Iceland Responsible Fisheries Foundation (IRFF)

Iceland Responsible Fisheries Certification Programme

CERTIFIED

Icelandic Summer Spawning Commercial Fishery

3rd Surveillance Assessment Report

Certification Body (CB):	**Global Trust Certification**
Assessment team:	Vito Romito, Lead Assessor Dankert Skagen, Assessor
Fishery client:	Samtök fyrirtækja í sjávarútvegi (SFS) (Fisheries Iceland), The National Association of Small Boat Owners, Iceland (NASBO)
Assessment Type:	Surveillance Assessment 3
Report Code:	ICE/HER/001.3/2022
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Foreword

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

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

1 Contents

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2 Glossary

AIS Automatic Identification System

B_{4+} Biomass of 4 years and older fish

B_{lim} The biomass limit reference point below which there is a high risk that recruitment will be impaired and that the stock could collapse

B_{loss} The biomass below which there is no historical record of recruitment

B_{MSY} SSB that is associated with Maximum Sustainable Yield (MSY)

B_{pa} Precautionary reference point designed to have a low probability of being below B_{lim}

EEZ Exclusive Economic Zone

EU European Union

ETP Endangered, Threatened and Protected species*

FAO United Nations Food and Agriculture Organization

F_{lim} Fishing mortality which in the long term will result in an average stock size at B_{lim}

F_{max} Fishing mortality rate that maximizes equilibrium yield per recruit

F_{MGT} Management elected fishing mortality target/limit; usually specified in FMP

FMP Fishery Management Plan

F_{MSY} Fishing mortality which in the long term will result in an average stock size at B_{MSY}

F_{pa} Precautionary reference point for fishing mortality to avoid true fishing mortality being above F_{lim}

HCR Harvest Control rule

ICES International Council for the Exploration of the Sea

ICG Icelandic Coast Guard

ITQ Individual Transferable Quota

IUU Illegal, Unreported and Unregulated fishing

IWC International Whaling Commission

kt kilo tonnes

MCS Monitoring, Control and Surveillance

MII Ministry of Industries and Innovation

MFRI Marine and Freshwater Research Institute (formerly MRI)

MRI Marine Research Institute (now MFRI)

MSY $B_{trigger}$ ICES MSY framework parameter that triggers advice on a reduced fishing mortality relative to F_{MSY}

MSY Maximum Sustainable Yield; the largest average catch or yield that can continuously be taken from a stock under existing environmental conditions

NAFO Northwest Atlantic Fisheries Organisation

NAMMCO North Atlantic Marine Mammal Commission

NEAFC North East Atlantic Fisheries Commission

NPA National Program Action

NWWG North-Western Working Group (within ICES)

SSB Spawning stock biomass; total weight of all sexually mature fish in the stock

SSB_{MGT} Management elected SSB target/limit; usually specified in FMP

$SSB_{trigger}$ SSB level that acts as a trigger when the stock fall below a certain level

TAC Total Allowable Catch

UN United Nations

VMEs Vulnerable Marine Ecosystems

VMS Vessel Monitoring System

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

3 Executive Summary

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

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

3.1 Assessment Team Details

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Fisheries Science Consultant
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Norway
Website: www.dwsk.net

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

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

3.2 Details of applicable IRF Documents

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

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

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

4 Fishery Applicant Details

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

5 Units of Certification

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

Table 3. Unit of Certification (UoC).		
Client Group		Samtök fyrirtækja í sjávarútvegi (SFS) (Fisheries Iceland), The National Association of Small Boat Owners, Iceland (NASBO)
Species:	**Common name (ENG and ISL):**	Atlantic herring/herring (Síld)
	Latin name:	*Clupea harengus*
Geographical Area(s)		Iceland 200-mile EEZ within FAO Fishing Area 27
Stock(s)		Herring in Division 5.a, summer-spawning herring (Iceland grounds)
Management System		Ministry of Industries and Innovation (Iceland)
Fishing gear(s)/method(s)		Purse seine net; Pelagic trawl; Gears from other Icelandic fisheries legally landing summer-spawning herring*
Client Group		Samtök fyrirtækja í sjávarútvegi (SFS) (Fisheries Iceland), The National Association of Small Boat Owners, Iceland (NASBO)

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

6 Assessment Process

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

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

IRF surveillance audits are required to include:

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

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

6.1 Surveillance Meetings

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

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

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

- Reasons for the shift in transfer of quotas – from negative to positive? Tusk was presumably less valuable than other species in the long line fishery, still true?
- Ling. Apparently, the number of otoliths read goes down for the long liners but not for the trawlers. Problem?
- Golden redfish.
  - Agreement with Greenland - practiced but not formally effective any more: plans to revive it
  - Plans for firmer action to bring the fishing mortality down to the target as the stock is expected to decline?
- Recent changes in assessment method, ling and tusk in particular. Have a brief discussion on motives, effects, further plans.
- Cod:
  - Shift from ADCAM to Muppet. Retro-problem solved? There was a mention in the WG report that the discrepancy in the effect on assessed biomass between the surveys could be worth an in-depth study. Plans for that?
  - Reviewers comments to WKICECOD 2021: Explore other time blocks and multi-fleet models for the fishery. Plans to do that?
  - News about stock diversity and metapopulation ideas?
- Long term trends in recruitment: For herring, downward until 2017-18. Ling: Peak 2000 – 2010, Golden redfish down since 2013, Spotted wolffish downward 1993 – 2010, low since then. Mostly a scientific question – is there something in common, and are there thoughts about more generic ways of handling these fluctuations.
- Retrospective errors: Clearly, a good deal is being done on several stocks, noticed saithe in particular – is there more coming? A related question: Is there a better performance measure than Mohs rho? Another, perhaps related issue: Is this a case for really systematic studies of conflicting evidence in various sources of data – cfr. note on cod.
- Reference points: Thoughts on recent developments in ICES. How much does that matter for Iceland? Are there stocks where reference points cause problems (for example undue constraints on the fishery, difficulties with explaining changes and their implications etc.)

<u>Ecosystem effects of the fisheries</u>

- Non-Conformance 1: (applicable to all certified fisheries): *Although required by legislation, there is evidence of extensive non-reporting/under-reporting of seabirds and marine mammals bycatch in fishing logbooks.*
  Regarding NC 1, what are the updates and developments addressing the issue for 2021/2022?
- Non Conformance 2: *There is insufficient evidence that adverse impacts of the cod, haddock and saithe fisheries on the following ecosystem components:*
  1. *Spotted wolffish, and;*
  2. *Common loon*

  are being considered and appropriately assessed and effectively addressed, consistent with the precautionary approach.
  Regarding NC 2, what are the updates and developments addressing the issue for 2021/2022?

- What survey abundance, interaction, catch and / or status updates information can be provided about the OSPAR listed threatened and/or declining species: 1) dogfish/spurdog, 2) Greenland shark 3) porbeagle shark, 4) basking sharks and 5) leafscale gulper sharks?
- Can the assessment team be provided with total catch in numbers of Grey skate (*Dipturus flossada / batis*) for the latest available MFRI survey? Any additional

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

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

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

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

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

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

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

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

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

7 Summary Findings

7.1 Relevant changes to Legislation/Regulations and the Management Regime

Iceland has an established Marine Policy and a structured management system[3] covering all commercial species, including herring[4]. There is a principal Act *(last amendment No 116/2006)*[5] and a number of supporting Acts and Regulations for the management of the fishery.[6] Article 1 in the principal act states the overall objective for Icelandic fisheries management: *The exploitable marine stocks of the Icelandic fishing banks are the common property of the Icelandic nation. The objective of this Act is to promote their conservation and efficient utilisation, thereby ensuring stable employment and settlement throughout Iceland.*

Institutions

There are a number of inter-related government agencies within the system under the direction of the Ministry of Food, Agriculture and Fishery which has ultimate responsibility. The Ministry of Food, Agriculture and Fishery[7] in Iceland is the principal management organization responsible for Icelandic fisheries and has the ultimate responsibility for fisheries management. They act according to law issued by the parliament (Alþingi), and according to advice from the Marine and Freshwater Research Institute (MFRI). The executive body is the Fisheries Directorate (Fiskistofa)[8], which is responsible for the implementation of Fishery Regulations on behalf of the Ministry. Key functions of the Directorate of Fisheries include: Implementation of regulations, collection and collation of fishery catch data, managing and policing the Icelandic ITQ system and supporting research, survey work and Coastguard surveillance activities. The Icelandic Coast Guard[9] is responsible for control at sea, both of the catches and the 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)[10] conducts a wide range of marine research and provides the Ministry with scientific advice. MFRI has wide international cooperation in all major fields of marine science, as indicated by its publication record[11].

TAC and ITQ system

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

The MFRI advice is based on calculations done within the framework of ICES (The International Council for Exploration of the Sea) by the ICES North-Western Working Group, (NWWG)[12] according to standards approved

3 http://www.fiskistofa.is/english/fisheries-management/
4 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/fisheries-management/
5 https://www.althingi.is/lagas/nuna/2006116.html
6 https://www.stjornarradid.is/library/04-Raduneytin/Atvinnuvega---og-nyskopunarraduneytid/ANR-ymislegt/Stj%c3%b3rn%20fiskvei%c3%b0a%202021-2022%20-%20loka%20-%20rafr%c3%a6n%20%c3%batg%c3%a1fa%20v2.pdf
7 https://www.government.is/ministries/ministry-of-food-agriculture-and-fisheries/
8 https://island.is/en/o/directorate-of-fisheries/about-the-directorate-of-fisheries
9 http://www.lhg.is/english
10 https://www.hafogvatn.is
11 https://www.hafogvatn.is/is/midlun/utgafa/ritaskra
12https://ices-library.figshare.com/articles/report/Northwestern_Working_Group_NWWG_/19771381?file=36007544

ICES in regular benchmark assessments[13]. ICES provides 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, following ICES standards, based on an assessment performed by MFRI, without involving ICES. In 2021, the normal procedure was resumed.

There is a management plan in place for most commercial stocks in Iceland, including herring, The statement by the Ministry on the management process was revised in 2022 and now states: *The decision on the annual TAC for each stock is by law anchored in the formal advice presented by the Marine and Freshwater Research Institute in June each year. ICES provides advice as well so both ICES and the MFRI advise on research and harvesting policy in general. The recommendation given by the MFRI for the main commercial species is peer reviewed by the Advisory Committee (ACOM) of ICES every year. While the scientific advice has been closely followed by the Minister of Fisheries and Agriculture in recent years, the purely scientific advice is nonetheless subject to a wide formal and informal consultative process involving industry stakeholders et al.*[14]

When harvest rules have been established in a management plan, as for herring, the Ministry recognizes an obligation to set the TAC accordingly. The current management plan for herring was introduced in 2017 after having been examined and approved by ICES.[15,] The plan is publicly available [16].

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)[17]. 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 herring, Quotas can also be transferred between years and between species, within limits. Transfer between species is not an issue in the pelagic sector.

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. 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

13 https://ices-library.figshare.com/articles/report/WKICEMSE_-Report_of_the_Workshop_on_Evaluation_of_the_Adopted_Harvest_Control_Rules_for_Icelandic_Summer_Spawning_Herring_Ling_and_Tusk/19255394
14 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/fisheries-management/
15 https://ices-library.figshare.com/articles/report/Iceland_request_on_evaluation_of_harvest_control_rules_for_a_management_plan_for_Icelandic_summer-spawning_herring_Division_5_a_/18630422
16 https://ices-library.figshare.com/articles/report/Herring_Clupea_harengus_in_Division_5_a_summer-spawning_herring_Iceland_grounds_/19447988?backTo=/collections/ICES_Advice_2022/5796935
17 https://www.althingi.is/lagas/nuna/2006116.html

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. Only part of the catch is subtracted from the quota. The fisher gets a strongly reduced price and 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[18], Bygdakvoti[19]), mostly to support local communities and small scale fisheries.

Log books are compulsory, and recently, only electronic logbooks (or mobile phone apps) are accepted[20]. The fishing year in Iceland runs from 1st September - 31st August. For herring, the season ends 31st May.

Protective measures

These include area closures (temporary and permanent) and gear restrictions. Most of them are directed towards demersal fish rather than herring, including an extensive system of areal closures that are to a large extent, but not exclusively, is designed to avoid exploitation of cod at the spawning grounds in the spawning season and to avoid catching juvenile fish. The Fisheries Directorate has recently launched a new map service (Hafsja) that shows closed areas with ample supplementary information.[21]

The fishery of the summer-spawning herring is specifically regulated by regulations set by the Icelandic Ministry[22]. According to this regulation, this fishery can only take place from 1st September to 31st May with nets, purse seines and mid-water trawls. Mid-water trawling is only allowed outside of the 12 nautical miles zones with some additional area restrictions. Use of sorting grids in the mid-water trawls can be required in some areas, if necessary to avoid by-catch. When gillnets are used in the herring fishery, the minimum mesh size (stretched) is 63 mm. At present, the fishery is largely outside the 12 mile border, so the catches are taken by trawl. In other periods, most catches have been taken inshore, with purse seine. Normally, the age of first recruitment to the fishery is age-3, which is fish at length around 26–29 cm.

International cooperation and review

Normally, the assessment is conducted by the ICES North-Western Working Group, where stakeholder nations participate. In 2020, because of the ongoing Covid 19 epidemic, Iceland skipped participation in NWWG. In 2021, normal practise was resumed. The harvest rule in the current management plan was evaluated and approved by ICES in 2017[23]. A new benchmark process is planned for 2023.

International relations

Policies incorporate a number of International Agreements and declarations [24], 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.

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18 https://island.is/reglugerdir/nr/0460-2022
19 https://island.is/byggdakvoti
20 https://island.is/afladagbok
21 http://atlas.lmi.is/mapview/?application=haf
22 https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/21662
23 https://ices-library.figshare.com/articles/report/Iceland_request_on_evaluation_of_harvest_control_rules_for_a_management_plan_for_Icelandic_summer-spawning_herring_Division_5_a_/18630422
24 https://www.government.is/topics/business-and-industry/fisheries-in-iceland/international-policy/

Iceland has broad international scientific cooperation through organisations such as the Northeast Atlantic Fisheries Commission (NEAFC)[25], the Northwest Atlantic Fisheries Organization (NAFO)[26], and the North Atlantic Marine Mammal Commission (NAMMCO)[27]. Icelandic scientists have been involved in many international projects arranged by these organizations and in co-operative projects with research institutes and universities.

The Icelandic summer spawning herring is considered to be a local Icelandic stock and not a migratory or straddling stock. In the summer, also herring of the Norwegian spring spawning stock occurs in Icelandic waters. It is reported and managed separately.

7.2 Stock status update

Assessment method

The method for assessing the abundance and exploitation of the Iceland summer spawning herring is the NFT Adapt from the NOAA assessment toolbox. It was approved for assessing the herring by ICES in a benchmark process in 2011[28] and has been used consistently since then. Other methods have been applied in parallel for control, recently it was a separable model. The models give very similar results.

Assessment data.

The assessment tool operates on the commercial catches disaggregated by age, and an acoustic survey index, and accounts for additional mortality caused by the pathogen *Ichthyophonus hoferi*.

Catches in number at age are from catch data that at present are collected at sea by fishermen, according to regulations[29]. The calculation is done in strata confined by season and area and with two different age-length keys and weight at length relations based on season. The present geographical location of the fishery is shown in Figure 1 below. Catches of Norwegian Spring Spawning herring that occur occasionally in the summer season in the East are reported separately – the split is done by inspection of gonads, which is regarded as a simple and safe procedure.

25 http://www.neafc.org/
26 http://www.nafo.int/
27 http://www.nammco.no/
28 https://ices-library.figshare.com/articles/report/Report_of_the_Benchmark_Workshop_on_Roundfish_and_Pelagic_Stocks_WKBENCH_2011_/19255145
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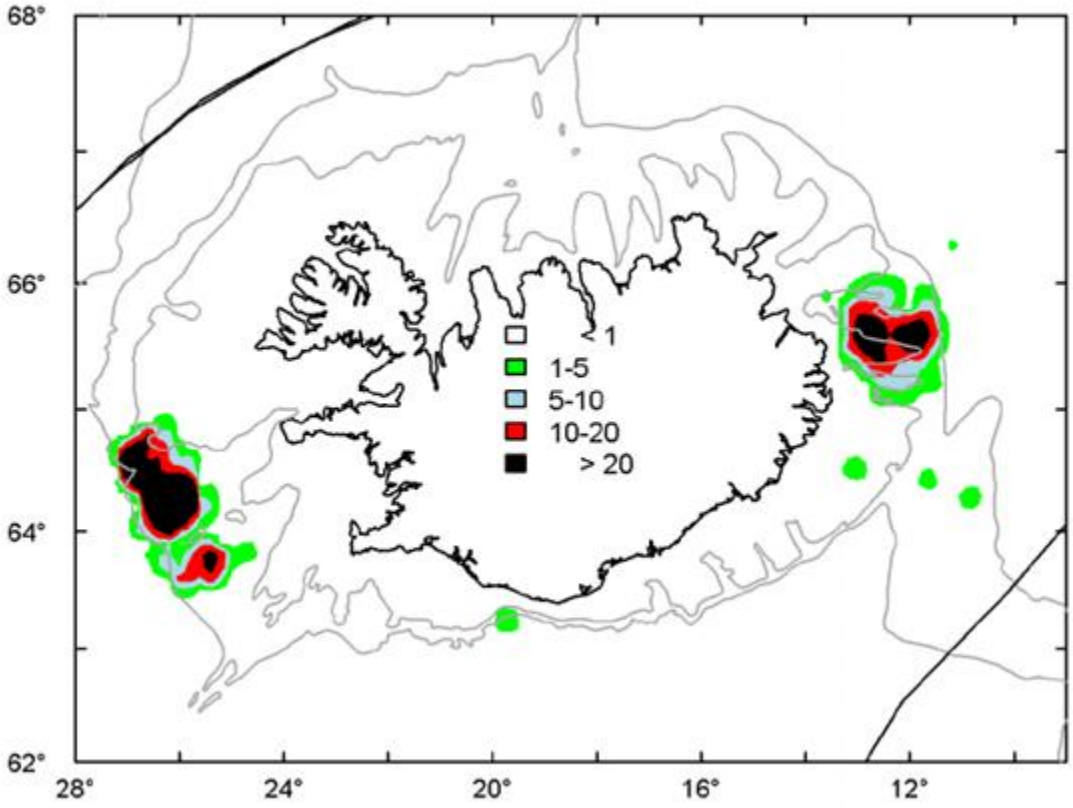


Figure 1. Herring fishing grounds 2021/2022.

The herring stock is measured in an acoustic survey. The survey area and timing is adaptive, according to the distribution of the herring. In the herring surveys in winter of 2020/21, herring was measured west of the country in the end of March 2021, and east, southeast, and south of the country in November 2020 (Figure 2). The survey areas and timing are adaptive and vary from year to year, but intends to cover the whole stock over the year[30]. In addition to getting an acoustic estimate, the objective was also to get an estimate of the prevalence of the Ichthyophonus infection in the stock.

