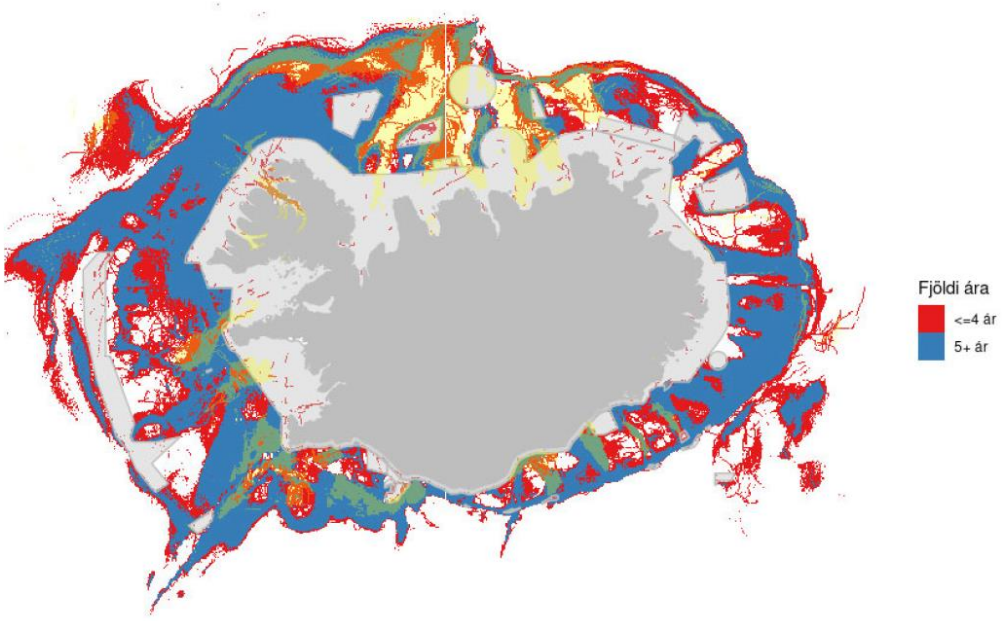

Figure 50. Long term closures and selected fishing distribution around Iceland between 2009-2019.

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

Foodweb considerations

The MRI has studied Icelandic saithe and its place/relationship in the ecosystem. Capelin is a key forage species in the ecoregion, and promotes an important energy transfer into the

3.1	Guiding Principle	
		ecosystem. Capelin feeds mainly on copepods and euphausiids, and it is one of the most important prey for several predators, e.g. cod, haddock, saithe, Greenland halibut, seabirds, and marine mammals[136]. The Capelin stock appears to be quite abundant as per the 2021 stock assessment (refer to Figure 43).
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 but please note the non-conformance listed above..

7.6.10 Clause 3.2 Specific Criteria

3.2	Specific Criteria including: 3.2.1 Information gathering and advice 3.2.2 By-catch and discards 3.2.3 Habitat Considerations 3.2.4 Foodweb Considerations 3.2.5 Precautionary Considerations	
Summary of relevant changes:		**Context and updates** Information is available on the legal specification of fishing gear in the Icelandic groundfish fishery. The primary aim of fishing gear regulations is size selectivity with a secondary aim being species selectivity. Gears are regulated in several ways to regulate both size and species selectivity. The MFRI provide advice for 40 fish stocks in Iceland as well as advice for harvest of marine mammal species (e.g. fin whale and common minke whale). Their most recent advice(i.e. 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 shark, Atlantic halibut, orange roughy, shagreen ray, etc… Catch records for over 50 species can be retrieved on their website.[137] There have been no changes in the gear used in Icelandic waters. Fiskistofa and the Client group confirmed that longliners use night settings and lasers of sounds cannons to keep birds off the longlines, while trawlers use semi-pelagic trawl doors and rock hoppers to decrease drag on the seabed to save fuel and decrease gear habitat contact. Gillnetters are mainly restricted through area closures. The status of bycatch and associated species has been detailed in the previous clause. Spotted wolffish is depleted and subject to corrective actions to reverse the trend. Vulnerable species effects are considered generally limited and not significantly affecting any of the species listed by OSPAR, or the marine mammals and seabirds regularly caught in the gillnet fisheries (mostly in lumpfish). According to section 2 of Act no. 57/1996, concerning the treatment of commercial marine stocks, discard of catches (although with minor exceptions) is prohibited, hence the very vast majority if not all catches are landed. Actual discards are illegal and considered relatively small in Icelandic waters. Discarding violations are subject to penalty ranging from ISK 400K to 8M. One feature of this ban is

[136] https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2020/2020/FisheriesOverview_IcelandicWaters_2020.pdf
[137] http://www.fiskistofa.is/veidar/aflastada/aflastodulisti/

3.2	Specific Criteria including: 3.2.1 Information gathering and advice 3.2.2 By-catch and discards 3.2.3 Habitat Considerations 3.2.4 Foodweb Considerations 3.2.5 Precautionary Considerations	
		that it has some inbuilt flexibility, as any 5% of demersal catches from a fishing trip (called VS catch), irrespective of fish species or size, may be excluded from quota restriction (which means that VS catches are additional to the TAC). On sale of VS catches in public fish markets 20% of the revenue generated is paid to the vessel with the remaining 80% going to a designated research and development fund (the VS fund, under the auspices of the Ministry). A maximum of 20% return on VS catches means that there are limited incentives for fishermen to land such catches. Key habitat considerations are listed in the yearly ICES ecosystem report for the Icelandic waters, the last of which was published in December 2020[138]. Key findings summarised in the report highlight that using vessel monitoring system (VMS) and logbook data ICES estimates that mobile bottom trawls used by commercial fisheries in the 12 m+ vessel category have been deployed over approximately 132,485 km^2 of the Icelandic ecoregion in 2018, corresponding to ca. 17.5 % of the ecoregion's spatial extent. Extensive spatial closures are also shown in the region. Foodweb considerations for saithe largely depend on its relationship to its mains prey species, capelin, which has been shown to be relatively healthy in 2021 as per MFRI stock assessment and advice[139]. Precautionary considerations are integrated in the management of associated and non- target species.
References:		Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard		The fishery continues to remain consistent with the standard.

