FAO-BASED RESPONSIBLE FISHERY MANAGEMENT CERTIFICATION SURVEILLANCE REPORT

For The

Icelandic Haddock Commercial Fishery (200 nm EEZ)

Facilitated By the

Iceland Responsible Fisheries Foundation

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i. Summary and Recommendations

The Iceland Responsible Fisheries Foundation on behalf of the Federation of Icelandic Fishing Vessel Owners (LÍÚ), the Federation of Icelandic Fish Processing Plants (SF) and the National Association of Small Boat Owners, Iceland (NASBO) requested assessment of the Icelandic haddock (*Melangrammus aeglefinus*) commercial fishery to the FAO Based Icelandic Responsible Fisheries Management (IRFM) Certification Programme. Certification was granted the 23rd of January 2015.

This report is the 1st Surveillance Report (ref: ICE/HAD/001.1/2015) for the Icelandic haddock commercial fisheries. The objective of the Surveillance Report is to monitor for any changes/updates in the management regime, regulations and their implementation, stock assessment and status, and wider ecosystem considerations since the previous assessment and to determine whether these changes and performance and current practices remain consistent with the overall confidence rating scorings of the fishery allocated during initial certification. In addition, any areas reported as "items for surveillance" or corrective action plans (following identified non-conformance) in the previous assessment are reassessed and a new conclusion on consistency of these items with the IRFM Specification is given accordingly.

The unit of certification includes the Icelandic haddock (*Melangrammus aeglefinus*) commercial fishery, under state management by the Icelandic Ministry of Industries and Innovation, fished directly by demersal trawl (main gear), long-line, gill net, Danish seine net, and hook and line by small vessel gear and indirectly with Nephrops, shrimp and pelagic trawls and purse seines within Iceland's 200 nautical miles Exclusive Economic Zone (EEZ).

The assessment was conducted according to the Global Trust procedures for FAO – Based IRFM certification using the Fundamental Clauses of the Icelandic Responsible Fisheries Management Specification (Version 1, Revision 1, March 2014) as the base template for surveillance assessment reporting. The IRFM Specification is based on the 1995 FAO Code of Conduct for Responsible Fisheries and on the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries adopted in 2005 and amended/extended in 2009, which in turn are based on the current suite of agreed international instruments addressing fisheries, in particular the 1982 UN Convention on the Law of the Sea, the 1995 UN Fish Stocks Agreement, related documentation including the 2001 Reykjavik Declaration on Responsible Fisheries in the Marine Ecosystem, as well as various other relevant documents from ISO and other sources.

The Certification and Accreditation Programme is based on internationally accredited, ISO/IEC 17065 Standards, which assure consistent, competent and independent certification practices. Formal ISO/IEC 17065 accreditation by an IAF (International Accreditation Forum) Accreditation body gives the Programme formal recognition (since September 2014) and a credibility position in the International marketplace and ensures that products certified under the Programme are identified at a recognised level of assurance.

Demonstration of compliance is verified through a rigorous assessment by a competent, third party, accredited certification body. The purpose of the Programme is to provide the fishing industry with a 'Certification of Responsible Fisheries Management" at the highest level of market acceptance.

Certification to requirements under the Programme demonstrates a commitment that will communicate to customers and consumers the responsibility of fishermen and fisheries management authorities and the provenance of Icelandic fish.

The assessment was conducted by a team of Global Trust appointed Assessors comprising of two externally contracted fishery experts and Global Trust internal staff. Details of the assessment team are provided in Appendix 1. The main Key outcomes have been summarised in Section 5 "Assessment Outcome Summary".

ii. Assessment Team Details

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1. Introduction

This Surveillance Report documents the 1st Surveillance Assessment (2015) of the Icelandic haddock commercial fisheries originally certified in October 2014, and presents the recommendation of the Assessment Team for continued FAO-Based IRFM Certification.

The unit of certification includes the Icelandic Haddock (*Melangrammus aeglefinus*) commercial fishery, under state management by the Icelandic Ministry of Industries and Innovation, fished directly by demersal trawl, long-line, gill net, Danish seine net, and hook and line by small vessel gear and indirectly with Nephrops, shrimp and pelagic trawls and purse seines within Iceland's 200 nautical miles Exclusive Economic Zone (EEZ).

This 1st Surveillance Report documents the assessment result for the continued certification of commercially exploited haddock fisheries to the FAO-Based RFM Certification Program. This is a voluntary program that has been supported by the Fisheries Association of Iceland and subsequently the Iceland Responsible Fisheries Foundation who wish to provide an independent, third-party accredited certification that can be used to verify that these fisheries are responsibly managed according to the FAO-Based IRFM Program.

The Iceland Responsible Fisheries Foundation owns and operates the brand of Iceland Responsible Fisheries. The Foundation was established in February 2011 and took over the operation and management of the IRF certification programme from the Fisheries Association of Iceland. The foundation operates on a cost basis, as a non-profit organisation.