30 https://www.hafogvatn.is/static/extras/images/22-herring1259461.pdf

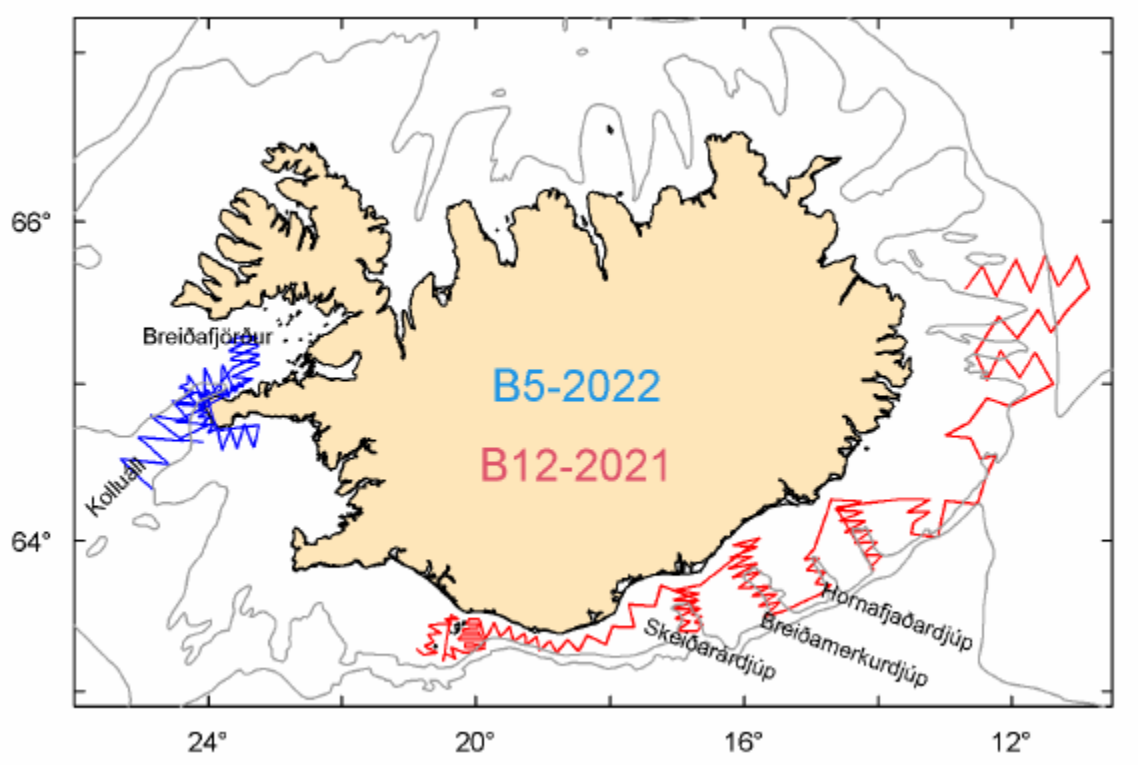


Figure 2. The survey tracks of two acoustic surveys on Icelandic summer-spawning herring in the south and south-east (B12-2021; younger part of the stock; red) and in the west (B5-2022; adults; blue) in 2021/22

There has been infection by *Ichthyophonus hoferi* in the stock since 2008, causing increased natural mortality. The increased mortality is calculated from the prevalence of Ichthyophonus assuming a 30% annual mortality of infected herring (Óskarsson et al. 2018a)[31] which is added to the natural mortality (M=0.1) for each age group each year (Mage, year = 0.1 + M infected × 0.3). The annual estimates are shown in the table below.

31 Óskarsson, G.J., Pálsson, J., and Gudmundsdottir, A. 2018. An ichthyophoniasis epizootic in Atlantic herring in marine waters around Iceland. Can. J. Fish. Aquat. Sci. 75: 1106 – 1116, 2018. https://cdnsciencepub.com/doi/10.1139/cjfas-2017-0219

Table 5. Annual estimates of natural mortality at age, taking into account the effect of *ichthyophonus* infection.

Year\age	3	4	5	6	7	8	9	10	11	12	13	14	15	13+
1987–2008	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
2009*	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22	0.22
2010*	0.29	0.29	0.28	0.26	0.25	0.24	0.24	0.24	0.23	0.23	0.23	0.23	0.23	0.23
2011*	0.13	0.26	0.26	0.25	0.23	0.24	0.25	0.24	0.20	0.21	0.21	0.21	0.21	0.21
2012-2016	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
2017	0.111	0.118	0.124	0.173	0.175	0.175	0.207	0.187	0.256	0.279	0.210	0.180	0.191	0.183
2018	0.116	0.112	0.172	0.162	0.175	0.228	0.226	0.247	0.275	0.338	0.307	0.184	0.186	0.250
2019	0.111	0.135	0.144	0.168	0.216	0.169	0.171	0.183	0.245	0.189	0.243	0.182	0.140	0.189
2020	0.110	0.116	0.152	0.186	0.158	0.154	0.196	0.195	0.238	0.226	0.220	0.179	0.225	0.235
2021	0.119	0.146	0.122	0.155	0.191	0.164	0.193	0.159	0.230	0.100	0.146	0.151	0.100	0.275
2022**	0.100	0.111	0.120	0.115	0.149	0.177	0.159	0.176	0.163	0.198	0.218	0.236	0.172	0.218

*** Based on prevalence of infection estimates and acoustic measurements (Minfected multiplied by 0.3 and added to 0.1; Óskarsson *et al.*, 2018b).**

**** Based on prevalence of infection estimates in the winter 2021/22 (multiplied by 0.3 and added to 0.1) and should by applied in the prognosis in the 2022 assessment.**

Assessment performance

The main sources of uncertainty appear to be the estimates of natural mortality, and possible variations in survey catchability due to variable locations of the herring. The latter is a likely cause of the cluster of positive survey residuals in the years after 2000 (Figure below). Previously, the assessment has had considerable bias and has been quite unstable. In the period after 2000 the assessment was rejected by ICES for several years, due to instability. At the time, there was a mismatch between survey results and catches. Even when a strong year class is coming in now, the problem is not expected to reappear[32]. The assessment is now rather consistent from year to year, (Figure 4) and also similar to the results with a separable assessment model (Muppet). Figure 5 gives an indication of the problem.

32 Communicated by MFRI at web-meeting 4 Nov. 2021.

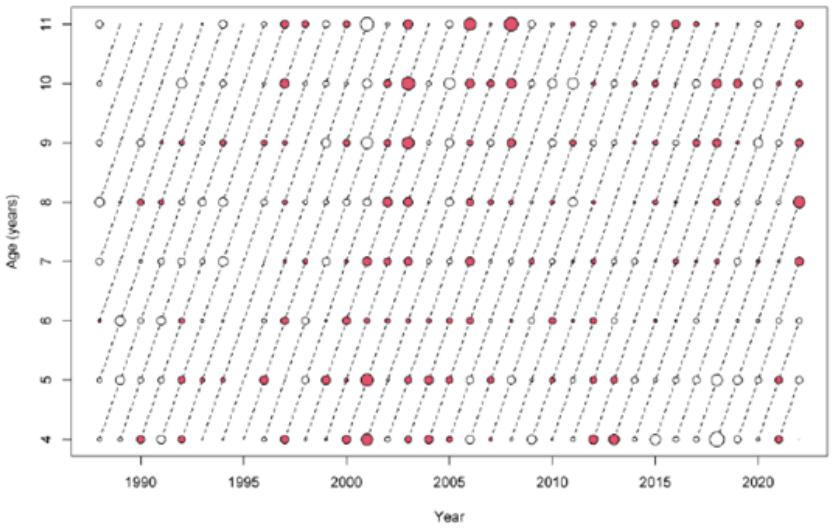


Figure 3. Icelandic summer spawning herring. Residuals of NFT-Adapt run in 2022 from survey observations (moved to January). Filled bubbles are positive (i.e. survey estimates higher than the assessment) and open negative.

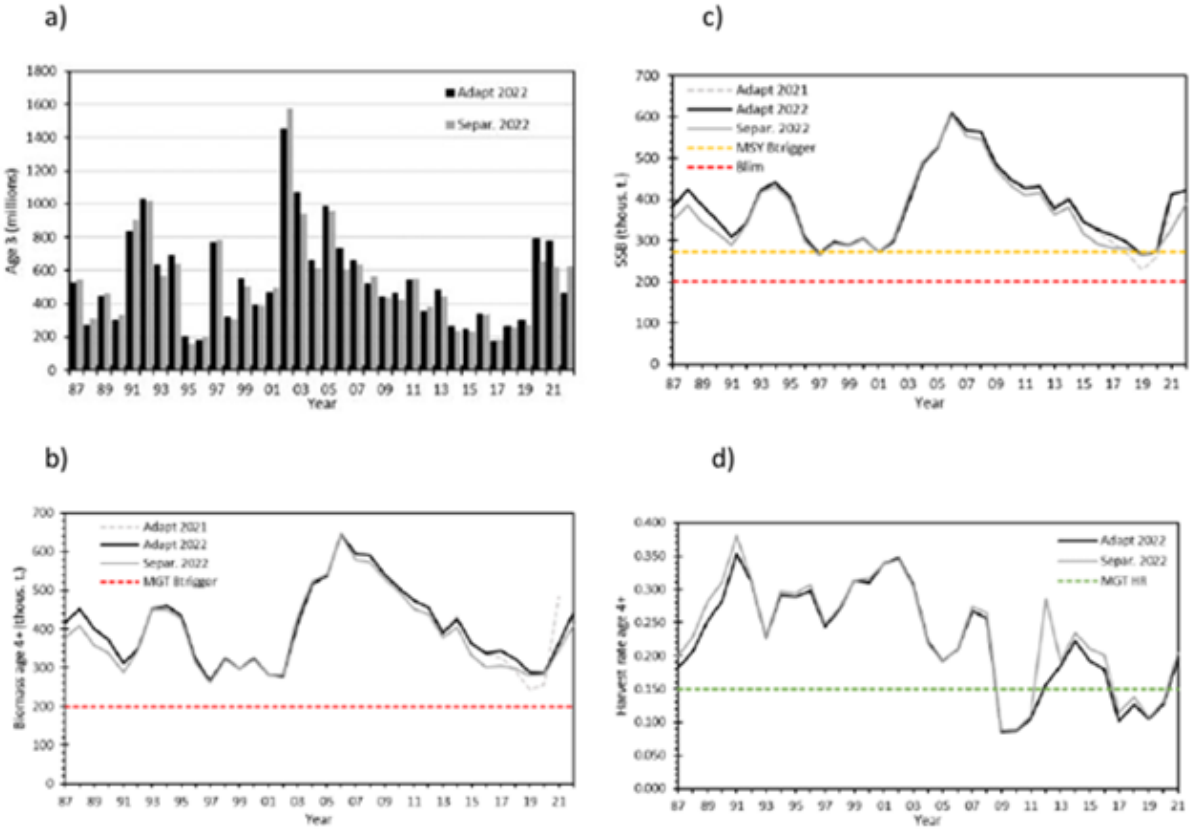


Figure 4. Comparisons of the final NFT-Adapt run in 2022, NFT-Adapt run in 2021 and a run from a separate model (Muppet) in 2022 concerning (a) number at age-3 (recruitment), (b) biomass of age 4+ (reference biomass), (c)

SSB and (d) harvest rate of the reference biomass (HRMGT shown). Some reference points are also shown. Note that the mass mortality in Kolgrafafjörður in the winter 2012/13 is included in harvest rate (d) for Muppet but not in Adapt run 2022.

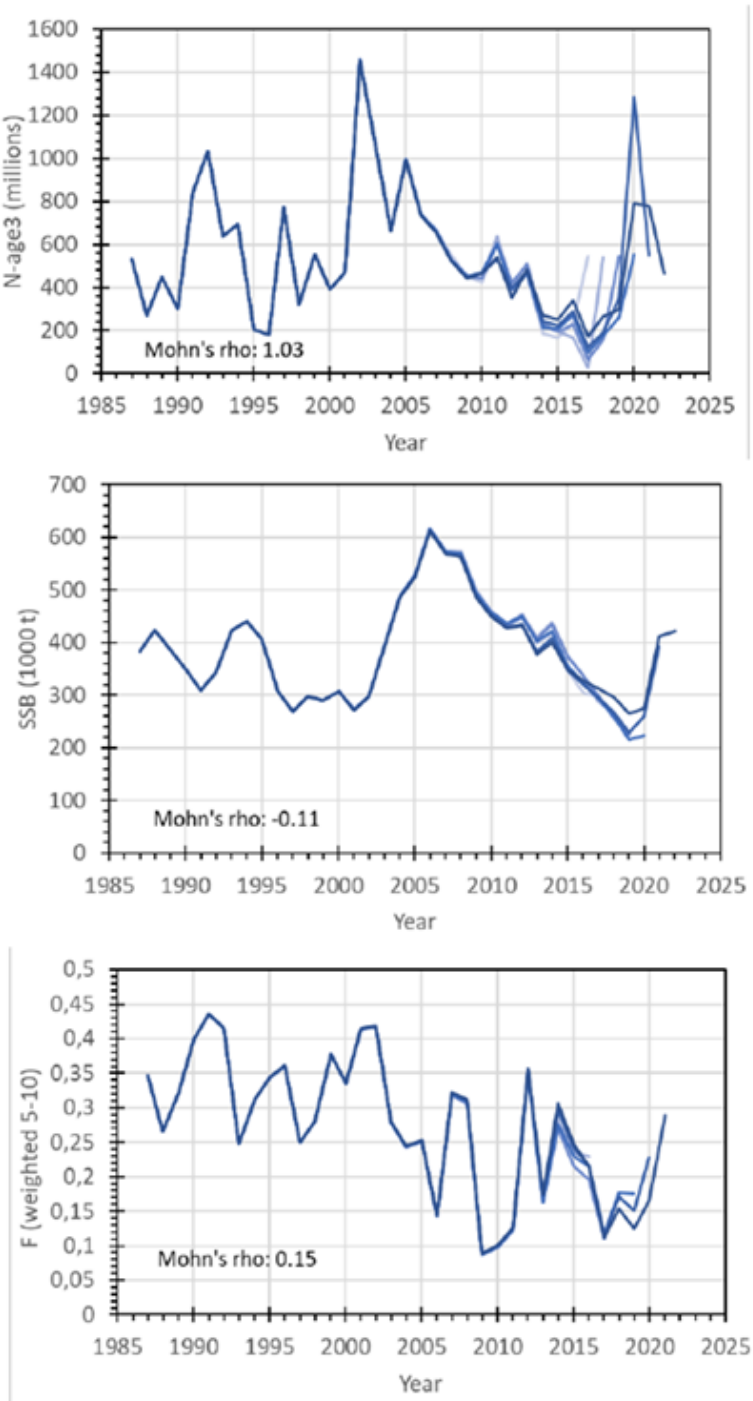


Figure 5. Six years (2017–2021) retrospective pattern from NFT-Adapt in 2022 in recruitment as number at age 3 (the top panel), spawning stock biomass (middle panel) and N weighted F5–10 (lowest panel).

Assessment results

The main results of the assessment are shown in Figure 6 below from the 2022 MFRI assessment[33]. They are consistent with the results last year. There was a period with strong year classes from about 2000 onwards, leading to a wave in SSB that peaked in 2006. Subsequently, the recruitment has declined gradually, as has the SSB. Both the 2017 and 2018 year classes are strong, which now is lifting the SSB and allows for increased TAC. The harvest rate and the fishing mortality have both been fairly stable for some years. At present, SSB is rising and above Btrigger while F was slightly above the target in 2021.

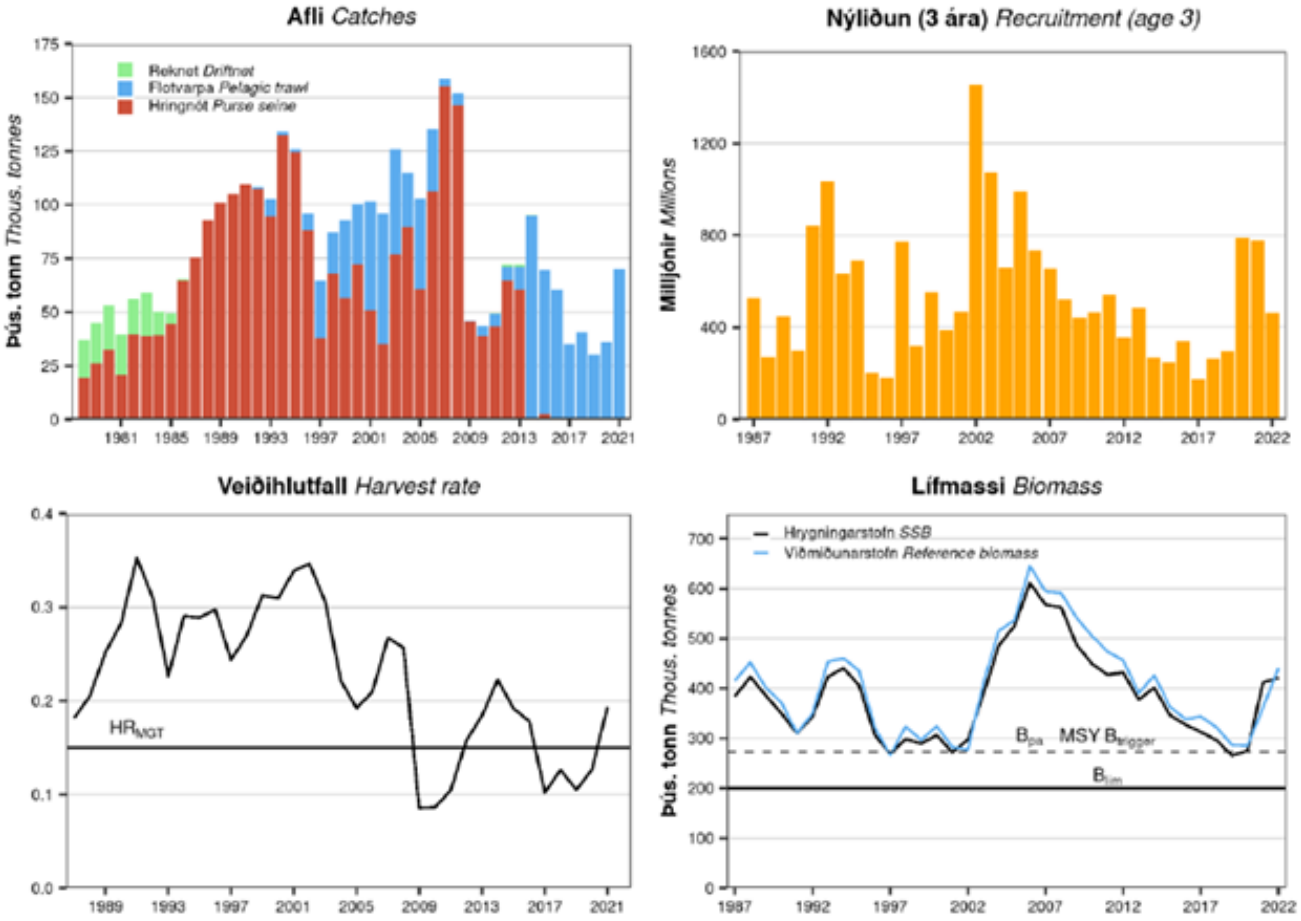


Figure 6. Catch by gear type, recruitment, harvest rate based on reference stock biomass, reference stock biomass (B4+) and spawning stock biomass (SSB). MFRI 2022 Advice[34].

33 https://www.hafogvatn.is/static/extras/images/22-herring_tr1326047.pdf

34 https://www.hafogvatn.is/static/extras/images/22-herring1326046.pdf

Reference points and harvest rule

The present reference points were set in by NWWG in 2016[35] and at a harvest rule evaluation in 2017 [36], where also the assessment method and the harvest rule were revised and approved.

Since this stock has been through a stock collapse in the past, there is ample observations to determine a stock – recruit relationship (Figure below).