[138] https://www.ices.dk/sites/pub/Publication%20Reports/Advice/2020/2020/EcosystemOverview_IcelandicWaters_2020.pdf
[139] https://www.hafogvatn.is/static/extras/images/lodnahaust20211278547.pdf

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 2019-2020 re-assessment audit of this fishery[140] all clauses but two were found to be in full conformance. One minor non-conformance was identified (during the 4th surveillance in 2018/19, first certification cycle) 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, while a new minor non-conformance was identified during the 2019-2020 Re-Assessment against clause 3.1.1 relative to the bycatch of spotted wolfish and common loon. The second part of NC#2 relating to common loon was closed at the previous surveillance. Progress against these two NCs for this 2nd Surveillance is shown below. No new non-conformances were identified during the 2nd Surveillance.

8.1.1 Closed non-conformances

Not applicable, the two active minor non-conformances are still open.

8.1.2 Progress against open non-conformances

8.1.3 New non-conformances

Non-conformance 1 (of 1)	
Clause:	2.3.2.4. Catch amounts by species and fishing area shall be estimated and continually recorded in fishing logbooks on-board the fishing vessels
Non-conformance level:	Minor Non-conformance
Non-conformance:	Although required by legislation, there is evidence of extensive non-reporting/under-reporting of seabirds and marine mammals bycatch such that the Assessment Team cannot be confident that catch amounts by species and fishing area (of marine mammals and seabirds) are estimated and continually recorded in fishing logbooks.
Rationale:	The recording of marine mammals and seabirds by number and species is required by Icelandic regulation[141]. Despite the implementation of new mandatory logbook reporting procedures for seabird and marine mammal bycatch, available evidence suggests that far fewer incidences of seabird and marine mammal bycatch are reported via the electronic logbook system than would be expected given the levels reported by onboard observers. This suggests significant levels of under-reporting and/or non-reporting of seabird and marine mammal bycatch. Examples of available evidence to support this conclusion include the findings of Pallson *et al.* 2015[142] and the

[140] https://www.responsiblefisheries.is/media/1/icelandic-saithe-re-assessment-report-final-03-feb-2020.pdf
[141] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967
[142] https://www.hafogvatn.is/static/research/files/fjolrit-178.pdf

	March 2018 MFRI report titled: "Bycatch of Seabirds and Marine Mammals in lumpsucker gillnets 2014-2017". Pallson *et al.* 2015 highlighted the fact that their bycatch estimates were based on limited data that needed to be increased and improved with a functioning reporting system for the fishery and better follow up. The MFRI 2018 report found that although reported bycatch in E-logbooks by the fleet has increased (suggesting better compliance with reporting requirements) the overall bycatch rates are still much lower than observed in the trips by inspectors. Overall, the marine mammal and seabird bycatch rate during inspector trips was around four times higher than reported by the fleet in 2017[143]. Furthermore according to a 2017 presentation to NAMMCO's Working group on bycatch of marine mammals; *"logbooks have unfortunately proven unreliable"* and *"bycatch of birds and marine mammals is 18x higher when observer is present vs logbook records"*. While much of the evidence related to non-compliance with reporting requirements may relate to the lumpsucker fishery, this fishery is still part of the management system under review and in addition there is insufficient evidence to show that compliance in the fisheries under assessment here is better.
Corrective Action Plan	In accordance with rules of the IRF Programme, the Client is required to submit a Corrective Action Plan (CAP) within 28 days. **The Client submitted the following CAP in February 2019**

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

To whom it may concern

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Reykjavík February 15, 2019
Reference: ANR18030330/11.02.09

The Icelandic fisheries management system is based on responsible conservation and sustainable use of living marine resources and an integral part of the system is to manage ecosystem effects of fishing, including bycatches of commercial and non-commercial species. All management decisions are taken based on the best available science.

Effective control and enforcement is a pivotal element of a responsible fisheries management system. The Directorate of Fisheries monitors fisheries to ensure that rules are being followed. Real-time status of landings is delivered to a live database through a synchronized weight control system at all landing ports. The Directorate also carries out surveillance and inspections of the fishing operations, landing of catches and processing plants in close collaboration with the Icelandic Coast Guard, the Food and Veterinary Authority as well as accredited municipal harbor officials responsible for proper recording of the weight of the landed catch.

Icelandic law explicitly prohibits discards of commercial species, i.e. bycatches of unwanted species or undersized fish. There are certain flexibility options and incentives for compliance incorporated into the system, to make it function well in practice.
Incidental catch of non-commercial species such as seabirds and marine mammals is monitored by mandatory recordings in electronic logbooks. These measures are meant to maintain the delicate balance between effective harvesting and good environmental health to support sustainable fisheries.

The Marine and Freshwater Institute in Iceland issues reports on incidental bycatches of non-commercial species. One issue that is currently being addressed as a result of the recommendations of these reports is the need for further measures to encourage the reporting of these catches in logbooks to prevent the transition from paper-logbooks to electronic reporting from resulting in lower levels of reporting. According to the reports from the MFRI, bycatch of marine mammals and seabirds are most frequent in gillnet fisheries.

The Minister of Fisheries recently received a response to his request to the Committee for consultation on responsible management of living marine resources regarding addressing

non-commercial bycatches. On the basis of the conclusions of this committee, work has commenced to improve data recording, data availability and reliability and explore certain management measures to reduce bycatch of these species.

The committee comprises individuals from main stakeholder organizations in the fishing industry as well as the Marine and Freshwater Research Institute and the Ministry of Fisheries.

The Ministry will be working with the MFRI, the Directorate and the fishing industry in the next months with the aim of acquiring accurate and more detailed information on frequency of non-commercial bycatches, by fishing-gear, area and time. This information is essential for the MFRI as basis for recommendation on management actions to address any significant adverse impacts of fisheries on these species in question and the ecosystem health in general. These actions could include time and area closures and fishing gear amendments.

On behalf of the Minister of Fisheries and Agriculture

Brynhildur Benediktsdóttir

Further to the corrective action letter provided, the client also clarified that the Committee has recommended the following to the Ministry of Industries and Innovation:

1) Improvement of information collection and monitoring activities to gather reliable seabird and marine mammal bycatch information from vessel e-logbooks (and directly addressing the non-conformance) through technology development (e.g. mobile app in development by the Directorate), a species identification training program for fishermen and observers, and a general improvement in the quality of bycatch data (i.e. narrower confidence limits) and depth of information recorded (e.g. catch information on area, time, depth etc.) to help design mitigation measures that will result in appropriate industry acceptance and buy in;
2) Measures to reduce bycatch (e.g. potential spatial/temporal closures at sensitive times such as around seal pupping or bird breeding season); and
3) US Marine Mammal Protection Act importing requirements collectively dealt with through improvements in the previous two points (i.e. information gathering and management measures).

	Accordingly, the Ministry is now considering further action with a view to determine what arrangements are realistically achievable and by when, potentially resulting in the following corrective action timelines: Year 1: Ongoing work to further refine the actions identified above in terms of specific deliverables with their accompanying timeline; Year 2: Initiate deliverable x, y, z identified in Year 1; Year 3: Fully implement and report on progress; Year 4: Continued implementation and reporting.
Assessment Team CAP response	**The Assessment Team has accepted the Corrective Action Plan provided by the Client for the fishery under assessment.**
Year 1 progress (Re-assessment 2019-2020)	**The Client Group submitted the following corrective action evidence in October 2019**

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Reykjavík October 25, 2019
Reference: ANR19020189/15.09.00

Subject: Bycatches of non-commercial species in fisheries

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

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

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

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

On behalf of the Minister of Industry and Commerce

Jóhann Guðmundsson
Director General, Department of Fisheries and Aquaculture

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

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

	The appointed Chair of the Committee for Consultation on Responsible Management of Living Marine Resources brings industry and management stakeholders together to gather information, explore options and seek consensus on what can be done and agreed in a practical sense, thus assisting in the official decision-making process. The Task Force is set to continue to collaborate directly with various stakeholders and to explore multiple options and solutions. The Chairs of the Committee and the newly formed Task Force have been in contact to report on recent issues, developments and general updates and to discuss future options. The Client Group communicated that there is a proposed regulation on the table aiming to prohibit all deliberate killing of seals in Iceland (with only minor exception subject to strict conditions and requiring permit from the Directorate of Fisheries) which, if adopted, would contribute to a reduction in overall mortality and assist seal populations growth. Furthermore, an important first step has been recognised as the need to improve social recognition and acceptance of the issues across the gillnet fisheries (for lumpfish and cod), currently considered at high risk. The Client Group further communicated, on behalf of the head of the Task Force, that the small vessels bycatch recording App should be ready for the end of the year, prior to trial by a select group of fishermen. However, the full recording of seabird and marine mammal bycatch in the App may extend beyond the next (2020) fishing season. Meetings have been scheduled in late 2019 to further discuss the App with the Directorate. Another action that is under consideration is the use of picture cards for gillnet fishermen to enable better identification of seals and seabirds and to investigate if additional forms to record bycatch are required in the small fleet. The Task Force is also planning to conduct meetings with small boat owners to reiterate the need to improve data collection. The Directorate is also considering to hold educational meetings around Iceland prior to the start of the next season to increase awareness of the issue and the need for improved catch recording.
Assessment Team Determination on Year-1 Corrective Evidence	**The Assessment Team has determined that the information supplied is sufficient to meet the original CAP deliverable for year 1. The non-conformance remains open and on track towards appropriate closure.** **The first surveillance activities will review evidence that the corrective actions highlighted above have been carried out.**
Year 2 progress (1st Surveillance 2021)	During the 2021 remote audit, Fiskistofa confirmed that starting in September 2020 smaller Icelandic vessels (including gillnetters that are responsible for most of the recognised bycatch of marine mammals and seabirds) are now required to log their catches in an app (essentially a e-logbook) which contains information on catch and bycatch, including that of marine mammals and seabirds. This follows regulation 298/2020[144]. The App also called Afladagbókina or catch diary[145] [146]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.