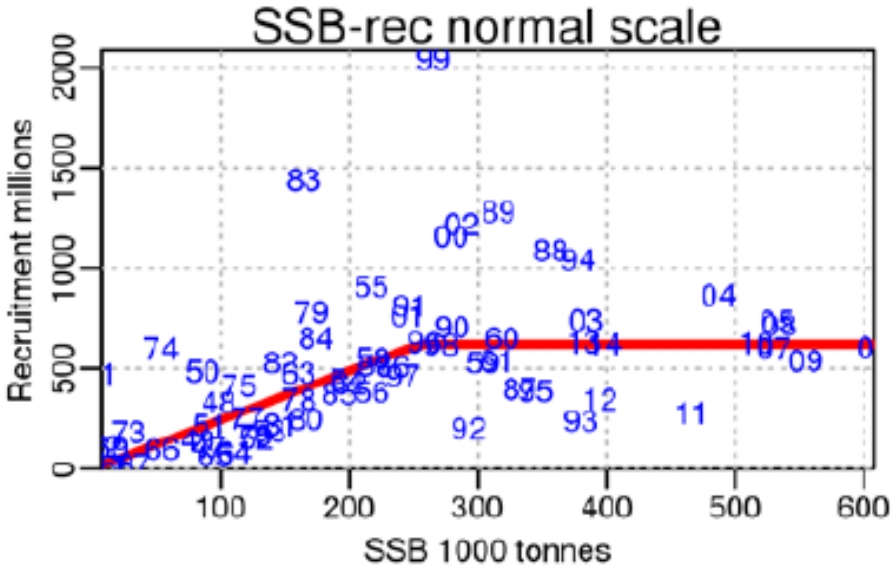


Figure 7. Stock-recruit relationship and historical stock-recruit pairs as used in harvest rule simulations.

The reference points for the herring stock have evolved over many years, and the attitude has been to keep values that have worked well over long time. A limit SSB of 200 000 tonnes has been in place for decades, and although the estimated breakpoint in the stock – recruit relation in the last evaluation was higher, it was considered reasonable to keep the old value. Other reference points were set according to the ICES guidelines valid at that time: Bpa was set at the 95-percentile of Blim, (Bpa = Blim × exp(1.645*σ) = 273 kt, where an assessment error with σ = 0.19 was assumed). Flim = 0.61 was set as the F leading to Blim with mean recruitment, and Fpa= 0.43 was set at Flim × exp(−1.645 * σ), where σ = 0.18.

The FMSY was set at 0.22. Historically, a target exploitation rate of F0.1 = 0.22 proved successful in managing the stock for about 30 years, despite biased assessments. At the revision in 2016 it was concluded that F0.1 = 0.22 could be valid as FMSY. During a harvest rule evaluation for the stock in 2017, F = 0.22 was not significantly different from results of simulation giving 0.24 as Fmax. Thus, it was concluded adequate to keep FMSY = 0.22. Simulations made at the 2017 harvest rule evaluation (see below) gave a HRMSY = 0.19 when some assessment bias was included.

35https://ices-library.figshare.com/articles/report/Report_of_the_North_Western_Working_Group_NWWG_27_April-4_May/19255301 Section 11

36https://ices-library.figshare.com/articles/report/WKICEMSE_-_Report_of_the_Workshop_on_Evaluation_of_the_Adopted_Harvest_Control_Rules_for_Icelandic_Summer_Spawning_Herring_Ling_and_Tusk/19255394

The reference points currently valid are tabulated below.

Table 6. Reference points for herring.

Nálgun *Framework*	Viðmiðunarmörk *Reference point*	Gildi *Value*	Grundvöllur *Basis*
Aflaregla *Management plan*	MGT $B_{trigger}$	200 000 t	Aðgerðarmörk í aflareglu sem standast MSY viðmið ICES *Trigger point in HCR considered consistent with ICES MSY framework*
	HR_{MGT}	0.15	Slembireikningar í aflaregluhermun. Hlutfall af viðmiðunarstofni *Stochastic HCR evaluation. Proportion of age 4+ biomass*
MSY	MSY $B_{trigger}$	273 000 t	B_{pa}
	F_{MSY}	0.22	Slembireikningar í aflaregluhermun. *Stochastic HCR evaluation*
Varúðarnálgun *Precautionary approach*	B_{lim}	200 000 t	Stærð hrygningarstofns þar sem líkur eru á skertri nýliðun *SSB beyond which recruitment becomes impaired*
	B_{pa}	273 000 t	$B_{lim} * e^{1.645\sigma}$, σ = 0.19
	F_{lim}	0.61	F sem leiðir til B_{lim} miðað við meðal nýliðun *F corresponding to B_{lim} with average recruitment*
	F_{pa}	0.45	$F_{pa} = F_{lim} \times \exp(-1{,}645 \times \sigma)$, σ = 0.18

Several alternative parameters for a management plans were tested at the last evaluation in 2017. Most of them were found to satisfy the criteria for precautionary management (See table below) , and one of these was adopted by the Government of Iceland and has been applied since then. This HCR is based on reference biomass of age 4+ in the beginning of the assessment years (Bref, Y), a spawning stock biomass trigger (MGT Btrigger) is defined as 200 kt, and the harvest rate (HRMGT) is set as 15% of the reference biomass age 4+ in the beginning of the assessment year.

The rule, as applied by ICES[37], is shown below.

Table 7. Harvest rule for Icelandic summer spawning herring.

Advice basis	Iceland management plan Rule 5 (ICES, 2017a; 2017b)
Management plan	The Icelandic Ministry of Industries and Innovation fisheries management plan has been implemented since 2017. The rule has been evaluated by ICES (ICES, 2017b) and is considered to be precautionary and conforms to ICES MSY approach. According to the rule, the TAC for the fishing year Y/Y+1 (1 September of year Y to 31 August of year Y+1) is calculated as follows: *When SSB_Y is equal to or above MGT $B_{trigger}$:* $TAC_{Y/Y+1} = HR_{mgt} \times B_{ref,Y}$ *When SSB_Y is below MGT $B_{trigger}$:* $TAC_{Y/Y+1} = HR_{mgt} \times (\frac{SSB_Y}{MGT\ B_{trigger}}) \times B_{ref,Y}$ The spawning-stock biomass trigger (MGT $B_{trigger}$) is defined as 200 000 tonnes; the reference biomass is defined as the biomass of herring of ages 4 and older, and the target harvest rate (HR_{mgt}) is set to 0.15.

[37] https://ices-library.figshare.com/articles/report/Herring_Clupea_harengus_in_Division_5_a_summer-spawning_herring_Iceland_grounds_/19447988?backTo=/collections/ICES_Advice_2022/5796935

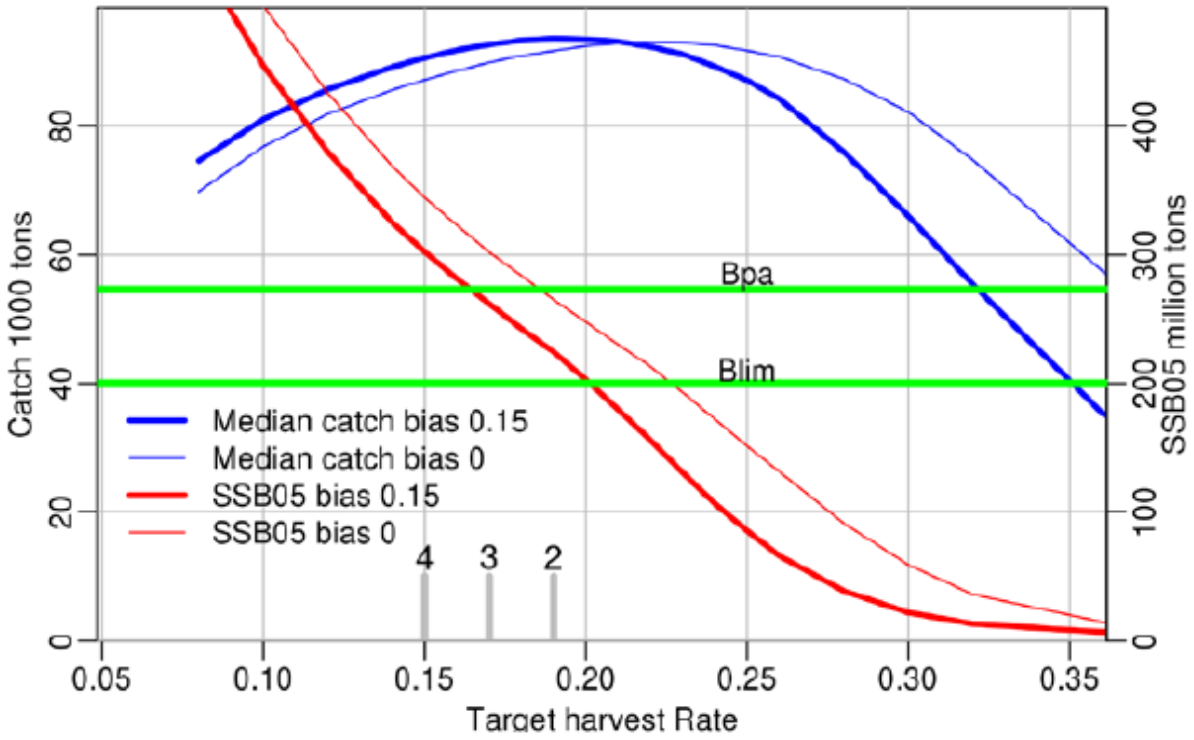


Figure 8. Median catch and fifth percentile of SSB at equilibrium (long term) for different harvest rates, with and without assuming 15% assessment bias. No increase in natural mortality from Ichthyophonus epidemics. Harvest rates corresponding HCRs 2, 3, and 4/5 (0.19, 0.17, and 0.15, respectively) are shown. HR = 0.19 maximizes the median catch when a 15% assessment bias is assumed. No Btrigger was applied.

Being a rule with a fixed target exploitation rate, a target SSB is redundant, and has not been defined.

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 provides advice based on the results from NWWG. Once released, the advice and the NWWG report are available at the ICES website[38]. 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[39]. The final advice to Icelandic authorities is provided by MFRI. The MFRI advice follows the advice for ICES when there is one, unless there is good reasons to deviate from it.

7.3 Landings update

The fishery can take place from 1 September to 31 May each fishing season (1 September–31 August) in nets, purse seines and mid-water trawls. In addition, there are by-catches in the fisheries for Mackerel and Norwegian spring spawning herring, that extend throughout the summer and autumn. Mid-water trawling is only allowed outside of the 12 nautical miles zones with some additional areal restrictions. Spawning takes place in July off the SE, S and SW coast. The nursery grounds are mainly in coastal areas off the NW and N coast, but occasionally also in coastal areas off the E, SE, and SW and W Iceland. The overwintering grounds of the mature and fishable stock

38 http://www.ices.dk
39 https://www.hafogvatn.is/is/veidiradgjof

was mainly off the SE and E Iceland prior to 1998. From 1998 to 2006, the overwintering took place both off the east and west coast, with increasing proportion being in the western part. In the winters 2006/07 to 2011/12, most of the stock was located in high density in coastal waters in northern part of Breidafjördur in western Iceland. Since then, it has moved to the shelf edge region in the West.

The location of the fishery has also varied over the years[40]. In the seasons 2007/2008 to 2012/2013, the majority of the catch (~90%) was caught in Breiðafjörður, but before that it was mainly caught off the south, southeast and east coasts. Since 2014/2015, most of the fishing has taken place in the west of the country. In Breiðafjörður, the fishery was by purse seine as trawl is prohibited in inshore waters. The last years the catches are exclusively by pelagic trawl (Figure 9), as the fishery has moved to the Western shelf edge (Figure 10),

In addition to the traditional fishery in the winter and spring in the West, there are by-catches of summer spawning herring in the fishery for Norwegian Spring Spawning herring and in the mackerel fishery. Both take place in the South and East. In the 2020/2021 season, the total catch was 36 100 tonnes while the TAC was 35 490 tonnes. Traditional catches in wintering grounds west of the country in November-February accounted for 44% (15 800 tonnes), 56% (20 300 tonnes) were taken as bycatch in mackerel fishing in the south in June-July (3 400 tonnes) and in fishing for mackerel and Norwegian spring-spawning herring to the east in June-July (4 400 tonnes) and in September-November (12 500 tonnes).

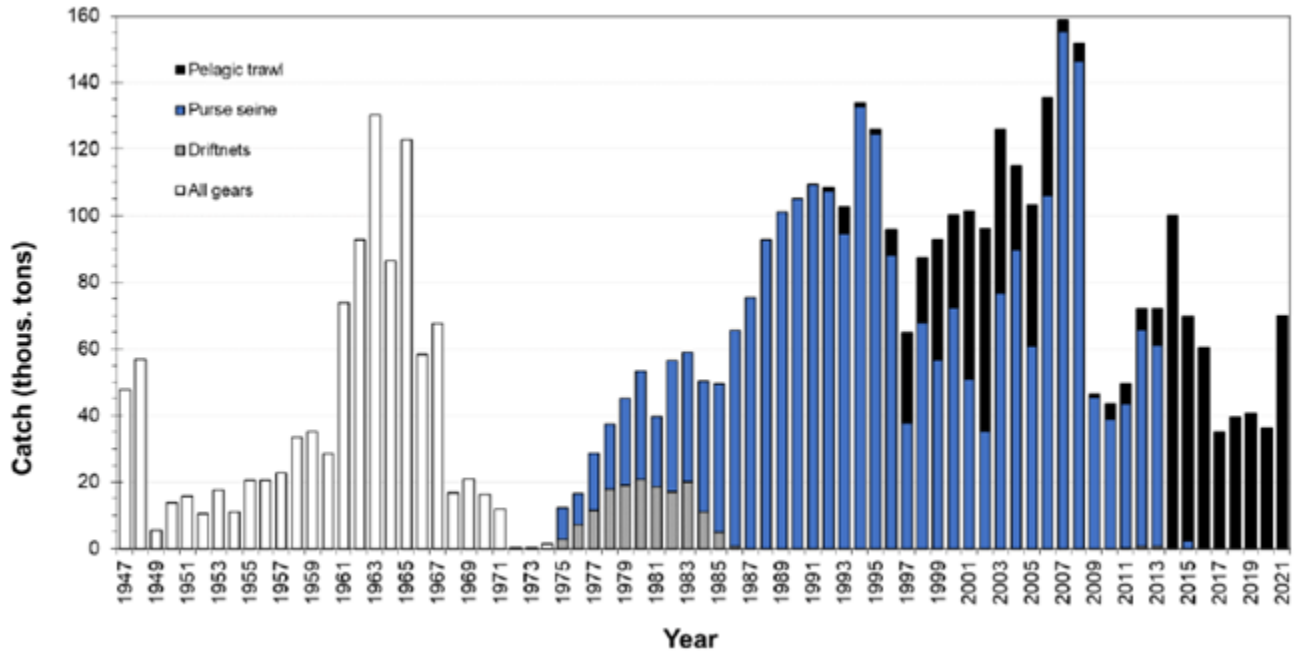


Figure 9. Icelandic summer-spawning herring. Seasonal total landings (in thousand tonnes) during 1947-2021, referring to autumns, by different fishing gears from 1975 onwards.

40https://ices-library.figshare.com/articles/report/Stock_Annex_Herring_Clupea_harengus_in_Division_5_a_summer-spawning_herring_Iceland_grounds_/18622559

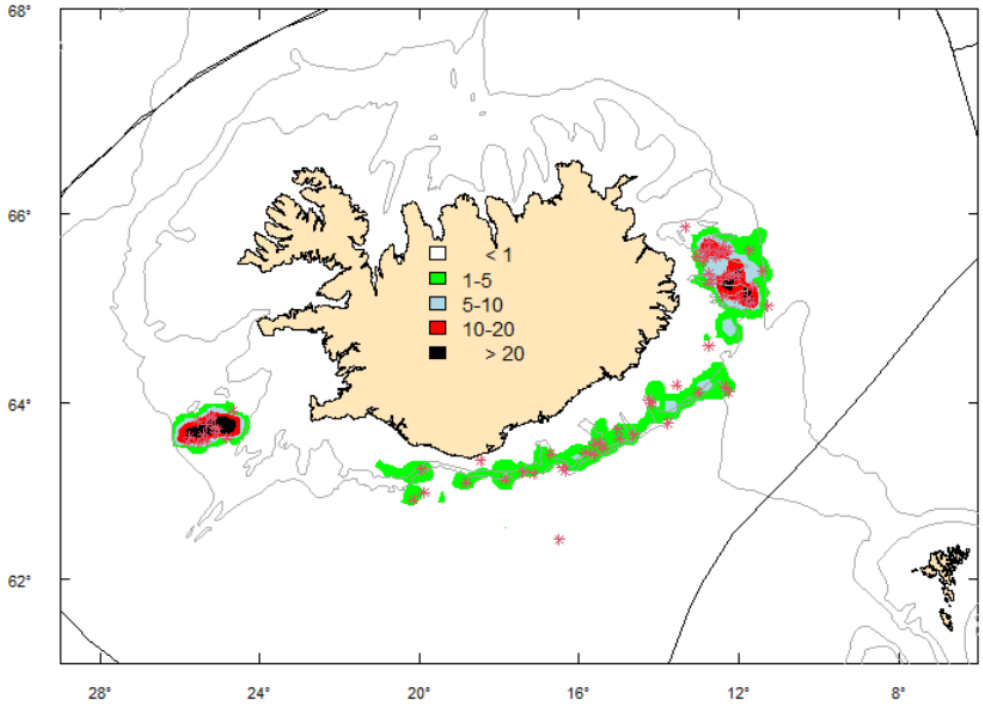


Figure 10. The distribution of the fishery (in tonnes) of Icelandic summer spawning herring during the fishing season 2020/21, including the bycatch in the mackerel fishery in July–November 2020. The stars indicate the location of catch samples.

Table 8. Quotas and catches of herring.

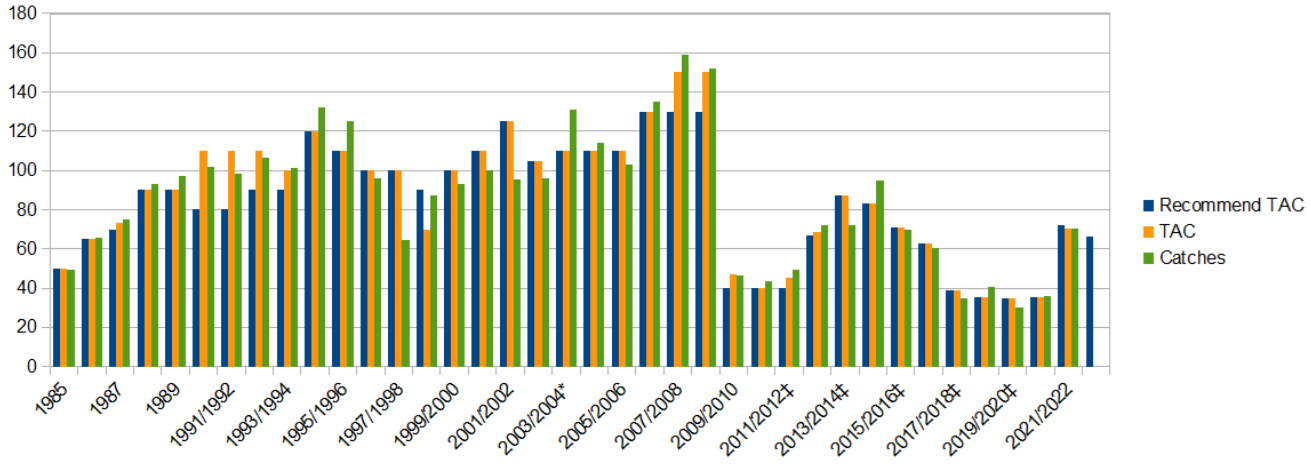
Fiskveiðiár *Fishing year*	Tillaga *Recommended TAC*	Aflamark *National TAC*	Afli *Catches*
2010/2011	40 000	40 000	43 533
2011/2012	40 000	45 000	49 446
2012/2013	67 000	68 500	71 976
2013/2014	87 000	87 000	72 058
2014/2015	83 000	83 200	94 975
2015/2016	71 000	71 000	69 729
2016/2017	63 000	63 000	60 403
2017/2018	38 712[1)]	39 000	35 034
2018/2019	35 186[1)]	35 186	40 683
2019/2020	34 572[1)]	34 572	30 038
2020/2021	35 490[1)]	35 490	36 100
2021/2022	72 239[1)]	70 084	70 084
2022/2023	66 195[1)]		

[1)] 15 % aflaregla. *15% harvest control rule*

To protect juvenile herring (27 cm and smaller) the mesh size in gillnets is 63 mm. Normally, the age of first recruitment to the fishery is age-3, which is fish at length around 26–29 cm.