[144] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887
[145] http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla
[146] https://www.mbl.is/200milur/frettir/2020/08/31/oll_aflaskraning_rafraen_fra_og_med_morgundeginum/

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**
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	**The Assessment Team has determined that the information supplied is sufficient to meet the original CAP deliverable for year 2. The non-conformance remains open and on track towards appropriate closure.** **The 2nd surveillance activities will review evidence that the corrective actions highlighted above have been carried out.**
Year 3 progress (2nd Surveillance, late 2021)	As of November 2021, the App continues to be used in the small vessel sector and catch and bycatch data is being collected by Fiskistofa and the MFRI for management purposes. MFRI staff reported that data from the App is in the process of being made available to the MFRI through MFRI/Firskistofa IT staff collaboration, although timelines for completion are unclear as of November 2021. Fiskistofa has also reported as part of this 2nd surveillance audit that since the beginning of the App's implementation it has been mandatory to register all catch and bycatch according to regulation 298/2020 and the data is being received by the authorities. Their inspectors have been busy training fishermen and captains at the quaysides during landing, and their helpline was quite busy in the beginning of the coastal fleet season. Also, one physical meeting was held in Akranes with coastal fishermen. A tutorial video on the use of the App was also published on the Fiskistofa website https://www.fiskistofa.is/ymsaruppl/tilkynningar/afladagbokarapp-myndband and on the Fiskistofa Facebook site[147]. 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.

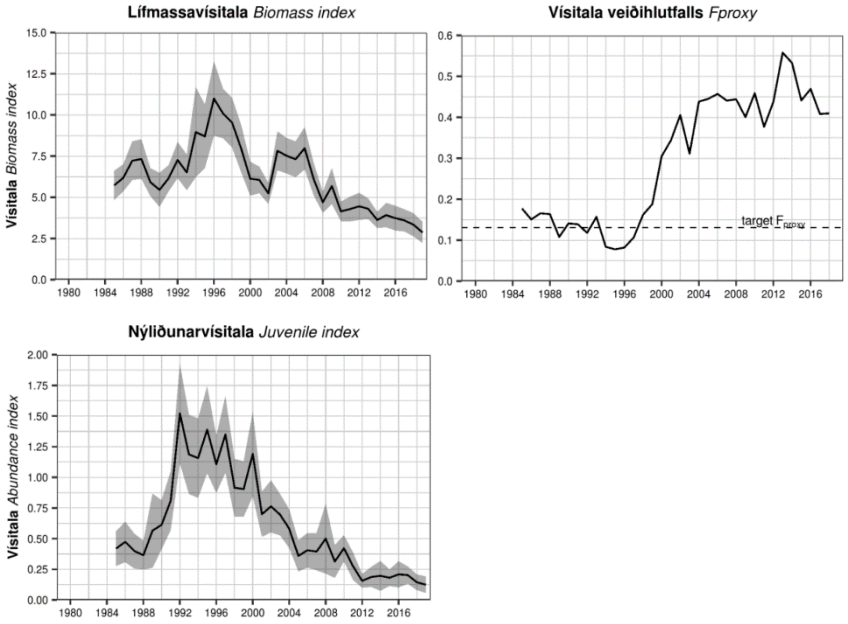
[147] https://www.facebook.com/Fiskistofa-1151844504903713/videos/304666984614930/

Assessment Team Determination on Year-3 Corrective Evidence	**The Assessment Team has determined that the information supplied is sufficient to meet the original CAP deliverable for year 3. The non-conformance remains open and on track towards appropriate closure.** **The 3rd surveillance activities will review evidence of continuous implementation of the App in the small vessel sector.**

Non-conformance 2 (of 2)	
Clause:	3.1.1. Adverse impacts of the fishery on the ecosystem shall be considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.
Non-conformance level:	*Minor Non-conformance*
Non-conformance:	There is insufficient evidence that adverse impacts of the saithe fishery on the following ecosystem components: 1) Spotted wolffish, and; ~~2) Common loon~~ (this part was closed at the 1st surveillance audit) are being considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.
Spotted wolffish Rationale:	Around 98% of spotted wolffish (*Anarhichas minor*) is currently caught as bycatch in the trawl and longline fisheries that target saithe and is mainly found at the northwest and north parts of the continental shelf of Iceland, at sandy or muddy substrate and depths of 100-400 meters, in fishing ground overlapping with those of saithe. From 2002, the catch on longline has been increasing relative to that taken in demersal trawl. In 2018, longline catch was around 53% of the total catch. Since 2012 catches have been consistently above advice/recommended TAC. Spotted wolffish was included in the ITQ system in 2018 and the TAC in 2018/2019 was set as per recommended TAC of 1001 t[2]. Issues surrounding this stock were flagged as a potential issue during the IRF 4th surveillance assessment in 2018, preceding the current re-assessment. Preliminary catches in 2018/19 have exceeded the TAC based on Fiskistofa records[3].

Year	Advice/ Recommended TAC	National TAC	Spotted Wolffish Catches	Total catches as a % of advice
12/13	900		2,042	227%
13/14	900		2,250	250%
14/15	900		1,655	184%
15/16	900		1,913	213%
16/17	1128		1,587	141%
17/18	1080		1,528	141%
18/19	1001	1,001	1,234	123%
19/20	375	375		

[2] https://www.hafogvatn.is/static/extras/images/13-SpottedWolffish%20(1)1141515.pdf
[3] http://www.fiskistofa.is/veidar/aflaupplysingar/afliallartegundir/

	In a request for clarification, the Ministry confirmed that spotted wolffish is caught with other species in the mixed fishery and is therefore very difficult to manage. They also explained that in the fishing year (2019/2020) the TAC is extremely small so there might be additional difficulties in maintaining the species within TAC. In their 2019 Advice, MFRI advised that when the precautionary approach is applied, catches in the fishing year 2019/2020 should be no more than 375 tonnes. As shown below, biomass and juvenile indices are at their lowest levels in the time series. Fproxy has been high since 2000.  This year the basis of the Fproxy was changed due to low spawning stock biomass and poor recruitment and thus the Fproxy applied last year is no longer considered precautionary. The target Fproxy is now defined as the mean Fproxy from the reference period of 1985–1998. This period was chosen as fishing pressure did not have any observed detrimental effects on the stock biomass. The catch advice is based on multiplying the most recent index value with the target Fproxy value. As this is the first year this basis is used, the uncertainty cap was not applied. Spotted Wolffish in Europe is categorised as near threatened under the IUCN Red list based on a last assessment from 2014[4]. It is not clear to what degree management has been successful at reducing harvest for this stock since catches in 2018/19 appear to have exceeded the TAC by over 20%. The same or perhaps a bigger issue remains for the reduced 2019/2020 quota and the related effects on the stock. The saithe fishery overlaps in terms of fishing gears, fishing grounds and depths with spotted wolffish catch and is therefore considered to have an effect on this stock, itself a component of the Iceland marine ecosystem.
Common loon Rationale:	The common loon or great northern diver (*Gavia immer*) is listed under Appendix II of the Convention on Migratory Species and under the African Eurasian Waterbird Agreement. It is listed in Article I under the EU Birds Directive. In Europe, it occurs in 20 Important Bird and Biodiversity Areas (IBAs), including in Iceland, Norway (Svalbard and mainland Norway), Ireland, the United Kingdom and in Spain. It is a listed species in 83 Special Protection Areas in the EU Natura 2000 network. Last assessed in 2018, this species is categorised as Least Concern in the IUCN Red List with a stable population trend. Wetlands

[4] https://www.iucnredlist.org/species/18263655/44739959

International (2016) estimated the population at 612,000-640,000 individuals. In Europe the breeding population is estimated at 700-1,300 pairs, which equates to 1,400-2,600 mature individuals (BirdLife International 2015).[148]

The Gavia immer population in Iceland is roughly estimated at 200–300 pairs. Known breeding territories are c. 500, with 56% within IBAs, ten of which are specifically designated for this species. Furthermore, one staging area is a designated IBA, holding 10% and sometimes 30% of the population.

Icelandic Red list 2018 Classification[149]: Vulnerable (VU, D1), downlisted from EN in 2000.

The annual removal by the cod fishery is estimated at 16.4% (see table below). Since saithe made up an average of 7.41% of all the Icelandic gillnet catches in the past 3 years, the direct contribution of common loon bycatch in the gillnet fisheries responsible for saithe catches can be calculated as (7,41% of the 16.4% removal) 1.21%. This value is considered to be quite small but potentially significant, given the small *G. immer* population.

Icelandic cod fishery (gillnet, longline, otter trawl) annual seabird estimated bycatch from 2014-2016, including estimates of annual removal. Source: MFRI.

Species	**Cod gillnets**	**Longline**	**Otter trawl**	**Iceland Institute of Natural History (INH) Red List Classification**	**Population estimated in INH's 2018 Red List**	**Annual bycatch % removal of estimated population***
Northern fulmar (*Fulmarus glacialis*)	1702 (1362-2042)	920 (340-1500)	0	Endangered	1.2 million pairs	0.11%
Common guillemot (*Uria aalge*)	454 (340-568)	0	0	Vulnerable	693,000 pairs	0.03%
Northern gannet (*Morus bassanus*)	128 (69-187)	0	45 (2-90)	Vulnerable	37,000 pairs	0.23%
Atlantic puffin (*Fratercula arctica)*	13 (1-26)	0	0	Critically Endangered	2 million pairs	0.00%
Razorbill (*Alca torda*)	26 (2-52)	0	0	Near threatened	313,000 pairs	0.00%
Common loon (*Gavia immer*)	82 (3-164)	0	0	Vulnerable	200–300 pairs	16.40%
Common eider (*Somateria mollissima*)	142 (2-282)	0	0	Vulnerable	850,000 birds	0.02%
Cormorants (*Phalacrocorax carbo*)	0	47 (16-78)	0	Least Concern	4,581 pairs	0.51%

[148] https://www.iucnredlist.org/species/22697842/132607418#conservation-actions
[149] https://en.ni.is/node/27141

	Great-black backed gull (*Larus marinus*)	0	67 (2-134)	0	Endangered	6,000–8,000 pairs	0.48%	

*Note, the potential decline trajectory of these populations resulting from their INH Red List classification has not been taken into account in the annual percentage removal calculation.

The MFRI provided further clarification on common loon bycatch where they highlighted that the estimate has a large variance based on an actual catch of 3 birds over several years. The birds are only vulnerable to bycatch for part of the year before they move to freshwater for nesting, hence the potential for an overestimate. They also noted that these 3 birds were all caught in the same year, and that is only 3 birds caught since 2010 when proper reporting started in the MFRI survey. They continued with saying that the estimate would be much lower if they include data from 2017-2019, but that analysis has not been finalized yet (Guðjón Már Sigurðsson, MFRI, pers. comm, 17th September 2019).

In view of the lack of reliable data to establish more precise bycatch estimates across the fishery (due to logbook underreporting of seabird and marine mammal bycatch and limited Directorate's Inspectors coverage on fishing vessels), the Team treats the estimates provided by the MFRI in September 2019 as best available information, in the absence of better-quality data to counter it. Considering the above, the Assessment Team determines that the saithe fishery is likely having an impact on the Icelandic *Gavia immer* population, partly due to the small population size of this species.