In recent years, TACs have been set close to the advice and catches have been close to the TAC (Table above and figure below). Both have been stable around 30-40 000 tonnes since the 2017/2018 season. For the present and coming seasons, the recommendation is a higher TAC, as the stock is increasing due to better recruitment, in particular a strong 2017 year class which now enters the reference biomass at age 4.

Figure 11. TACs and catches of Icelandic summer spawning herring.



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)[41], the Fisheries Management Act (no. 116/2006)[42], 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[43]. It also provides supervision on board fishing vessels and in ports of landing (i.e. shore based monitoring), which involves inspecting the composition of catches, fishing equipment and handling methods. It works closely with the Icelandic Coast Guard, which carries out fisheries inspection at sea, monitors the EEZ and receives required notifications from vessels, Port Authorities and the MFRI. A full list of regulations which was harmonised and streamlined starting in 2019 is available on https://www.stjornarradid.is/efst-a-baugi/frettir/stok-frett/2021/09/23/Stjorn-fiskveida-2021-2022-Log-og-reglugerdir/.

The Fisheries Management Act sets out penalties for the violation of its provisions, or rules adopted by virtue of it, which are provided in detail in the Act Concerning the Treatment of Commercial Marine Fish Stocks (Act No. 57 1996[44]). Provisions of the Act on a Special Fee for Illegal Marine Catch[45] 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[46] and 2020[47].

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[48].

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

The weight registration document for each vessel is transmitted to the Fisheries Directorate who record it on their Catch Registration System (the Fisheries Directorate and Landing Ports database GAFL). The Directorate also receives the e-logbook information. Starting from September 2020 smaller Icelandic vessels are required to log their catches in an App (essentially an e-logbook) which contains information on catch and bycatch, including that of marine mammals and seabirds. This follows regulation 298/2020[49]. The App also called Afladagbókina or catch diary[50] [51] automatically records the location of the boat during fishing and the captains then records the catch, its condition and by-catch, in a very simple way. The app replaces paper logbooks in the small boat sector, with an electronic catch recording system. More information on this topic has been provided as part of minor Non Conformance #1 progress update (Section 8 of this report).

Weighing is undertaken on official port scales certified by the Fisheries Directorate and operated by individuals authorised by the Directorate. In circumstances where there are significant difficulties in using a port scale, private weighing scales can be used provided the company involved has been approved by the port authority, the scales and operators using them are certified and Fisheries Directorate inspectors have unimpeded access to the facilities. This is known as a 'Home-weighing license'. Fish markets can also be authorised to weigh catches by the Directorate.

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

A December 2018 report from the Icelandic National Audit Office (NAO)[52] on certain aspects of the Icelandic enforcement system highlighted that more quantitative data are needed to substantiate the conclusions that discards are low and that there are few irregularities in connection with re-weighing of catches after de-icing. Although available evidence (e.g. data from scientific cruises held up against information reported by the vessels) still indicates that discards are low and re-weighing irregularities not significant, the Directorate of Fisheries has recently placed new staff to control re-weighing at processing plants at risk and has started to publish information on its website showing catch composition reported by fishing vessels on trips with and without an inspector on board, with a view to roll this out more widely to several fishing fleets in Iceland. During the 2022 audit, Fiskistofa confirmed that they worked on this issue by increasing surveillance. Two incidents were registered in 2022. The results of this surveillance are published online to show the violations and deter other potential violators[53].

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[54] on (7th)

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

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

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

Also, in 2019, the Directorate of Fisheries began implementing ISO-31000 the standard intended for effective guidance on risk management for institutions and companies. This is being implemented in an effort to strengthening confidence in the Agency's oversight, and increase efficiency and transparency in the operations of the Directorate of Fisheries [55].

Acts/Laws and Regulations may be accessed by searching by Act/Law/Regulation No./Year (e.g. 116/2006) at http://www.althingi.is/lagasafn/ (for Acts/Laws) or https://www.reglugerd.is/ (for Regulations). In addition to their being easily accessible and searchable online laws and regulations are also effectively disseminated through an online law gazette which provides the most up to date versions of the legislation (i.e. incorporates latest amendments)[56].

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.[57]

All scientific advice is available online[58]. 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[59].

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

Table 9. Short term closures in Iceland for the years 2018-2022.

Year	Species	Number of closures
2018	Cod	90

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

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

Directorate Inspections at Sea

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

Table 10. Directorate inspector days on fishing vessels (Source: Fiskistofa, October 2022 on-site audit).

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

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

7.4.1 Enforcement by Fiskistofa

The Directorate of Fisheries monitors compliance with laws and regulations which apply to fishing, handling of commercial stocks and treatment catch. In many cases, the Directorate of Fisheries is intended to respond to

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

Table 11. Fiskistofa suspected violations in 2020 and 2021. Source: Fiskistofa 2020[60] and 2021 Annual Report[61]. Note, the information between 2020 and 2021 is not directly comparable, and offenses of a similar nature may have been combined into one case.

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

7.4.2 Enforcement by the Icelandic Coast Guard

At sea surveillance is primarily the remit of the Icelandic Coast Guard (ICG). The Icelandic Coast Guard monitors commercial fishing vessels in Iceland's EEZ on a continuous basis. There are requirements surrounding the reporting of vessel position (manually or using VMS systems) and the reporting of catch on entering or leaving Icelandic waters, among others.

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

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

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

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

Figure 12. Overall number of ICG inspection from 2012 to 2022**.** Source: ICG, November 2022.

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

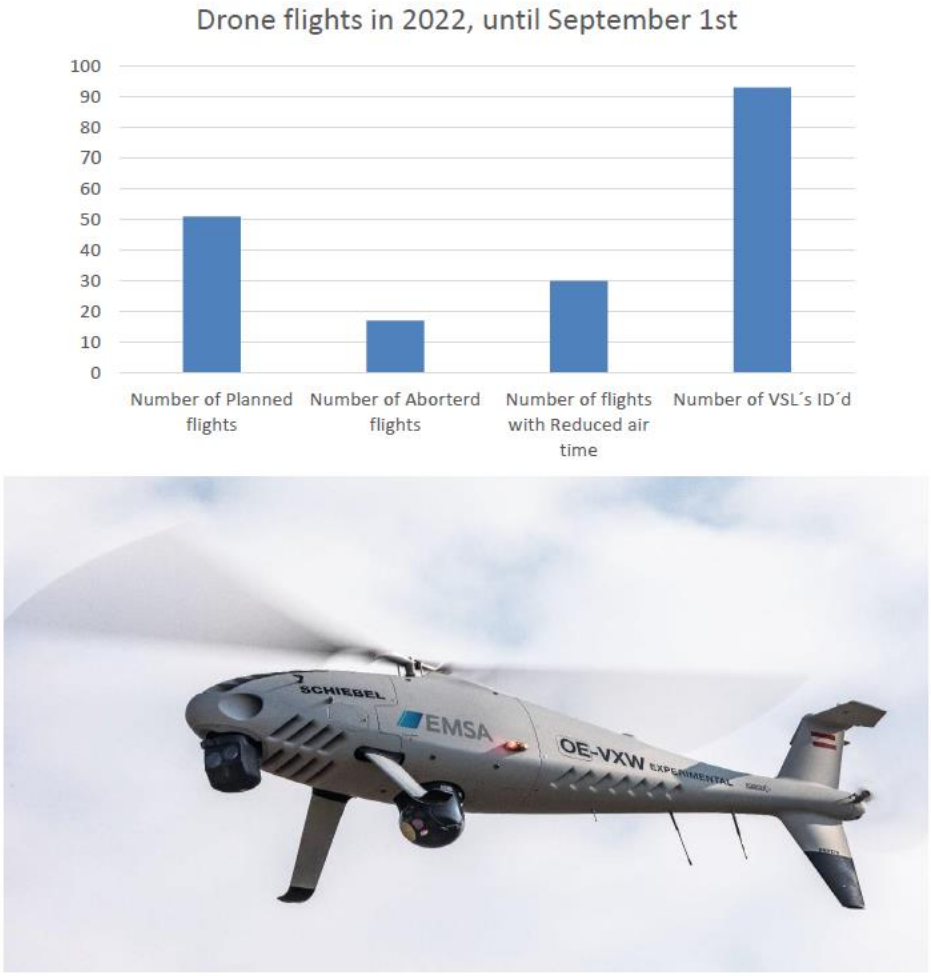


Figure 13. Air Surveillance hours by RPAS (drone) between May 31st until August 31st 2022.

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

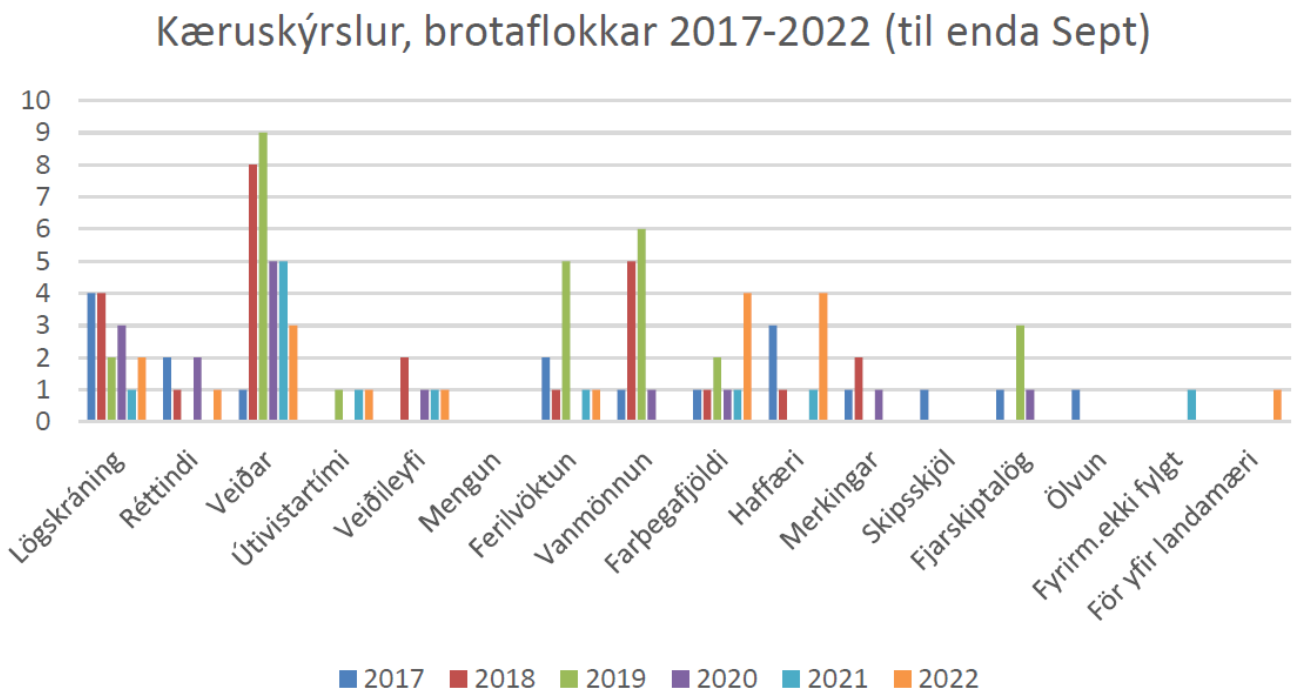


Figure 14. Overview of ICG infringement reports in 2017- (1st September) 2022. Source: provided by the ICG on the 8th of November 2022.

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

Foreign vessels inspection 2022

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

7.5 Bycatch, habitat and ecosystem update

Associated species catch and bycatch to the fishery

The fishery has been dominated by pelagic trawls in recent years, but both purse seine and pelagic trawls are considered 'clean' fisheries with relatively little bycatch. The bycatch species /associated catch to the ISS herring fishery are blue whiting, capelin, mackerel and Norwegian spring spawning herring. The status of these species has been updated and is shown below.

Table 12. Status of bycatch and associated species in the ISS herring target and non-target fisheries.

Status of bycatch and associated species in the ISS herring target and non-target fisheries as identified during the full assessment from historic average catches for each relevant gear type. All data and information is derived from the MFRI Advice page[62] for each individual species.
KOLMUNNI – BLUE WHITING (*Micromesistius poutassou*)[63] Fishing pressure on the stock is above FMSY / Fpa but below Flim; spawning-stock size is above MSY Btrigger, Bpa and Blim.

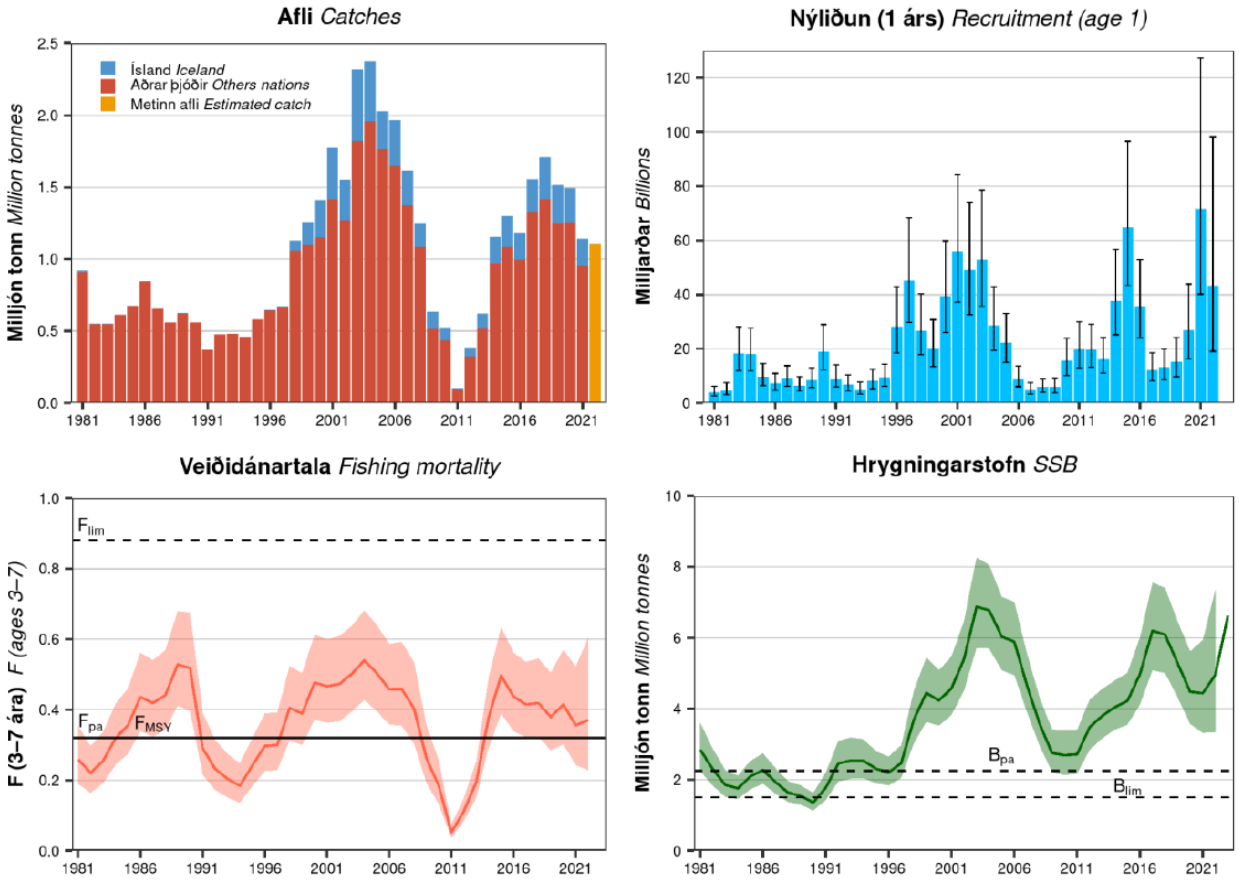


Figure 15. Blue whiting harvest rate and biomass.

[62] https://www.hafogvatn.is/en/harvesting-advice
[63] https://www.hafogvatn.is/static/extras/images/kolmunni-radgjafarskjal-20221344829.pdf

LOÐNA – CAPELIN (*Mallotus villosus*) [64]

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[65]. The Capelin stock appears to be quite abundant as per the 2022 stock assessment.

Icelandic capelin's status was assessed by the MFRI again in 2022[66]. Based on the 2021 acoustic autumn survey and surveys conducted in January and February 2022 and catches this season, the median of the distribution of SSBs used as input into harvest control rule (HCR) is 1'342'000 tonnes. The 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 869 600 tonnes during the fishing season 2021/2022, the HCR goal will be achieved.

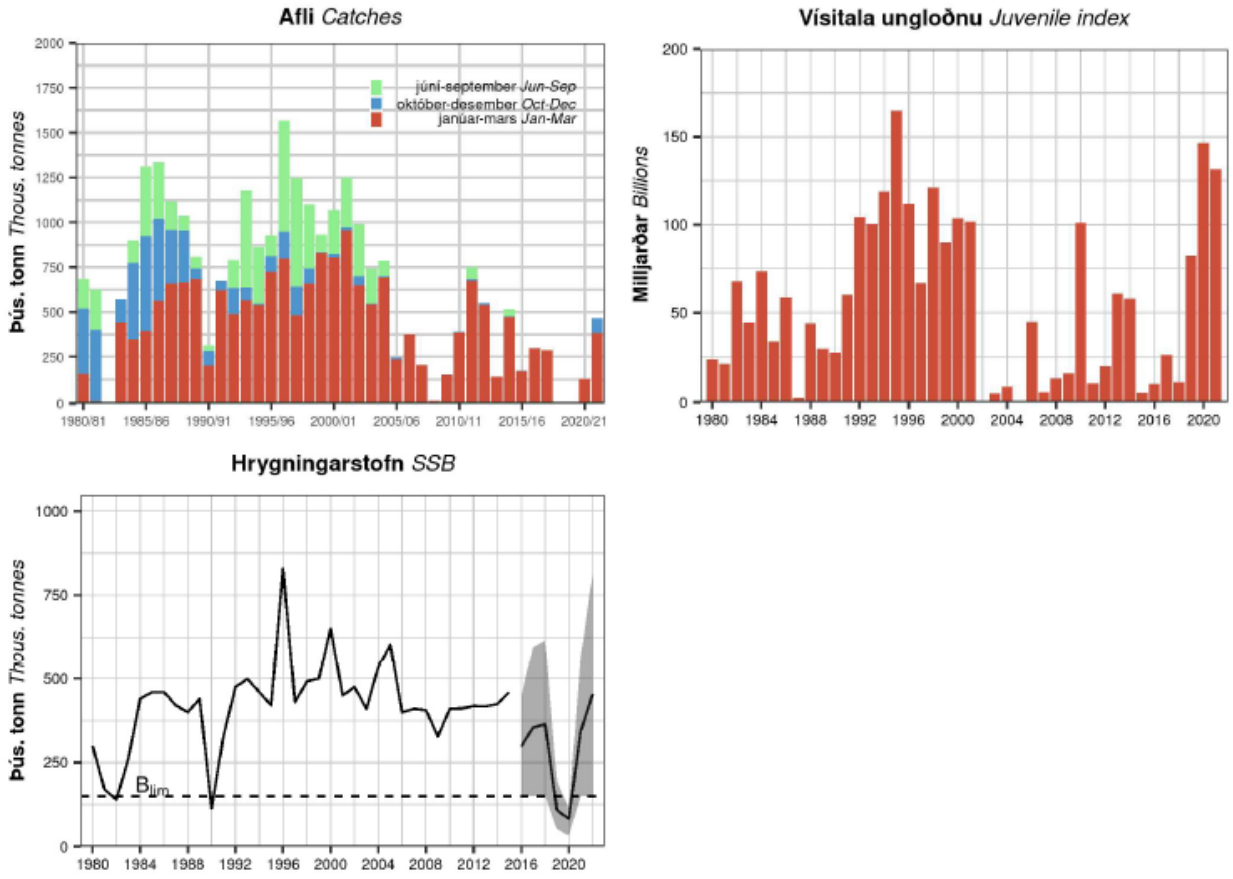


Figure 16. Catches, acoustic index for immatures from autumn surveys, and SSB at spawning time (with 90% confidence limits since 2016). The SSB value for 2016 and onwards is not directly comparable to historical values because it is based on different assumptions about natural mortality. Catches from the fishing year 2021/22 are obtained at publishing date and therefore not final.