Corrective Action Plan	In accordance with rules of the IRF Programme, the Client is required to submit a Corrective Action Plan (CAP) within 28 days. **Corrective Action Plan (CAP) submitted by the client in November 2019** Action to improve management of the spotted wolffish was taken by setting a TAC and allotting individual quotas to vessels beginning in the fishing year 2018-2019. Normally, such change in management approach is expected to lead to adjustment and changes in vessel behaviour, thus in turn leading to catch avoidance and consequent catch reduction. This process may take some time to stabilise and for that reason it is too early to tell to what extent this change serves to remedy the situation. Nevertheless, the TAC for 2019-2020 is only 37.5% of the previous year's TAC and thus the situations deserves more focused study. It is thus positive to seek other management tools and measures that may further aid in this endeavour. Accordingly, the MFRI has set up a monitoring plan (below). Among other things, this plan sets the goal of further charting the situation in order to identify more closely areas for potential closure during spawning time and beyond. It would thus be appropriate to collate the results and initiate further planning in connection with the next surveillance assessment.

To whom it may concern

MARINE & FRESHWATER RESEARCH INSTITUTE

Reykjavík, 20.11.2019
21.09.01 /HLÝ
GÞ/mþ

Monitoring plan for spotted wolffish *(Anarhichas minor)*

The aim of the plan is to monitor spatial and temporal changes in catches of spotted wolffish. Reporting of following variables will be done each month.

- Total catch.
- Catch by fishing gear.
- Identifying the vessels that are taking most of the catch.
- Temporal and spatial changes in the catch.

A research team of 6 scientist from the Marine and Freshwater Research Institute (MFRI) and one from *Fisheries Iceland has been established* . The first meeting of this group will be on the 28th November where the following issues will be discussed.

- To put more manpower to age read otoliths of spotted wolffish, in order to improve the stock assessment.
- Examination of reported catch of spotted wolffish from logbooks at spawning time, to locate possible spawning areas. Possible benefits of ongoing research on migration of spotted wolffish, where 15 fishes out of 44 tagged with Digital Storage Tags (DSTs) have been recaptured to locate spawning areas of spotted wolffish. If such areas are found the group will decide on further research steps in order to identify more closely areas for potential closure during spawning and incubation time of spotted wolffish.
- Ongoing research on fecundity of spotted wolffish will be discussed. One of the aims of this research is to examine if fecundity of spotted wolffish can be estimated with biological variables which are easy to measure and if so used to estimate total egg production (TEP) which can be used to examine the relationship between TEP and recruitment.
- Future research which will benefit the conservation of spotted wolffish.

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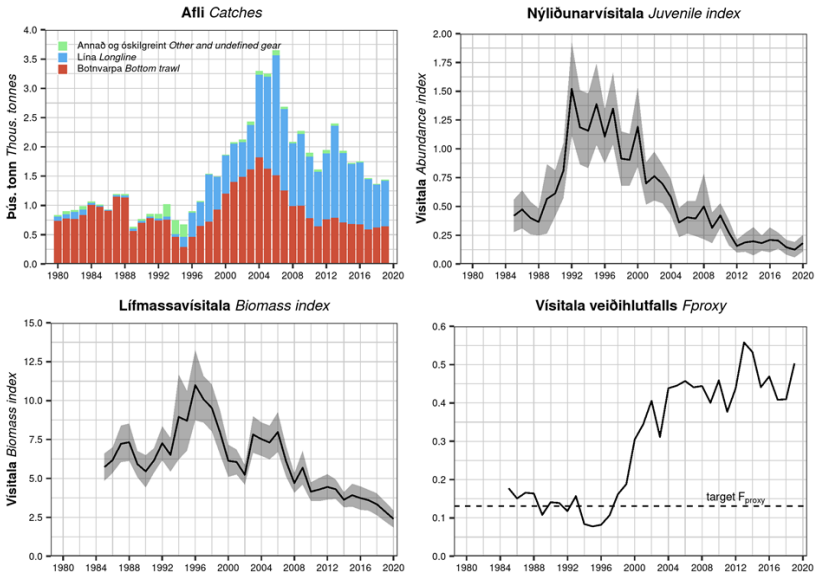
The Client re-highlighted the MFRI clarification on common loon bycatch whereby they stated that the estimate has a large variance based on an actual catch of 3 birds over several years. The birds are only

	vulnerable to bycatch for part of the year before they move to freshwater for nesting, hence the potential for an overestimate. They also noted that these 3 birds were all caught in the same year, and that is only 3 birds caught since 2010 when proper reporting started in the MFRI survey. They continued with saying that the estimate would be much lower if they include data from 2017-2019, but that analysis has not been finalized yet (Guðjón Már Sigurðsson, MFRI, pers. comm, 17th September 2019). Hence, at this point, it is difficult to see what specific management action could be taken at this time. The Client awaits the outcome of the analysis discussed by the MFRI (above) in 2020 and notes that there is ongoing action to improve the recording of bycatch in the fishery. Furthermore, the client plans to monitor whether there are instances of common loon bycatch, in order to assess and evaluate and reconsider accordingly, in cooperation with the relevant expert at the MFRI.
Assessment Team CAP response	The Assessment Team has accepted the CAP submitted by the Client Group in collaboration with the MFRI. The CAP is thus considered adequate to address the spotted wolfish and common loon issue. Monitoring of such CAP and related measures will occur in upcoming surveillance audits. Accordingly, the Assessment Team will be requesting the Client group for updated information about this issue at the 1st Surveillance audit in late 2020/early 2021 and will try to establish a more specific set of milestones for future surveillances at that time, to better define the timelines for closure of this minor non-conformance.
Year 1 progress (1st Surveillance 2021)	**HLÝRI – Spotted wolffish (*Anarhichas minor*)[150]** Because the stock is depleted and Icelandic catches were consistently above recommended TAC and above TAC in the two most recent fishing seasons (see next table), a minor non-conformance was raised in 2019. *Spotted wolffish. Recommended TAC, national TAC, and catches (tonnes).* Fiskveiðiár *Fishing year* / Tillaga *Rec. TAC* / Aflamark *National TAC* / Afli *Catches* 2012/13 – 900 – - – 2042 2013/14 – 900 – - – 2250 2014/15 – 900 – - – 1655 2015/16 – 900 – - – 1913 2016/17 – 1128 – - – 1587 2017/18 – 1080 – - – 1528 2018/19 – 1001 – 1001 – 1383 2019/20 – 375 – 375 2020/21 – 314 Updates and corrective actions follow. As spotted wolffish are mainly caught as bycatch, catches have been above recommendations, and biomass indices are now at historically low levels, MFRI recommends in their 2020 advice that fishermen will be allowed to release spotted wolffish caught beyond set TAC. 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.

[150] https://www.hafogvatn.is/static/extras/images/13-spottedwolffish1206865.pdf



Spotted wolffish harvest rate and biomass. Source 2020 MFRI Advice.

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)[151] showed a 92-100% post capture survival for spotted wolffish following net entrainment in commercial bottom otter trawl tows up to 2.5 h, haul back through a thermocline (range, 5.8 °C), and exposure to 5–13 °C air temperatures for up to 2 h. As a result of this, the MFRI gave a landings advice for the 2020/21 season and suggested that fishers would be allowed to discard spotted wolffish as per Regulation 1256/2020[152] 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. 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.

Seabirds bycatch

For seabirds, the highest estimated bycatch numbers between 2016 and 2019 are those of common guillemot (gillnet), Nothern fulmar, longline and gillnet), lesser black backed gull and northern gannet (both caught with gillnets). This data has been provided by the MFRI in January 2021.

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

[152] Reglugerð um (2.) breytingu á reglugerð nr. 468/2013, um nýtingu afla og aukaafurða. https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/22242

Estimates of annual bycatch removal of seabirds species.

Species	Cod gillnets	Longline	Otter trawl	Iceland Institute of Natural History (INH) Red List Classification	Population estimated in INH's 2018 Red List	Annual bycatc % removal estimated population*
Northern fulmar (*Fulmarus glacialis*)	118	3716	0	Endangered	1.2 million pairs	0.14%
Common guillemot (*Uria aalge*)	434	0	0	Vulnerable	693,000 pairs	0.03%
Northern gannet (*Morus bassanus*)	0	467	21	Vulnerable	37,000 pairs	0.66%
Brünnich's guillemot (Uria lomvia)	19	0	0	Endangered	327,000 pairs	0.003%
Herring gull (*Larus argentatus*)	0	111	0	Near Threatened	5,000−10,000 pairs	0.74%
Lesser black-backed gull (*Larus fuscus*)	0	779	0	Data Missing	42,000 pairs	0.93%
Common loon (*Gavia immer*)	25	0	0	Vulnerable	279 pairs[153]	4.48%
Common eider (*Somateria mollissima*)	16	0	0	Vulnerable	850,000 birds	0.001%

For all birds but common loon the removals are considered quite limited and unlikely to significantly hinder recovery of these seabirds.

Common Loon

Last assessed in 2018, this species is categorised as Least Concern in the IUCN Red List with a stable global population trend. Wetlands International (2016) estimated the population at 612,000-640,000 individuals. In Europe the breeding population is estimated at 700-1,300 pairs, which equates to 1,400-2,600 mature individuals (BirdLife International 2015).[154]

Common loon was the subject of a minor non-conformance during the Re-Assessment audit because the 2014-2016 removal estimates were larger than the most up to date ones (2016-2019 dataset). More specifically, the MFRI provided further clarification about the 2014-2016 dataset on common loon bycatch where they highlighted that the estimate had a large variance based on an actual catch of 3 birds over several years. The birds are only vulnerable to bycatch for part of the year before they move to freshwater for nesting, hence the potential for an overestimate. They also noted that these 3 birds were

[153] Presumably the population is now somewhat larger, as there are about 500 known nesting sites and the nesting is densest in Mýrar, the heaths up from Dalarna, in Húnavatnssýsla and Borgarfjörður, on Skaga, Norður-Slétta, near Mývatn and in Veiðivötn. Source: https://www.ni.is/node/27141

[154] https://www.iucnredlist.org/species/22697842/132607418#population

	all caught in the same year, and that there were only 3 birds caught since 2010 when proper reporting started in the MFRI survey (these 3 birds were presumably caught once in 2016). They continued with saying that the estimate would be much lower if they include data from 2017-2019, which has been confirmed during this first surveillance audit through provision of more up to date bycatch information. We also note that the assessment from the Iceland Institute of Natural History (INH) Red List Classification states that the population of common loon in Iceland (currently estimated at 279 pairs) is presumed to be somewhat larger, as there are about 500 known nesting sites and the nesting is densest in Mýrar, the heaths up from Dalarna, in Húnavatnssýsla and Borgarfjörður, on Skaga, Norður-Slétta, near Mývatn and in Veiðivötn. Because this population is quite small, even very small removals can have negative effects, especially if those happen year after year. However, given that saithe made up an average of 7% of all the Icelandic gillnet catches in the past between 2016 and 2020, the direct contribution of common loon bycatch in the gillnet fisheries responsible for saithe catches can be calculated as (7% of the 4.48% removal) 0.3%. This value is considered here to be not significant (based on the updated bycatch dataset submitted by the MFRI), even when considering the small *G. immer* population. The assessment team considers the new data is a step in the right direction in terms of continuous risk monitoring for this species and furthermore, because the overall removal by the saithe fishery is considered negligible, the issue is considered closed (although it remains active in the cod fishery assessment which is the most important stock targeted and caught with gillnet gear (i.e. almost 90% of total catches).
Assessment Team Determination on Year-1 (2021) Corrective Evidence	**The Assessment Team has determined that the information supplied is sufficient to show adequate progress. In terms of corrective action against timelines, the Assessment Team agreed to continue monitoring the status of this non-conformance until the 4th surveillance using up to date evidence submitted by the Client Group and management authorities, and to ensure the condition is closed within that timeframe.** **The non-conformance remains open (i.e. the part relative to spotted wolffish bycatch) and on track towards appropriate closure. <u>The part relating to common loon is considered closed at this 1st surveillance audit in 2021.</u>** **The 2nd surveillance activities will review evidence that the corrective actions highlighted above have been carried out.**
Year 2 progress (2nd Surveillance, late 2021)	The MFRI gave a landings advice for the 2020/21 season and suggested that fishers would be allowed to discard spotted wolffish as per Regulation 1256/2020[155] which now allows fishers (starting December 2020) to discard viable (living) spotted wolffish, as opposed to landing it dead, taking advantage of the high post capture survival of this fish. The regulation continues in the 2021/2022 fishing season[156]. 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