[64] https://www.hafogvatn.is/static/extras/images/31-capelin-autumn1345531.pdf
[65] https://www.hafogvatn.is/static/files/2022_2/fisheriesoverview_icelandicwaters_2021.pdf
[66] https://www.hafogvatn.is/static/extras/images/lodnavetur2022_final1303548.pdf

MAKRÍLL – MACKEREL (*Scomber scombrus*)[67]

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 above FMSY and spawning-stock size is above MSY Btrigger, Bpa, and Blim.

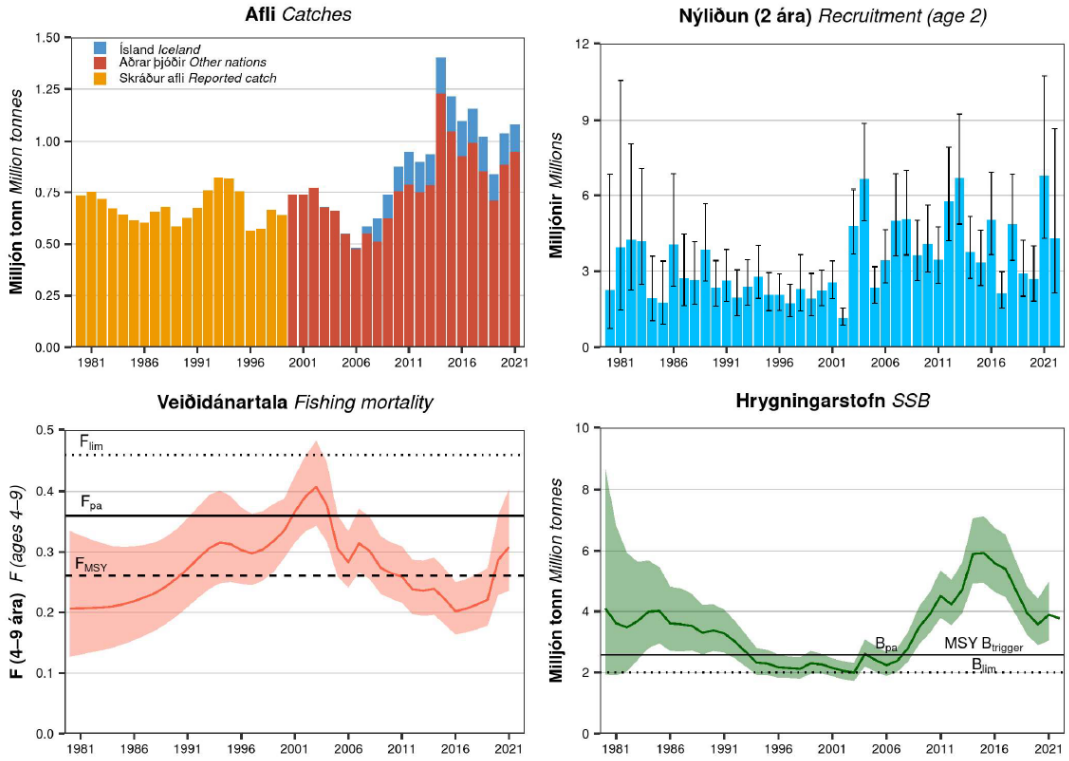


Figure 17. Mackerel harvest rate and biomass.

NORSK-ÍSLENSK VORGOTSSÍLD NORWEGIAN SPRING-SPAWNING HERRING (*Clupea harengus*)[68]

ICES advises that when the long-term management strategy agreed by the European Union, the Faroe Islands, Iceland, Norway, and the Russian Federation is applied, catches in 2023 should be no more than 511 171 tonnes. Fishing pressure on the stock is above FMSY and between Fpa and Flim; spawning-stock size is above MGT Btrigger, Bpa, and Blim.

[67] https://www.hafogvatn.is/static/extras/images/makrill-radgjafarskjal-20221344831.pdf
[68] https://www.hafogvatn.is/static/extras/images/sild-ni_20221344827.pdf

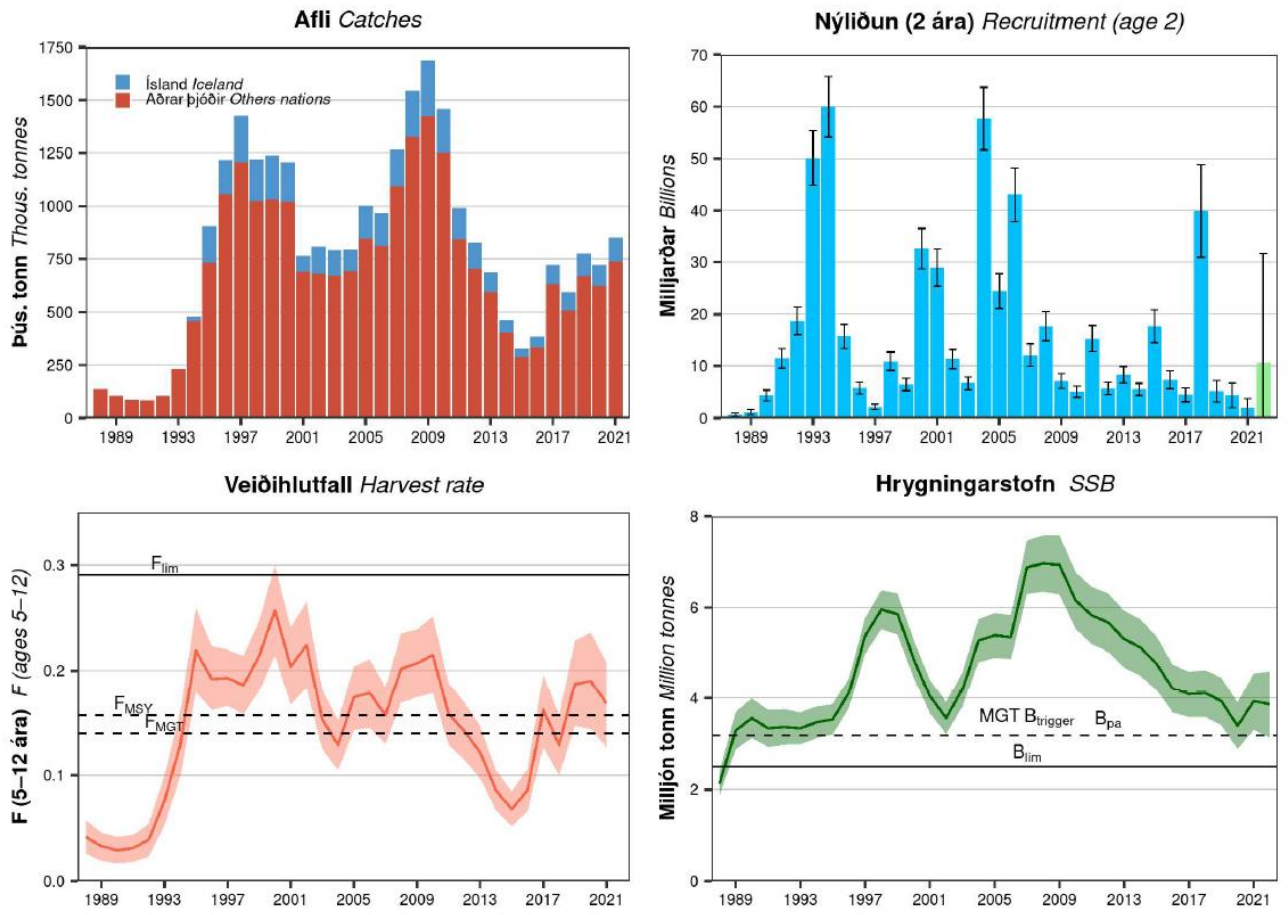


Figure 18. Catches, recruitment at age 2, fishing mortality and spawning stock biomass (SSB). Assessment run starts in 1988, when the stock has started to rebuild after collapse in the 1960s.

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

The discard prohibition only applies to commercially important species and protected species including Atlantic halibut (*Hippoglossus hippoglossus*)[69] and porbeagle (*Lamna nasus*), basking shark (*Cetorhinus maximus*) and spurdog (*Squalus acanthias*)[70] unless they are captured alive in which case they must be released and systematic recording of non-commercial by-catch has not occurred. Measures have been taken in recent years to extend the inspector programme to cover by-catch such as elasmobranchs (pers. comm. MFRI, site visit) and records for by-catch species including skate (*Dipturus batis*), Atlantic halibut, dogfish, Greenland shark (*Somniosus microcephalus*) and porbeagle (*Lamna nasus*) can be seen in the catch data available via the Directorate website (http://www.fiskistofa.is/english/quotas-and-catches/catches-in-individual-species/). These are seen to be either vulnerable or endangered, threatened or protected (ETP) species. However, these species are unlikely to interact

[69] Regulation 470/2012. https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/18302
[70] Regulation 456/2017. https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/0456-2017

significantly with the gears used in the ISS herring fishery and in the last 5 year, there were no landings of these species reported in pelagic gears (2017 to 2021) based on Fiskistofa records.

ISS herring is important for killer whale (*Orcinus orca*) which in Iceland mainly prey upon herring and mackerel. There are on-going studies documenting this association (Sammara *et al.*, 2017 cited in NAMMCO 2017[71]). Fishermen report that killer whales are generally not seen during trawling for ISS herring. They are frequently observed during the purse seine fishery but fishermen report that interactions with the gear are rare. Adult killer whales are generally able to make their own way out of the net but can cause significant damage if they are caught and need to be cut free. If it looks likely that a killer whale will be caught the gear is released to prevent damage to it (pers. com. site visit). In relation to understanding of their population and its status, the last review of killer whales in the North Atlantic dates from 1987. The NAMMCO Scientific Committee recommended in their last meeting that a review be undertaken of all available information and current research activities on abundance, stock structure, and movements of killer whales in the North Atlantic in readiness for their next meeting. Initial abundance estimates for Icelandic waters range from 4,000-6,847 killer whales but these estimates may include killer whales from several populations over large areas. A recent study identified a minimum of 314 individuals regularly using the waters off the southern and west coasts of Iceland (Tavares *et al*., 2016 cited in[72]) and the MFRI, through their long-term killer whale project, have published a catalogue containing over 400 killer whale individuals identified between 2006 and 2015 on their website in 2017. Killer whale research continues in Iceland and is documented in the NAMMCO 2021 Iceland progress report[73] as follows: In 2021, the University of Iceland (UI) and the Icelandic Orca Project conducted a field season in Vestmannaeyjar during June, July and August, continuing the long-term project on killer whales started in 2008. The current focus of the project is to investigate dietary specialization on killer whales, to observe interspecific interactions with pilot whales and to investigate the acoustic behaviour of killer whales. Tagging with tags was also conducted during the summer field season as well as playback experiments of pilot whale sounds to killer whales to investigate their interspecific interactions. Land-based observations also allowed for broader monitoring of variations in the occurrence of killer whales and other cetaceans in the local marine ecosystem. In January 2014, year-round systematic data collection on killer whales via photo identification in the waters off the Snæfellsnes peninsula started, with the primary aim of recognizing individual killer whales and documenting their associations and behaviour. This will potentially aid in identifying critical habitat or important feeding grounds, feeding behaviour, prey types, natural mortality and behavioural patterns of the Icelandic killer whale population. The project is the collaboration of West Iceland Nature Research Centre, Láki Tours and Orca Guardians.

The species is listed as 'Least Concern' on the Icelandic (2018) and Norwegian (2015) national red lists and as 'Data Deficient' on the IUCN Red List for both the European and global stock in the most recent assessments (2007 and 2017, respectively)[74].

Although evidence of the degree to which ISSH fisheries and marine mammals interact is sparse, available evidence would indicate that, in Icelandic waters, direct mortality of marine mammals as a result of interactions with pelagic fishing gears used in the fishery is likely to be low and unlikely to have detrimental effects at the population level.

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[71] NAMMCO (2017). North Atlantic Marine Mammal Commission. Report of the 24th Scientific Committee meeting, 14-17 November 2017. https://nammco.no/wp-content/uploads/2018/01/08-nammco-26-scientific-committee-report.pdf
[72] NAMMCO https://nammco.no/topics/killer-whale/#1475844082849-433d5060-e5a9

[73] https://nammco.no/wp-content/uploads/2022/03/2021-nammco-iceland_progress_report_revised.pdf
[74] https://nammco.no/topics/killer-whale/

Notwithstanding the above we provide here below some updates on vulnerable and ETP species bycatch that have a bearing on information availability from the Icelandic fleets and risk from the most important gear types (gillnet and longline).

Harbour Porpoises (*Phocoena phocoena*)

Harbour porpoises are classified as Least Concern in the IUCN Red List[75] (population trend unknown, last assessed in 2020). They are also classified as Least Concern in the Icelandic National Redlist (based on a 2016 assessment)[76]. 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[77] and down to about 750 animals in 2014-2015.

Results based on close kin mark recapture genetics indicates that the population has increased substantially in recent years.[78]

The 2019 Report of the NAMMCO Scientific Committee Working Group on Harbour Porpoise (19-22 March 2019)[79] reported the following about the Icelandic harbour porpoise population. After reviewing the assessment and noting the recent decline in bycatch, the WG agreed that there was no specific cause for concern for harbour porpoises in Iceland. However, they also concluded that the lack of time and expertise meant they were not in a position to provide management advice on sustainable removals.

In 2022 the same group provided the following update[80]:" Sigurdsson indicated that a population estimate of harbour porpoise in Iceland waters was available from an aerial survey conducted in 2007, but noted that the survey was incomplete and the abundance estimate obtained then was probably an underestimate. Sigurdsson informed the WG about plans to conduct an aerial survey in July 2023 to obtain updated abundance estimates for harbour porpoise in Iceland. The group commanded the planning of such a survey. Given that abundance estimates from the NASS surveys may not be usable for harbour porpoise in Iceland, the group agreed that the 2023 abundance estimate be the one used in the future Icelandic assessment.
Sigurdsson indicated that previous work using close kin Mark-Recapture genetics and presented at the 2018 NAMMCO/IMR International Workshop on harbour porpoise indicated that the Icelandic population was increasing. Sigurdsson informed the WG that around 500 animals were by-caught annually in the Icelandic lumpsucker fishery and 1500-2000 in the cod fishery, noting that by-catch levels were much higher in the past. Sigurdsson informed the WG that Iceland was also conducting isotopic work and investigating the diet of harbour porpoise using samples from by-caught and stranded animals. Life history parameters and age distribution histograms are possible to infer from these samples. The group recommended that an assessment for Iceland be made when the new abundance estimate becomes available.

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[75] https://www.iucnredlist.org/species/17027/50369903
[76] https://www.ni.is/node/27406
[77] 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
[78] North Atlantic Marine Mammal Commission and the Norwegian Institute of Marine Research. (2019). Report of Joint IMR/NAMMCO International Workshop on the Status of Harbour Porpoises in the North Atlantic. Tromsø, Norway. https://nammco.no/wp-content/uploads/2020/03/final-report_hpws_2018_rev2020.pdf
[79] NAMMCO (2019). Report of the NAMMCO Scientific Committee Working Group on Harbour Porpoise, 19-22 March, Copenhagen, Denmark. https://nammco.no/wp-content/uploads/2019/02/final-report_hpwg-2019.pdf
[80] NAMMCO-North Atlantic Marine Mammal Commission (2022). Report of the Scientific Committee Working Group on Harbour Porpoise. November 2022, Oslo, Norway. https://nammco.no/wp-content/uploads/2023/01/final-report-hpwg-2022_with-exsum.pdf

Sigurdsson informed the WG of the by-catch time series available in Iceland, including some back calculated by-catch estimates, and presented at the international harbour porpoise workshop in 2018. As in the case of Norway, the group recommended Iceland to generate the best back-calculated bycatch estimates (i.e., generate a time series going back to the beginning of the fishery) for the upcoming Icelandic assessment, planned for 2024."

Harbour seals

The MFRI 2021 advice for harbour seals[81] indicates that the 2020 harbour seal census resulted in a population estimated of 10,319 animals (95% confidence intervals: 6,733-13,906). The current population estimate is 69% lower than the first abundance estimate from 1980 and the estimate is 14% under the management objective of 12 thous. Animals (Hafrannsóknastofnun 2021). In 2019, new regulation regarding seal hunting in Iceland was enacted (Atvinnuvega- og nýsköpunarráðuneytið 2019). All seal hunting is banned, but it is possible to obtain an exemption for traditional hunt. It is also forbidden to sell Icelandic seal products. Bycatch in gillnets is probably the highest mortality risk for harbour seals in Iceland currently. Limited data are available on seal bycatch, but data collected by on-board observers of the Directorate of Fisheries, and in the MFRI gillnet survey, indicate that on average, 1389 (coefficient of variation, CV=35) harbour seals have been bycaught annually in the lumpfish fishery between 2014 and 2018. Bycatch in cod gillnet fishery and bottom trawls is less common and more uncertainty associated with the bycatch estimates in those fisheries. Between 2014 and 2018, it has been estimated that annually, 15 harbour seals were bycaught in cod gillnet fisheries (CV=102) and 17 harbour seals in bottom trawls (CV=100) (Hafrannsóknastofnun, 2019). Negative effects from the cod gillnet fisheries (and associated fisheries that land fish in those nets) are considered to be very limited.

Other marine mammals

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

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

Pingers testing

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

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

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

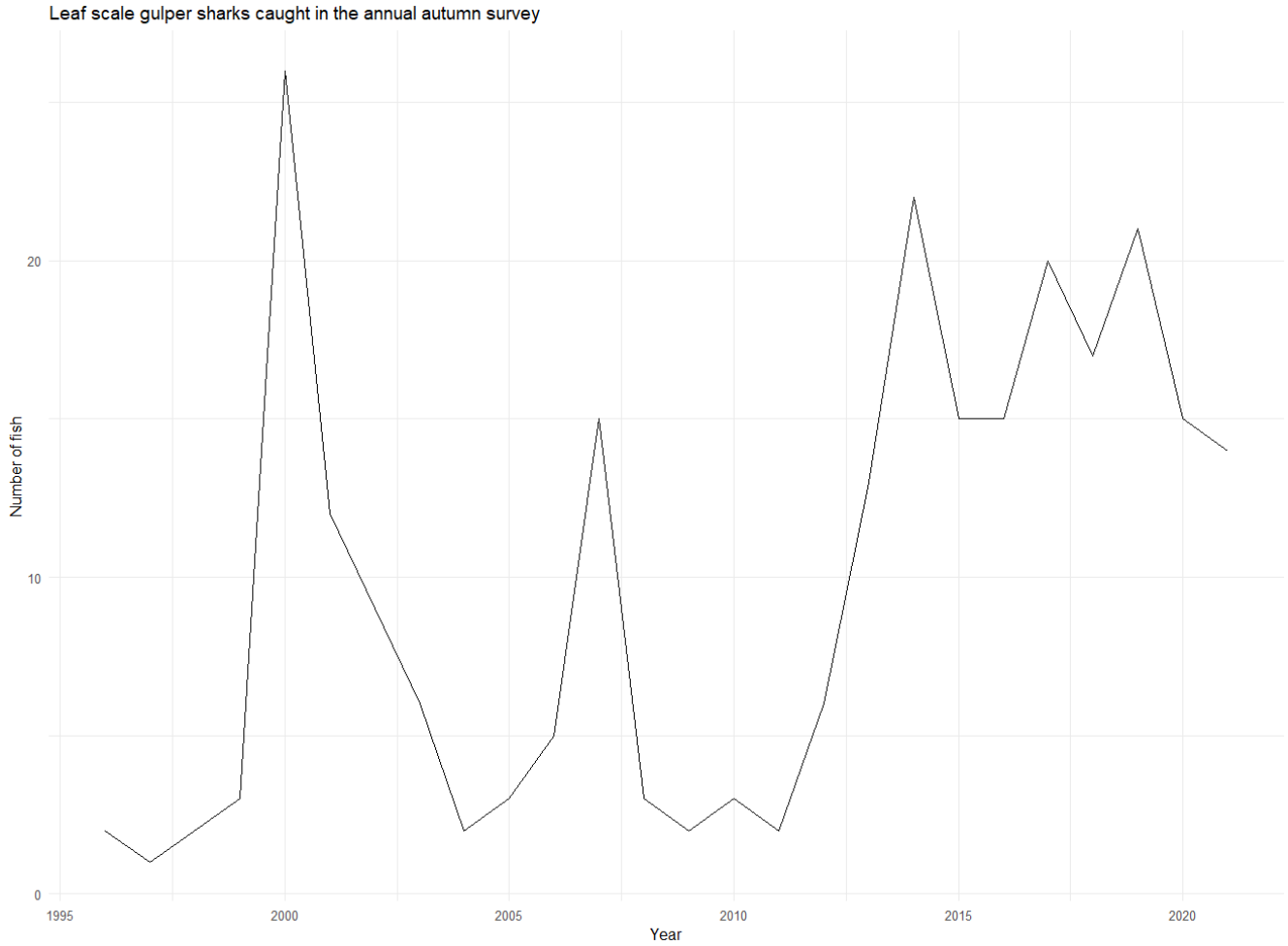


Figure 19. Leaf scale gulper shark caught in the annual autumn survey, from 1996 to 2022.

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

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

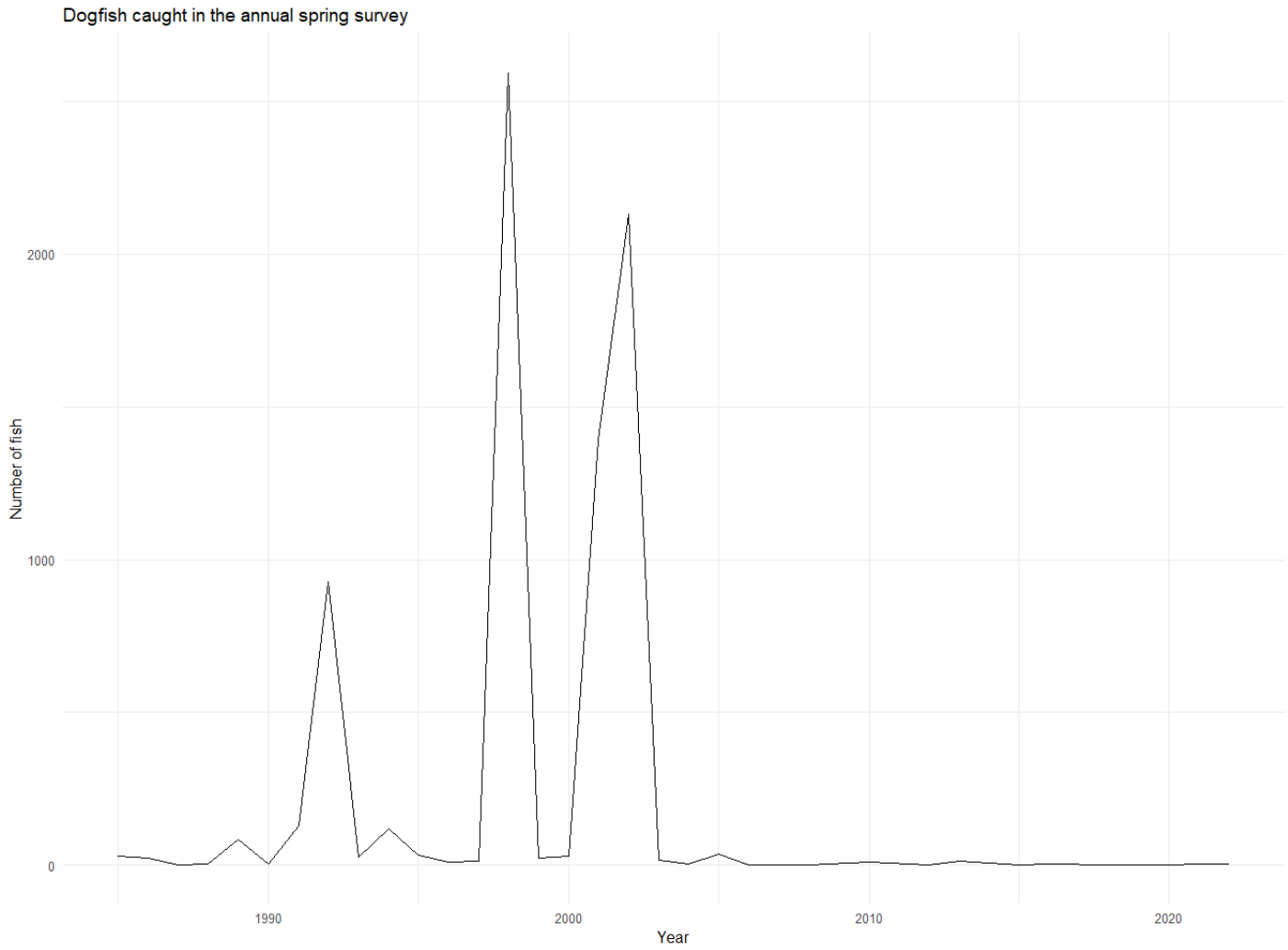


Figure 20. Dogfish caught in the annual spring survey, 1985 to 2022.

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

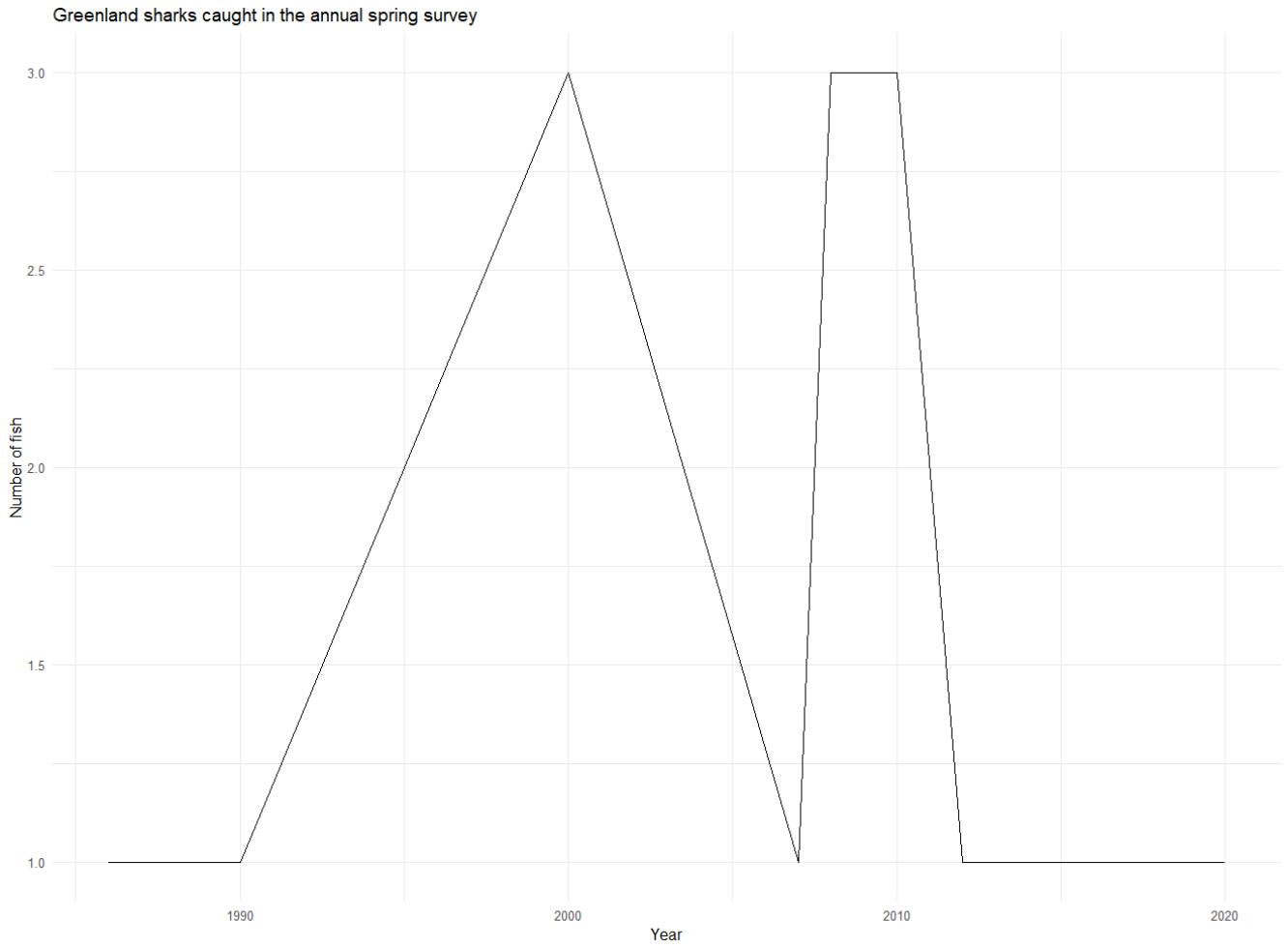


Figure 21. Greenland shark caught in the annual spring survey.

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

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

Trawl impacts

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

The herring fishery being conducted with pelagic gear is not considered to affect bottom sea habitats in any significant way.

Foodweb considerations

In Icelandic waters herring are both a major predator of zooplankton and an important prey species with numerous species of fish, marine mammals and seabirds all being major predators of herring. Herring therefore, are an important part of the ecosystem with many trophic connections. However, the Icelandic marine ecosystem

is not considered to be wasp-waisted due to the presence of several other abundant, high biomass, low trophic level stocks including capelin, mackerel and blue whiting. These other abundant high biomass stocks demonstrate similar levels of trophic connectivity and provide alternative pathways through which energy can be transferred to higher trophic levels. This was shown in a study by Stulodottir et al. in 2018[82] in an 'end-to-end' dynamic ecosystem model of Icelandic waters using the Atlantis framework. In addition, predators of herring are primarily highly mobile, opportunistic feeders that are not reliant exclusively on herring as a food source. The ISS herring stock biomass has been significantly above precautionary limits in recent years reaching its highest estimated levels in the late 2000s before falling recently due to high natural mortality caused by an *Ichthyophonus* infection and poor recruitment. Given the current management regime and based on the harvest strategy assumptions, there is little risk of Icelandic fisheries reducing herring stocks to the point where populations of dependent predators would be adversely affected. The stock is currently above MSY Btrigger as of 2022[83], and spawning stock biomass is expected to increase in the coming years due to better recruitment and large incoming year classes. Available evidence would suggest that indirect impacts of ISS herring fisheries are unlikely to have severe adverse impacts on dependent predators and the integrity of the stock's role in the marine ecosystem is most likely protected.

[82] https://www.sciencedirect.com/science/article/pii/S0165783618301620
[83] https://www.hafogvatn.is/static/extras/images/22-herring1326046.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:	**Overview** 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 organises 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[84] and a discard ban[85]. 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 fishery for herring has a specific regulation.[86] 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. There is some opportunity to transfer herring quotas between years. The management plan includes the measures noted above. It has a harvest rule for deriving the total quota from a stock assessment. The plan includes reference points for biomass and exploitation rate. Such plans are generally developed by Iceland, mostly by the MFRI, and evaluated and endorsed by ICES.
References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.

84 https://island.is/reglugerdir/nr/0745-2016
85 https://www.althingi.is/lagas/nuna/1996057.html
86 Regulation 962/2019: https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/21662

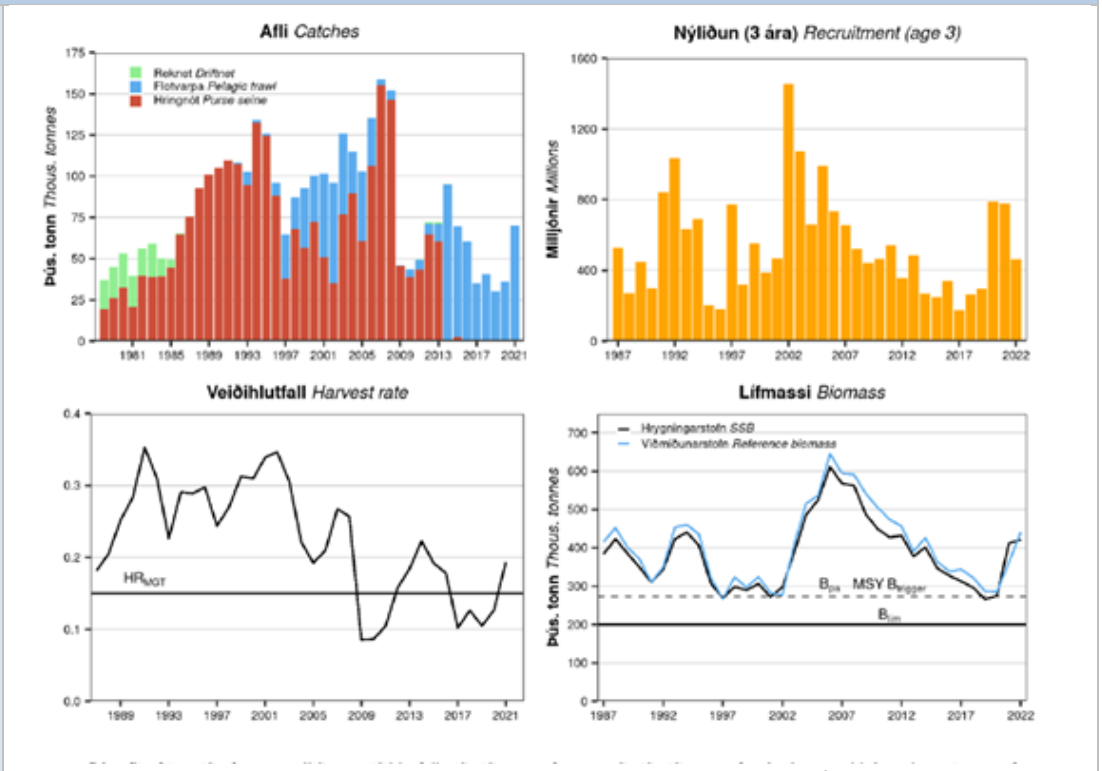
1.1	Fisheries Management System and Plan for Stock Assessment, Research, Advice and Harvest Controls including: – The fisheries management system – The fisheries management plan
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

7.6.2 Clause 1.2 Research and Assessment

1.2	Research and Assessment
Summary of relevant changes:	Icelandic summer spawning herring is a local stock, that is distributed mostly in the Western and Southern part of the coast at locations that have varied over the years, but have been fairly stable for the last 7-8 years. It is assessed using an ADAPT type method from the NOAA assessment toolbox, tuned to an acoustic survey. The method was approved for assessing the herring by ICES in a benchmark process in 2011[87] and has been used consistently since then. It was revisited and endorsed in 2017[88]. Other methods have been applied in parallel for control, recently it was a separable model. The models give very similar results. A new benchmark is planned in 2023. The acoustic survey is split in two parts and is adapted to the current distribution. Catch numbers at age are obtained by splitting the total catch to catch in numbers at age using samples collected at sea by fishermen. Catches in the summer are mixed with Norwegian spring spawning herring, that is separated out by inspection of the gonads, that are quite different at that time. Infection by Ichthyophonus hoferi gives additional mortality, that is estimated from the prevalence of the disease in samples. . The additional mortality has been relatively stable in the recent years. The assessment has been problematic in periods in the past, but has been stable with satisfactory diagnostics in the last 7-8 years. After a long period with declining recruitment and stock biomass, both the 2017 and the 2018 year classes are large. That leads to a recent rise in the SSB and allows increased quota recommendations. The harvest rate has fluctuated around the target value for the last 10 years. At present, it is slightly below the target. The main results of the 2022 MFRI assessment are summarized in the figure below.

87https://ices-library.figshare.com/articles/report/Report_of_the_Benchmark_Workshop_on_Roundfish_and_Pelagic_Stocks_WKBENCH_2011_/19255145

88 https://ices-library.figshare.com/articles/report/Herring_Clupea_harengus_in_Division_5_a_summer-spawning_herring_Iceland_grounds_/19447988?backTo=/collections/ICES_Advice_2022/5796935

1.2	Research and Assessment
	 **Figure 22.** Catch by gear type, recruitment, harvest rate based on reference stock biomass, reference stock biomass (B4+) and spawning stock biomass (SSB). Source: 2022 MFRI stock assessment.[89]
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 following a harvest rule based on precautionary reference points. Reference points were defined by ICES and adopted by Iceland in 2016-17. They are

89 https://www.hafogvatn.is/static/extras/images/22-herring1326046.pdf

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)

tabulated below (Table below).

Table 13. Reference points for herring.

Nálgun *Framework*	Viðmiðunarmörk *Reference point*	Gildi *Value*	Grundvöllur *Basis*
Aflaregla *Management plan*	MGT $B_{trigger}$	200 000 t	Aðgerðarmörk í aflareglu sem standast MSY viðmið ICES *Trigger point in HCR considered consistent with ICES MSY framework*
	HR_{MGT}	0.15	Slembireikningar í aflaregluhermun. Hlutfall af viðmiðunarstofni *Stochastic HCR evaluation. Proportion of age 4+ biomass*
MSY	MSY $B_{trigger}$	273 000 t	B_{pa}
	F_{MSY}	0.22	Slembireikningar í aflaregluhermun. *Stochastic HCR evaluation*
Varúðarnálgun *Precautionary approach*	B_{lim}	200 000 t	Stærð hrygningarstofns þar sem líkur eru á skertri nýliðun *SSB beyond which recruitment becomes impaired*
	B_{pa}	273 000 t	$B_{lim} * e^{1.645\sigma}$, $\sigma = 0.19$
	F_{lim}	0.61	F sem leiðir til B_{lim} miðað við meðal nýliðun *F corresponding to B_{lim} with average recruitment*
	F_{pa}	0.45	$F_{pa} = F_{lim} \times \exp(-1{,}645 \times \sigma)$, $\sigma = 0.18$

The limit biomass has been at 200 000 tonnes for decades, and recent revisions have not revealed strong reasons to change it. Bpa is defined as the 95-percentile of Blim when assuming an assessment error with CV = 0.19. An Flim is derived as the F having a 50% probability of leading below Blim, and Fpa is at the 5-percentile of Flim assuming a CV of 0.18.

There is a harvest rule in place, which was revised, approved by ICES and adopted by Icelandic authorities in 2017 for the next 5 years. The exploitation rate is defined in terms of a harvest rate (HR = Catch/Biomass aged 4+), rather than fishing mortality, which is in line with most Icelandic stocks.