[155] Reglugerð um (2.) breytingu á reglugerð nr. 468/2013, um nýtingu afla og aukaafurða.
[156] https://www.hafogvatn.is/static/extras/images/16-spottedwolffish1259438.pdf

	caught and landed and the amount caught and released will be recorded. The Client and Fiskistofa both communicated that the logbook system is not properly set up with space to recorded landed and released spotted wolffish and for now, captains are recording the released portion in the comment section of the logbook. There is also work in progress by Trackwell to modify the electronic logbooks to allow for separate recording of landed and released catches. In addition, the MFRI is in the process of measuring the survival of spotted wolffish in Icelandic waters and, in addition to age reading, they hope to potentially develop a recovery plan for the stock. It is expected that the allowance to release live individuals (as opposed to having to land them) will contribute to bringing the catches within TAC as a first step towards stock rebuilding. The Icelandic fishing season started on the 1st of September and ends on the 31st of August each year. The current landed catch of spotted wolffish as per 2021-22 season that started is 250 tonnes. It is expected that some percentage of the total spotted wolffish caught will be released alive and recorded as such in this season, to avoid landed harvest above the current 2011/22 TAC of 377 tonnes. The 2021/22 season will be the first full fishing season where the full effect of this regulation will be recorded.
Assessment Team Determination on Year-2 Corrective Evidence	**The Assessment Team has determined that the information supplied is sufficient to show progress for year 2. The non-conformance remains open and on track towards appropriate closure.** **The 3rd surveillance activities will review evidence of implementation of the new spotted wolffish live-release regulations.**

8.1.4 New non-conformances

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

8.1.5 New or revised corrective action plans

Not applicable

8.1.6 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	
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[157]) and sea-pen fields[158]. 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.

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

9 Recommendations for continued certification

9.1 Certification Recommendation

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

9.2 Certification Committee Determination

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

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

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11 Appendices

11.1 Appendix 1 – Assessment Team Bios

11.1.1 Assessment Team Bios

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

Vito Romito, Lead Assessor

Vito has 10 years of expertise in fisheries certification and is an ISO14001 Certified Lead Auditor and MSC FCR v.2.0 and FCP v.2.1 approved Fisheries Team Leader for SAI Global with extensive experience in ecosystems effects of fisheries. Vito received a BSc (Honours) in Ecology and a MSc in Tropical Coastal Management from Newcastle University (U.K.), in between which he worked for a year in Tanzania, carrying out comparative biodiversity assessments of pristine and dynamited coral reef ecosystems around the Mafia Island Marine Park. For five years he worked at Global Trust Certification/ later SAI Global as Lead Assessor for all the fishery assessments in Alaska, Iceland and Louisiana. Vito has also carried out several IFFO forage fisheries assessments in Chile, Peru, Europe and other various pre-assessments in Atlantic and Pacific Canada. To date, Vito has headed and conducted dozens of assessments involving 40+ different species including salmonid, groundfish, pelagic, flatfish, crustacean and cephalopod species in Europe, North and South America, and SE Asia. For three years, as a senior fisheries consultant and then manager with RS Standards Ltd., he was involved in the development and testing of a Data Deficient Fisheries framework and v.2.0 fisheries standard for the ASMI Alaska RFM Scheme, and IFFO RS Improver/FIP projects related to South East Asia multispecies bottom trawl fisheries. Vito re-joined the SAI Global Fisheries Team in 2018 and has since been involved in MSC and RFM fisheries assessments in Canada, New England, Iceland, Alaska and Louisiana, the Baltic Sea, Ireland and Italy.

Dankert Skagen, Assessor

Dankert retired from the Institute of Marine Research (IMR), Bergen in 2010, where he worked for 22 years. His responsibilities included stock assessment, multispecies work, in particular in the North Sea, work connected to the introduction of the precautionary approach in fisheries and more recently, on development of harvest control rules and management strategies.

He was leader of the IMR research program for population dynamics and multispecies investigations in 1996-97 and for the development of new assessment tools for North-East arctic cod in 1998-99 and the assessment package TASACS in 2007-08. In addition, he has developed several programs for simulating harvest control rules that are commonly used in fisheries management today. Within ICES, he has participated in a wide range of working groups and has been chairman of several of them, including the Study Group of Management Strategies. He was chairman of the Resource Management Committee for 3 years and member of ACFM for 7 years. Dankert has been involved with sustainability assessment of Icelandic fisheries for 10 years.