The harvest rule is for herring is shown below:

Advice basis	Iceland management plan Rule 5 (ICES, 2017a; 2017b)
Management plan	The Icelandic Ministry of Industries and Innovation fisheries management plan has been implemented since 2017. The rule has been evaluated by ICES (ICES, 2017b) and is considered to be precautionary and conforms to ICES MSY approach. According to the rule, the TAC for the fishing year Y/Y+1 (1 September of year Y to 31 August of year Y+1) is calculated as follows: *When SSB_Y is equal to or above MGT $B_{trigger}$:* $TAC_{Y/Y+1} = HR_{mgt} \times B_{ref,Y}$ *When SSB_Y is below MGT $B_{trigger}$:* $TAC_{Y/Y+1} = HR_{mgt} \times (\frac{SSB_Y}{MGT\ B_{trigger}}) \times B_{ref,Y}$ The spawning-stock biomass trigger (MGT $B_{trigger}$) is defined as 200 000 tonnes; the reference biomass is defined as the biomass of herring of ages 4 and older, and the target harvest rate (HR_{mgt}) is set to 0.15.

Since the harvest rule limits the exploitation by a applying a constant harvest rate, a biomass target is redundant and not included in the harvest rule. However, a requirement for accepting the rule was that it implied a low (<5%) risk of bringing the SSB below Blim in simulations taking relevant uncertainties into account.

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

7.6.4 Clause 1.4 External Scientific Review

1.4	External Scientific Review
Summary of relevant changes:	ICES[90] is regarded as the relevant scientific body for external scientific review. It organizes stock assessments, performs evaluations of management plans and advises on a wide range of issues within marine science, including fisheries management. The assessment and the management plan for herring were evaluated and approved in 2017. The approved procedures have been followed 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.

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 [91]. Normally, the MFRI advice follows the ICES advice. The Minister of Fisheries and Agriculture decides on the TAC of the herring stock for each fishing year (Sept –Aug) in accordance to law (Fisheries Management Act 116), based on HCR and the advice mentioned above. The minister will generally follow the advice from ICES and MFRI, but has the authority to deviate from the advice if needed. The Icelandic summer spawning herring is a local stock in Iceland.
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.

90 http://www.ices.dk
91 https://www.hafogvatn.is/static/extras/images/22-herring1326046.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[92], is an independent administrative body responsible to the Fisheries Minister, in charge of the day to day implementation of the Act on Fisheries Management and related legislation, for day-to-day management of fisheries and for supervising the enforcement of fisheries management rules. The Icelandic Coast Guard[93] 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[94]). Provisions of the Act on a Special Fee for Illegal Marine Catch[95] are also applied as appropriate. Penalties range from the issue of reprimands by the Directorate of Fisheries and the suspension of commercial fishing permits to fines and, in cases of serious or repeated deliberate violation, imprisonment for up to six years (Article 24 and 25 of Act No. 116/2006). **Summary of relevant updates in 2022** Temporary/sudden closures (generally 2 weeks triggered by high juvenile abundance on fishing grounds) are announced by the Coastguard on VHF radio on a specified wavelength and on the radio before the news and weather. They are also published on the MFRI website. The short-term closure monitoring (and issuing of) was transferred to Fiskistofa in the fall of 2020. Some regulation regarding the short-term closures was also changed in 2020, whereby the trigger size limit was increased for cod, which led to significant decrease in the number of closures. An updated table as provided by the management authorities (MFRI and Fiskistofa) is shown below. **Table 14.** Short term closures in Iceland for the years 2018-2022.

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

[92] https://www.fiskistofa.is/umfiskistofu/
93 http://www.lhg.is/english
[94] https://www.althingi.is/lagas/149a/1996057.html
[95] https://www.althingi.is/lagas/149a/1992037.html

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

Directorate Inspections at Sea

Days spent by Fisheries Directorate inspectors at sea inspecting vessels is shown in Table 10. The number has remained consistent with previous years.

Enforcement by Fiskistofa

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

Table 15. Fiskistofa suspected violations in 2020 and 2021. Source: Fiskistofa 2020[96] and 2021 Annual Report[97]. Note, the information between 2020 and 2021 is not directly comparable, and offenses of a similar nature may have been combined into one case.

Suspected violation	2020 No.	2021 No.
Veiðar án leyfis / Fishing without a permit	14	1
Brottkast / offences	11	70
Vigtun afla / weighing of catch	24	2
þar af vigtun vigtarleyfishafa / of which the weighing by the weighing licensee	9	3
Framhjálöndun / landing	6	1
Afladagbók / logbook	40	91
Vanskil afladagbókar / submitting logbook late	470	
Veiðar án aflaheimilda / Fishing with insufficient catch quotas	6	1
Mál vegna umframafla / Cases due to excess catch * mostly daily allowance in coastal vessels	1321	1456
Lax og silungsveiði / salmon and trout fishing	24	13
Undirmálsfiskur / bottom fish fishing	4	11
Röng tilgreining tegunda / Incorrect identification of species	3	3

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

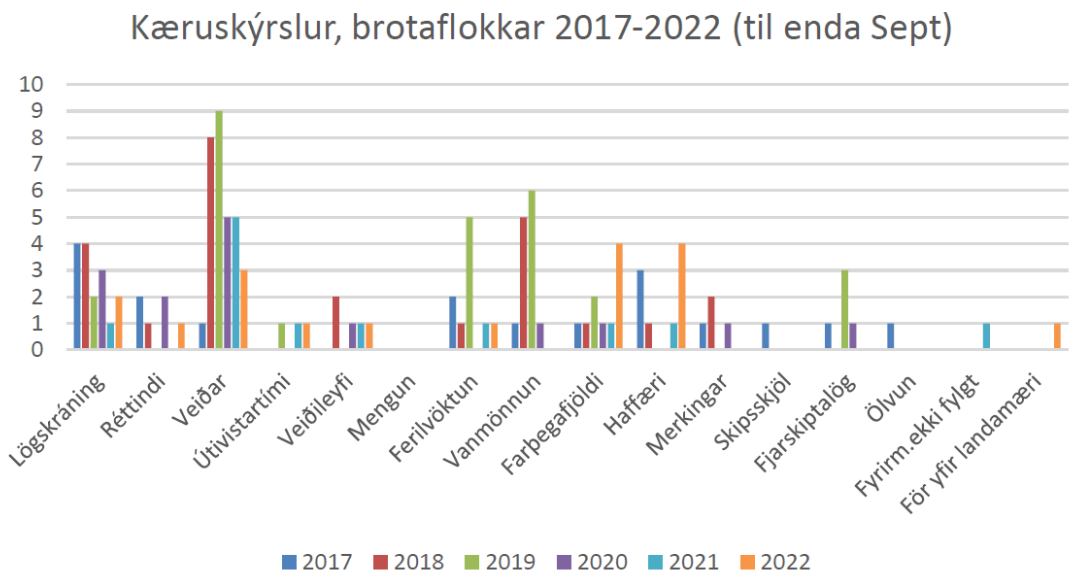
Grásleppuveiðar / Lumpsucker fishing	13	2
Strandveiðar / coastal fishing	42	2
Annað s.s. tilkynningarskylda, löggilding vigtarmanns, vigtun án löggilts vigtarmanns, ónákvæmni við áætlun afla og hindrun eftirlits. / Other s.s. notification obligation, certification of the weigher, weighing without a certified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

Enforcement by the Icelandic Coast Guard

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

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

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

2.1 Implementation, Compliance, Monitoring, Surveillance and Control	
	 **Figure 23.** Overview of ICG infringement reports in 2017- (1st September) 2022. Source: provided by the ICG on the 8th of November 2022. For 2022, infringements on Passenger and Sea Worthiness are most common 4 each, Fishing is next with 3 Apparent Infringements. No apparent infringement were reported in 2022 in the following categories; Mengun /Pollution, Vanmönnun /Manning, Merkingar /Markings, Skipsskjöl /Ships documents, Fjarskiptalög /Communications, Fyrirm.ekki fylgt /Instructions not obeyed or Ölvun /intoxication.
References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

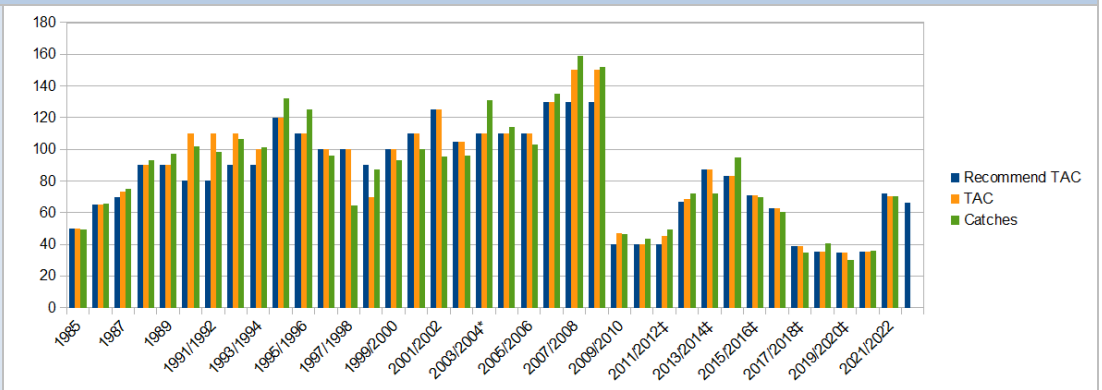
7.6.7 Clause 2.2 Concordance between actual Catch and allowable Catch

2.2 Concordance between actual Catch and allowable Catch	
Summary of relevant changes:	**Context** Catches and landings in Iceland are monitored and recorded in a number of complementary ways. Logbooks, either electronic (e-logs) or standard paper based, depending on the vessel, record landings at sea and these are verified and standardised through physical weighing at accredited weigh stations in landings ports throughout Iceland. Logbooks are compulsory as required by Regulation No.746/2016[98]. These must be electronic (e-logs). Small vessels used to use paper logbooks until late 2020 when regulation 298/2020[99] implemented the use of an electronic app. The App also called Afladagbókina or catch

[98] https://www.stjornartidindi.is/Advert.aspx?RecordID=42a16a67-60a7-4ae7-ad7c-0f53fc254654
[99] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/21887

2.2	Concordance between actual Catch and allowable Catch
	diary[100] [101] 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 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)[48]. **2022 updates** The Minister of Fisheries and Agriculture decides on the TAC of the cod 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. In recent years, TACs have been set close to the advice and catches have been close to the TAC (figure below). Both have been stable around 30-40 000 tonnes since the 2017/2018 season. For the present and coming seasons, the recommendation is a higher TAC, as the stock is increasing due to better recruitment, in particular a strong 2017 year class which now enters the reference biomass at age 4.

[100] http://www.fiskistofa.is/umfiskistofu/frettir/afladagbokin-smaforrit-fyrir-rafraena-skraningu-afla
[101] 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
	 **Figure 24.** TACs and catches of Icelandic summer spawning herring.
References:	Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard	The fishery continues to remain consistent with the standard.

7.6.8 Clause 2.3 Monitoring and Control

2.3	Monitoring and Control including: 2.3.1 Vessel registration and catch quotas 2.3.2 Fishing vessel monitoring and control systems 2.3.3 Catches are subtracted from relevant quotas 2.3.4 Rules are enforced 2.3.5 Analysis is carried out
Summary of relevant changes:	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[102]. 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)

[102] 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	

2. Compensations (quota gained/lost through compensations)
3. Quota transferred from the previous year (this may be a negative balance)
4. Quota transferred between vessels (a negative balance indicates an outward transfer of quota (i.e. quota transferred to other vessels) while a positive balance indicates an inward transfer of quota (i.e. quota gained from other vessels)
5. Allowed catch (the sum of 1 to 4 above)
6. Catch (vessels landings in the season to date of that species)
7. Balance (Allowed catch - Catch)
8. Overfished

Specific data on each Icelandic quota species, its allocation to ITQ holders, transfer information, balances and catches to date is available at http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/aflastodulisti.jsp?lang=en. Registered catches are based on information from ports of landing and information on catches exported unprocessed. The catch statistics are published, subject to change, once they have been compared to submitted logbooks and reports from buyers, and are available on the Fisheries Directorate website. Accordingly, information on the size and composition of the fleet of fishing vessels is available and documented, and the catch quota of each vessel or vessel group, along with the fishing year is recorded in the official central database (GAFL) in a transparent manner and is publicly accessible.

The Icelandic Coast Guard, working closely with the Fisheries Directorate, administers an integrated monitoring, control and surveillance system which covers the activities of Icelandic and foreign fishing vessels, using VMS for all Icelandic vessels and for all foreign vessels. Fishing gear is subject to inspection, as well as the composition of the catch and its handling onboard the fishing vessels. At-sea inspections are undertaken during boardings by the Coast Guard and on fishing trips accompanied by the inspectors of the Fisheries Directorate. The Coast Guard undertakes unannounced inspections at sea and check logbooks during these boardings. Fisheries Directorate inspectors also make unannounced checks of logbooks during port inspections. The Coast Guard uses several different but complementary electronic vessel monitoring systems including satellite-based systems comprising VMS and use of satellite imagery, the monitoring of coastal activity through a dedicated land-based very high frequency (VHF) system and the use of the Automatic Identification System (AIS), and more recently drones.

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

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
	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[103]. In addition to the landing, weighing and registration system for catches, export documentation provides an independent comparative check on catch quantities. Analysis of catches includes the comparison of reported catches with the amount of sold or exported products to verify independently that reported landings aligned accurately with those reported. If comparison reveals discrepancies in reported and actual landings received from quayside weighing by registered weighers corrective action is taken as appropriate and Fiskistofa can send inspectors to verify for issues. **Updates for 2022** In late 2021 Fiskistofa reported that a new data department has been created to allow for further data analysis relating to catch recording and day to day implementation of management measures, ultimately to improve the ability to detect discrepancies and enforce regulations. Aside from the above, the monitoring and control systems remain largely unchanged since the previous surveillance. The only other update for 2022 relates to the progress to address the minor non-conformance raised against Clause 2.3.2.4 . **Non-conformance #1 (Clause 2.3.2.4: Minor Non-conformance). Although required by legislation, there is some evidence of non-reporting/under-reporting of seabirds and marine mammals bycatch such that the Assessment Team cannot be fully confident that catch amounts by species and fishing area (of marine mammals and seabirds) are estimated and continually recorded in fishing logbooks.** One important development in terms of corrective action is the development and use of an app to facilitate catch and bycatch recording in smaller vessels. Fiskistofa, the MFRI and the Client group representative confirmed that starting in September 2020, smaller Icelandic vessels are required to log their catches in a phone/tablet app (essentially an e-logbook) which contains information on catch and bycatch, including that of marine mammals and seabirds. This follows regulation

[103] 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	
		298/2020[104]. The App also called Afladagbókina or catch diary[105] [106] automatically records the location of the boat during fishing and the captains then records the catch, its condition and by-catch, in a very simple way. The app replaces paper logbooks in the small boat sector, with an electronic catch recording system. Updates from 2021 (previous surveillance audit) and 2022 (current surveillance audit are provided below for full context: **2021 Updates.** In November 2021, the system continued to be used in the small vessel sector and catch with bycatch data being collected by Fiskistofa and sent to MFRI for management purposes. MFRI staff reported that data from the App is in the process of being made available to the MFRI through MFRI/Firskistofa IT staff collaboration. Fiskistofa also reported as part of the 2nd surveillance audit that since the beginning of the App's implementation it has been mandatory to register all catch and bycatch according to regulation 298/2020 and the data is being received by the authorities. Their inspectors have been busy training fishermen and captains at the quaysides during landing, and their helpline was quite busy in the beginning of the coastal fleet season. Also, one physical meeting was held in Akranes with coastal fishermen. A tutorial video on the use of the App was also published on the Fiskistofa website https://www.fiskistofa.is/ymsaruppl/tilkynningar/afladagbokarapp-myndband and on the Fiskistofa Facebook site[107]. Furthermore, a traceability component to the App has been implemented in April 2021 which is been used to further help with the detection of discrepancies in catch records and to allow better traceability across the supply chain. This traceability component is currently subject to further development. **2022 Updates.** The App is no longer operated/managed by Fiskistofa. The companies Aflarinn, Trackwell and Fontos are now operating the small vessels App. Fiskistofa noted during the October 2022 on site meeting that this data is being sent to the MFRI. However, the MFRI stated that although work is ongoing to getting access to that data stream, staff in charge of bycatch analysis (i.e. Dr Guðjón Már Sigurðsson) does not yet have access to the data from the App. All in all, since implementation of the App it is not clear if bycatch information a) is being collected and b) received by the relevant science authorities in charge of data analysis. **Status:** Open, Corrective Actions in place to be reviewed annually in subsequent audits. **Progress is deemed to be behind schedule and a revised corrective action has been requested from the Client.** A corrective action plan against this non-conformance has been provided under the Non Conformances and Corrective Action Section of this report. Please refer to it for further detail on the non-conformance, the corrective action plan and the corrective evidence supplied during this audit.

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

2.3	Monitoring and Control including: 2.3.1 Vessel registration and catch quotas 2.3.2 Fishing vessel monitoring and control systems 2.3.3 Catches are subtracted from relevant quotas 2.3.4 Rules are enforced 2.3.5 Analysis is carried out	
References:		Please refer to the footnotes and references in the text above, the summary/background section and the Reference section at the end of this document.
Statement of continuing consistency to the IRF Fishery Standard		The fishery continues to remain consistent with the standard.

Section 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 fishery has been dominated by pelagic trawls in recent years, but both purse seine and pelagic trawls are considered 'clean' fisheries with relatively little bycatch. The bycatch species /associated catch to the ISS herring fishery are blue whiting, capelin, mackerel and Norwegian spring spawning herring. The status of these species has been updated and is shown in **Table 12**. **Endangered, Threatened and Protected (ETP) and vulnerable species interactions** The discard prohibition only applies to commercially important species and protected species including Atlantic halibut (*Hippoglossus hippoglossus*)[108] and porbeagle (*Lamna nasus*), basking shark (*Cetorhinus maximus*) and spurdog (*Squalus acanthias*)[109] unless they are captured alive in which case they must be released and systematic recording of non-commercial by-catch has not occurred. Measures have been taken in recent years to extend the inspector programme to cover by-catch such as elasmobranchs (pers. comm. MFRI, site visit) and records for by-catch species including skate (*Dipturus batis*), Atlantic halibut, dogfish, Greenland shark (*Somniosus microcephalus*) and porbeagle (*Lamna nasus*) can be seen in the catch data available via the Directorate website (http://www.fiskistofa.is/english/quotas-and-catches/catches-in-individual-species/). These are seen to be either vulnerable or endangered, threatened or protected (ETP) species. However, these species are unlikely to interact significantly with the gears used in the ISS herring fishery and in the last 5 year, there were no landings of these species reported in pelagic gears (2017 to 2021) based on Fiskistofa records. ISS herring is important for killer whale (*Orcinus orca*) which in Iceland mainly prey upon herring and mackerel. There are on-going studies documenting this association (Sammara *et al.*, 2017 cited in[110]). Fishermen report that killer whale are generally not seen during trawling for ISS herring. They are frequently observed during the purse seine fishery but fishermen report that interactions with the gear are rare. Adult killer whales are generally able to make their own way out of the net but can cause significant damage if they are caught and need to be cut free. If it looks likely that a killer whale will be caught the gear is released to prevent damage to it (pers. com. site visit). In relation to understanding of their population and its status, the last review of killer whales in the North Atlantic dates from 1987. The NAMMCO Scientific Committee recommended in their last meeting that a review be undertaken of all available information and current research activities on abundance, stock structure, and movements of killer whales in the North Atlantic in readiness for their next meeting. Initial abundance estimates for Icelandic waters range from 4,000-6,847 killer whales but these estimates may include killer whales from several populations over large

[108] Regulation 470/2012. https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/18302
[109] Regulation 456/2017. https://www.reglugerd.is/reglugerdir/eftir-raduneytum/atvinnuvega--og-nyskopunarraduneyti/nr/0456-2017
[110] NAMMCO (2017). North Atlantic Marine Mammal Commission. Report of the 24th Scientific Committee meeting, 14-17 November 2017. https://nammco.no/wp-content/uploads/2018/01/08-nammco-26-scientific-committee-report.pdf

3.1	Guiding Principle
	areas. A recent study identified a minimum of 314 individuals regularly using the waters off the southern and west coasts of Iceland (Tavares *et al*., 2016 cited in[111]) and the MFRI, through their long-term killer whale project, have published a catalogue containing over 400 killer whale individuals identified between 2006 and 2015 on their website in 2017. Killer whale research continues in Iceland and is documented in the NAMMCO 2019 Iceland progress report. [112] Killer whale research continues in Iceland and is documented in the NAMMCO 2021 Iceland progress report[113] as follows: In 2021, the University of Iceland (UI) and the Icelandic Orca Project conducted a field season in Vestmannaeyjar during June, July and August, continuing the long-term project on killer whales started in 2008. The current focus of the project is to investigate dietary specialization on killer whales, to observe interspecific interactions with pilot whales and to investigate the acoustic behaviour of killer whales. Tagging with tags was also conducted during the summer field season as well as playback experiments of pilot whale sounds to killer whales to investigate their interspecific interactions. Land-based observations also allowed for broader monitoring of variations in the occurrence of killer whales and other cetaceans in the local marine ecosystem. In January 2014, year-round systematic data collection on killer whales via photo identification in the waters off the Snæfellsnes peninsula started, with the primary aim of recognizing individual killer whales and documenting their associations and behaviour. This will potentially aid in identifying critical habitat or important feeding grounds, feeding behaviour, prey types, natural mortality and behavioural patterns of the Icelandic killer whale population. The project is the collaboration of West Iceland Nature Research Centre, Láki Tours and Orca Guardians. The species is listed as 'Least Concern' on the Icelandic (2018) and Norwegian (2015) national red lists and as 'Data Deficient' on the IUCN Red List for both the European and global stock in the most recent assessments (2007 and 2017, respectively)[114]. The species is listed as 'Least Concern' on the Icelandic (2018) and Norwegian (2015) national red lists and as 'Data Deficient' on the IUCN Red List for both the European and global stock in the most recent assessments (2007 and 2017, respectively)[115]. Although evidence of the degree to which ISSH fisheries and marine mammals interact is sparse, available evidence would indicate that, in Icelandic waters, direct mortality of marine mammals as a result of interactions with pelagic fishing gears used in the fishery is likely to be low and unlikely to have detrimental effects at the population level. Notwithstanding the above we provide here below some updates on vulnerable and ETP species bycatch that have a bearing on information availability from the Icelandic fleets and risk from the most important gear types (gillnet and longline).

[111] NAMMCO https://nammco.no/topics/killer-whale/#1475844082849-433d5060-e5a9

[112] https://nammco.no/wp-content/uploads/2020/03/npr-is_national-progress-report-2019-iceland_nammco28-20205.pdf
[113] https://nammco.no/wp-content/uploads/2022/03/2021-nammco-iceland_progress_report_revised.pdf
[114] https://nammco.no/topics/killer-whale/
[115] https://nammco.no/topics/killer-whale/

3.1 Guiding Principle	
	Harbour Porpoises (*Phocoena phocoena*) Harbour porpoises are classified as Least Concern in the IUCN Red List[116] (population trend unknown, last assessed in 2020). They are also classified as Least Concern in the Icelandic National Redlist (based on a 2016 assessment)[117]. 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[118] and down to about 750 animals in 2014-2015. Results based on close kin mark recapture genetics indicates that the population has increased substantially in recent years.[119] The 2019 Report of the NAMMCO Scientific Committee Working Group on Harbour Porpoise (19-22 March 2019)[120] reported the following about the Icelandic harbour porpoise population. After reviewing the assessment and noting the recent decline in bycatch, the WG agreed that there was no specific cause for concern for harbour porpoises in Iceland. However, they also concluded that the lack of time and expertise meant they were not in a position to provide management advice on sustainable removals. In 2022 the same group provided the following update[121]:" Sigurdsson indicated that a population estimate of harbour porpoise in Iceland waters was available from an aerial survey conducted in 2007, but noted that the survey was incomplete and the abundance estimate obtained then was probably an underestimate. Sigurdsson informed the WG about plans to conduct an aerial survey in July 2023 to obtain updated abundance estimates for harbour porpoise in Iceland. The group commanded the planning of such a survey. Given that abundance estimates from the NASS surveys may not be usable for harbour porpoise in Iceland, the group agreed that the 2023 abundance estimate be the one used in the future Icelandic assessment. Sigurdsson indicated that previous work using close kin Mark-Recapture genetics and presented at the 2018 NAMMCO/IMR International Workshop on harbour porpoise indicated that the Icelandic population was increasing. Sigurdsson informed the WG that around 500 animals were by-caught annually in the Icelandic lumpsucker fishery and 1500-2000 in the cod fishery, noting that by-catch levels were much higher in the past. Sigurdsson informed the WG that Iceland was also conducting isotopic work and investigating the diet of harbour porpoise using samples from by-caught and stranded animals. Life history parameters and age distribution histograms are possible to infer from these samples. The group recommended that an assessment for Iceland be made when the new abundance estimate becomes available. Sigurdsson informed the WG of the by-catch time series available in Iceland, including some back calculated by-catch estimates, and presented at the international harbour porpoise workshop in 2018. As in the case of Norway, the group recommended Iceland to generate the best back-

[116] https://www.iucnredlist.org/species/17027/50369903
[117] https://www.ni.is/node/27406
[118] 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
[119] North Atlantic Marine Mammal Commission and the Norwegian Institute of Marine Research. (2019). Report of Joint IMR/NAMMCO International Workshop on the Status of Harbour Porpoises in the North Atlantic. Tromsø, Norway. https://nammco.no/wp-content/uploads/2020/03/final-report_hpws_2018_rev2020.pdf
[120] NAMMCO (2019). Report of the NAMMCO Scientific Committee Working Group on Harbour Porpoise, 19-22 March, Copenhagen, Denmark. https://nammco.no/wp-content/uploads/2019/02/final-report_hpwg-2019.pdf
[121] NAMMCO-North Atlantic Marine Mammal Commission (2022). Report of the Scientific Committee Working Group on Harbour Porpoise. November 2022, Oslo, Norway. https://nammco.no/wp-content/uploads/2023/01/final-report-hpwg-2022_with-exsum.pdf

3.1	Guiding Principle

calculated bycatch estimates (i.e., generate a time series going back to the beginning of the fishery) for the upcoming Icelandic assessment, planned for 2024."

Harbour seals

The MFRI 2021 advice for harbour seals[122] indicates that the 2020 harbour seal census resulted in a population estimated of 10,319 animals (95% confidence intervals: 6,733-13,906). The current population estimate is 69% lower than the first abundance estimate from 1980 and the estimate is 14% under the management objective of 12 thous. Animals (Hafrannsóknastofnun 2021). In 2019, new regulation regarding seal hunting in Iceland was enacted (Atvinnuvega- og nýsköpunarráðuneytið 2019). All seal hunting is banned, but it is possible to obtain an exemption for traditional hunt. It is also forbidden to sell Icelandic seal products. Bycatch in gillnets is probably the highest mortality risk for harbour seals in Iceland currently. Limited data are available on seal bycatch, but data collected by on-board observers of the Directorate of Fisheries, and in the MFRI gillnet survey, indicate that on average, 1389 (coefficient of variation, CV=35) harbour seals have been bycaught annually in the lumpfish fishery between 2014 and 2018. Bycatch in cod gillnet fishery and bottom trawls is less common and more uncertainty associated with the bycatch estimates in those fisheries. Between 2014 and 2018, it has been estimated that annually, 15 harbour seals were bycaught in cod gillnet fisheries (CV=102) and 17 harbour seals in bottom trawls (CV=100) (Hafrannsóknastofnun, 2019). Negative effects from the cod gillnet fisheries (and associated fisheries that land fish in those nets) are considered to be very limited.

Other marine mammals

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

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

Pingers testing

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

Sharks

Generally speaking, landed catches of sharks remain quite small. Some catch of leaf scale gulper sharks has been recorded, last in 2016. Survey trends are presented below from MFRI data. Grey

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

3.1 Guiding Principle	
	skate (*Dipturus flossada / batis*) survey abundance is variable but has been on average relatively stable in recent years. The MFRI spring survey caught 56 t in 2019, 43 t in 2020, 32 t in 2021 and 69 t in 2022. Fishery landed catch of Grey skate was 160 t in 2020 and 158 t in 2021. Landed catch of dogfish (*Squalus acanthias*) was 1 t in 2019 and 3 t in 2020, and 0.9 t in 2021. Survey trends are very sporadic. No Greenland sharks (*Somniosus microcephalus*) were caught in the 2020-2022 surveys. Around 16 tonnes of them were landed in both 2020 and 2021. Around 3.6t of porbeagle (*Lamna nasus*) were landed in 2020 and 2.3t in 2021. Porbeagles are rarely caught in surveys, but two were caught in the autumn survey in 2021. No records of basking sharks are available in catch or surveys. Few have been recorded by onboard inspectors, last one in 2005. **Foodweb considerations** In Icelandic waters herring are both a major predator of zooplankton and an important prey species with numerous species of fish, marine mammals and seabirds all being major predators of herring. Herring therefore, are an important part of the ecosystem with many trophic connections. However, the Icelandic marine ecosystem is not considered to be wasp-waisted due to the presence of several other abundant, high biomass, low trophic level stocks including capelin, mackerel and blue whiting. These other abundant high biomass stocks demonstrate similar levels of trophic connectivity and provide alternative pathways through which energy can be transferred to higher trophic levels. This was shown in a study by Stulodottir et al. in 2018[123] in an 'end-to-end' dynamic ecosystem model of Icelandic waters using the Atlantis framework. In addition, predators of herring are primarily highly mobile, opportunistic feeders that are not reliant exclusively on herring as a food source. The ISS herring stock biomass has been significantly above precautionary limits in recent years reaching its highest estimated levels in the late 2000s before falling recently due to high natural mortality caused by an *Ichthyophonus* infection and poor recruitment. Given the current management regime and based on the harvest strategy assumptions, there is little risk of Icelandic fisheries reducing herring stocks to the point where populations of dependent predators would be adversely affected. The stock is currently above MSY Btrigger as of 2022[124], and spawning stock biomass is expected to increase in the coming years due to better recruitment and large incoming year classes. Available evidence would suggest that indirect impacts of ISS herring fisheries are unlikely to have severe adverse impacts on dependent predators and the integrity of the stock's role in the marine ecosystem is most likely protected.
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.

[123] https://www.sciencedirect.com/science/article/pii/S0165783618301620
[124] https://www.hafogvatn.is/static/extras/images/31-capelin-autumn1345531.pdf

7.6.10 Clause 3.2 Specific Criteria

3.2	Specific Criteria including: 3.2.1 Information gathering and advice 3.2.2 By-catch and discards 3.2.3 Habitat Considerations 3.2.4 Foodweb Considerations 3.2.5 Precautionary Considerations
Summary of relevant changes:	**Context and updates** Information is available on the legal specification of fishing gear in the Icelandic groundfish fishery. The primary aim of fishing gear regulations is size selectivity with a secondary aim being species selectivity. Gears are regulated in several ways to regulate both size and species selectivity. The MFRI provide advice for 40 fish stocks in Iceland as well as advice for harvest of marine mammal species (e.g. fin whale and common minke whale). Their most recent advice(i.e. 2022), which include results 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.[125] There have been no changes in the gear used in Icelandic waters. Fiskistofa and the Client group confirmed that longliners use night settings and lasers of sounds cannons to keep birds off the longlines, while trawlers use semi-pelagic trawl doors and rock hoppers to decrease drag on the seabed to save fuel and decrease gear habitat contact. Gillnetters are mainly restricted through area closures. The status of bycatch and associated species has been detailed in the previous clause. Spotted wolffish is depleted and subject to corrective actions to reverse the trend. Vulnerable species effects are considered generally limited and not significantly affecting any of the species listed by OSPAR, or the marine mammals and seabirds regularly caught in the gillnet fisheries (mostly in lumpfish). According to section 2 of Act no. 57/1996, concerning the treatment of commercial marine stocks, discard of catches (although with minor exceptions) is prohibited, hence the very vast majority if not all catches are landed. Actual discards are illegal and considered relatively small in Icelandic waters. Discarding violations are subject to penalty ranging from ISK 400K to 8M. One feature of this ban is that it has some inbuilt flexibility, as any 5% of demersal catches from a fishing trip (called VS catch), irrespective of fish species or size, may be excluded from quota restriction (which means that VS catches are additional to the TAC). On sale of VS catches in public fish markets 20% of the revenue generated is paid to the vessel with the remaining 80% going to a designated research and development fund (the VS fund, under the auspices of the Ministry). A maximum of 20% return on VS catches means that there are limited incentives for fishermen to land such catches. Key habitat considerations are listed in the yearly ICES ecosystem report for the Icelandic waters, the last of which was published in 2022[126]. Key findings summarised in the report highlight that using vessel monitoring system (VMS) and logbook data ICES estimates that mobile bottom trawls used by

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

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

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	
		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** In Icelandic waters herring are both a major predator of zooplankton and an important prey species with numerous species of fish, marine mammals and seabirds all being major predators of herring. Herring therefore, are an important part of the ecosystem with many trophic connections. However, the Icelandic marine ecosystem is not considered to be wasp-waisted due to the presence of several other abundant, high biomass, low trophic level stocks including capelin, mackerel and blue whiting. The stock is currently above MSY Btrigger as of 2021[127], and spawning stock biomass is expected to increase in the coming years due to better recruitment and large incoming year classes. Available evidence would suggest that indirect impacts of ISS herring fisheries are unlikely to have severe adverse impacts on dependent predators and the integrity of the stock's role in the marine ecosystem is most likely protected.
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.

[127] https://www.hafogvatn.is/static/extras/images/22-herring1259461.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 full assessment audit[128] of this fishery in 2019 (of the first certification cycle), all clauses but one was found to be in full conformance. In this respect, one minor non-conformance was identified against clause 2.3.2.4 of the IRFM Standard (V2), relating to the appropriate recording of marine mammal and seabird bycatch data in fishing logbooks. Progress against the NC for this 3rd Surveillance is specified below, but has been found to be behind target. No new non-conformances were identified during this 3rd Surveillance.

Non-conformance 1 (of 1)	
Clause:	2.3.2.4. Catch amounts by species and fishing area shall be estimated and continually recorded in fishing logbooks on-board the fishing vessels
Non-conformance level:	Minor Non-conformance
Non-conformance:	Although required by legislation, there is evidence of extensive non-reporting/under-reporting of seabirds and marine mammals bycatch such that the Assessment Team cannot be confident that catch amounts by species and fishing area (of marine mammals and seabirds) are estimated and continually recorded in fishing logbooks.
Rationale:	The recording of marine mammals and seabirds by number and species is required by Icelandic regulation[129]. 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[130] and the March 2018 MFRI report titled: "Bycatch of Seabirds and Marine Mammals in lumpsucker gillnets 2014-2017". Pallson *et al.* 2015 highlighted the fact that their bycatch estimates were based on limited data that needed to be increased and improved with a functioning reporting system for the fishery and better follow up.

[128] https://www.responsiblefisheries.is/media/1/form-11.2-iceher-initial-assessment-final-report-and-determination.pdf
[129] https://www.reglugerd.is/reglugerdir/eftir-raduneytum/sjavarutvegsraduneyti/nr/18967
[130] https://www.hafogvatn.is/static/research/files/fjolrit-178.pdf

	The MFRI 2018 report found that although reported bycatch in E-logbooks by the fleet has increased (suggesting better compliance with reporting requirements) the overall bycatch rates are still much lower than observed in the trips by inspectors. Overall, the marine mammal and seabird bycatch rate during inspector trips was around four times higher than reported by the fleet in 2017[131]. 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**

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

To whom it may concern

ATVINNUVEGA- OG
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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).

<table>
<tr><td></td><td>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.</td></tr>
<tr><td>Assessment Team CAP response</td><td>The Assessment Team has accepted the Corrective Action Plan provided by the Client for the fishery under assessment.</td></tr>
<tr><td>Progress at 1st Surveillance (2021) – year 1</td><td>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[132]. The App was designed and trialled between 2018 and 2020. The App also called Afladagbókina or catch diary[133] [134]automatically records the location of the boat during fishing and the captains then records the catch, its condition and by-catch, in a very simple way. The app replaces paper logbooks in the small boat sector, with an electronic catch recording system. It is expected that this app will make the recording of bycatch easier for the fleet.

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

Bycatch of marine mammals and seabirds by gear type in 2016-2019 as reported by the fishing fleet. Source MFRI, January 2021.
<table>
<tr><th colspan="6">Cod and Greenland halibut gillnets</th></tr>
<tr><td>Species</td><td>2016</td><td>2017</td><td>2018</td><td>2019</td><td>Total</td></tr>
<tr><td>Harbour porpoise</td><td>52</td><td>45</td><td>48</td><td>26</td><td>171</td></tr>
<tr><td>White beaked dolphin</td><td>1</td><td>0</td><td>0</td><td>1</td><td>2</td></tr>
</table>
</td></tr>
</table>

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

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 1, 1st Surveillance (2021) Corrective Evidence	**The Assessment Team has determined that the information supplied is sufficient to meet the original CAP deliverable for year 1 and 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 2 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[135]. Furthermore, a traceability component to the App has been implemented in April 2021 which is been used to further help with the detection of discrepancies in catch records and to allow better traceability across the supply chain. This traceability component is currently subject to further development.
Assessment Team Determination on Year-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 3rd surveillance activities will review evidence of continuous implementation of the App in the small vessel sector.**
Year 3 progress (3rd Surveillance, late 2022)	**2022 Updates.** The App is no longer operated/managed by Fiskistofa. The companies Aflarinn, Trackwell and Fontos are now operating the small vessels App. Fiskistofa noted during the October 2022 on site meeting that this data is being sent to the MFRI. However, the MFRI stated that although work is ongoing to getting access to that data stream, staff in charge of bycatch analysis (e.g. Dr Guðjón Már Sigurðsson) do not yet

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

	have access to the data from the App. All in all, since implementation of the App it is not clear if bycatch information a) is being collected in the fleet and b) received by the relevant science authorities in charge of data analysis.
Assessment Team Determination on Year-3 Corrective Evidence	**Status in late 2022. Progress is deemed to be behind schedule and a revised corrective action has been requested from the Client.**

8.1.1 New non-conformances

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

8.1.2 New or revised corrective action plans

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

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

Icelandic Commercial Fishery

IRF Client Action Plan

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

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

ACTION

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

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

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

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

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

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

1) *Spotted wolffish:*

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

ACTION

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

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

2) *Common loon*

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

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

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

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

Reykjavík, February 16th 2023

On behalf of Fisheries Iceland,

Hrefna Karlsdóttir

Support letters from MFRI and Fiskistofa

MARINE & FRESHWATER
RESEARCH INSTITUTE

To whom it may concern

Date: 15.02.2023
Ref:V2023-02-0106

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

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

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

On behalf of the Marine and Freshwater Research Institute,

Þorsteinn Sigurðsson
Director

HAFRANNSÓKNASTOFNUN
Rannsókna- og ráðgjafarstofnun hafs og vatna
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Akureyri 15 February 2023

To whom it may concern

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

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

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

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

Ögmundur Knútsson PhD
CEO Directorate of Fisheries

Assessment Team determination on the revised CAP

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

8.1.3 Update on Recommendations

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

Recommendation 1 (of 1)	
Clause:	1.3.1.2
Recommendation:	At present, the management plan does not have an explicit revision clause; therefore, the Assessment Team recommends that a revision clause be incorporated in the management plan, to account for situations where SSB approaches B_{lim}. This is also important because the harvest rule does not specify a reduction in harvest rate before B_{lim} is reached, and simulations did not take into account declining recruitment in the last decade.
Rationale:	Reducing the harvest rate before B_{lim} is reached
Progress against Recommendation:	A new stock assessment benchmark process is planned for 2023.

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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10.1 Appendix 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.