The assessment was conducted according to the Global Trust procedures for FAO – Based IRFM certification using the Fundamental Clauses of the Icelandic Responsible Fisheries Management Specification (Version 1, Revision 1, March 2014) as the base template for surveillance assessment reporting. The Assessment is based on the 3 major Sections of responsible management derived from the FAO – Based IRFM Specification (Version 1, Revision 1, March 2014); including:

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

These 3 Sections are supported by 20 fundamental clauses that guide the FAO-Based IRFM Certification Program Surveillance Assessment.

A summary of the site meetings is presented in Section 4. Assessors included both externally contracted fishery experts and Global Trust internal staff (Appendix 1).

1.1. Recommendations of the Assessment Team

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

2. Fishery Applicant Details

Applicant Contact Information	
Organisation/Company Name:	**The Federation of Icelandic Fishing Vessel Owners (LÍÚ)**
Date:	June 2014
Correspondence Address:	Landssamband íslenskra útvegsmanna
Street :	Borgartuni 35
Country:	Iceland
Postal Code:	IS-105
Phone:	(354) 591 0300
E-mail Address	ss@liu.is
Organisation/Company Name:	**The Federation of Icelandic Fish Processing Plants (SF)**
Date:	June 2014
Correspondence Address:	Samtök fiskvinnslustöðva
Street :	Borgartuni 35
City :	105 Reykjavik
Country:	Iceland
Postal Code:	IS-105
Phone:	(354) 591 0350
E-mail Address:	sf@sf.is
Organisation/Company Name:	**The National Association of Small Boat Owners, Iceland (NASBO)**
Date:	June 2014
Correspondence Address:	Landssamband smabataeigenda
Street :	Hverfisgotu 105
City :	101 Reykjavik
Country:	Iceland
Postal Code::	IS-101
Phone:	(354) 552 7922
E-mail Address:	ls@smabatar.is

3. Unit of Certification

	Fish Species (Common and Scientific Name)	Geographical Location of Fishery	Gear Type	Principal Management Authority
1	Icelandic haddock *(Melangrammus aeglefinus)*	Iceland 200 mile EEZ	Demersal trawl	Icelandic Ministry of Industries and Innovation
2	Icelandic haddock *(Melangrammus aeglefinus)*	Iceland 200 mile EEZ	Long-line	Icelandic Ministry of Industries and Innovation
3	Icelandic haddock *(Melangrammus aeglefinus)*	Iceland 200 mile EEZ	Danish Seine net	Icelandic Ministry of Industries and Innovation
4	Icelandic haddock *(Melangrammus aeglefinus)*	Iceland 200 mile EEZ	Gill net	Icelandic Ministry of Industries and Innovation
5	Icelandic haddock *(Melangrammus aeglefinus)*	Iceland 200 mile EEZ	Hook and Line by small vessels	Icelandic Ministry of Industries and Innovation
6	Icelandic haddock *(Melangrammus aeglefinus)*	Iceland 200 mile EEZ	Nephrops Trawl[1]	Icelandic Ministry of Industries and Innovation
7	Icelandic haddock *(Melangrammus aeglefinus)*	Iceland 200 mile EEZ	Shrimp Trawl[1]	Icelandic Ministry of Industries and Innovation
8	Icelandic haddock *(Melangrammus aeglefinus)*	Iceland 200 mile EEZ	Pelagic Trawl[1]	Icelandic Ministry of Industries and Innovation
9	Icelandic haddock *(Melangrammus aeglefinus)*	Iceland 200 mile EEZ	Purse Seine[1]	Icelandic Ministry of Industries and Innovation

[1]Indirect landings, significant minority of catches.

4. Surveillance Meetings

Date	Organisation	Present	Overview/Key Items Discussed
26th October 2015	Fisheries Association of Iceland	Finnur Garðarsson, Hrefna Karlsdóttir **Assessment Team:** Sam Dignan, Dankert Skagen, Gísli Svan. Einarsson	• Brief review of 2014/15 cod, haddock and saithe fishing seasons • Legislation obliging vessels to report seabird and marine mammal bycatch • Development of the Iceland Responsible Fisheries Specification
26th October 2015	Fisheries Iceland	Steinar Matthiasson, Karen Kjartansdóttir, Haukur Þór Hauksson **Assessment Team:** Sam Dignan, Dankert Skagen, Gísli Svan. Einarsson	• Outline of founding and purpose of Fisheries Iceland in October 2014 • Role of Fisheries Iceland • Importance of the fishing industry to the Icelandic economy • Initiatives to improve the fishing industry in Iceland and promote the utilisation of a greater proportion of catches • Recycling of old fishing gear and reporting of lost gear
26th October 2015	Coastguard	Björgólfur Ingason, Auðunn Kristinsson, **Assessment Team:** Sam Dignan, Dankert Skagen, Gísli Svan. Einarsson	• Enforcement Laws and Regulations. Have there been amendments or changes to the Icelandic enforcement laws? • How many boardings and violations (as well as type)were carried out by the ICG during 2014/15 fishing season? • Have there been significant violations which undermined directly the management of the Icelandic cod, haddock, saithe fisheries in 2014 (i.e. overfishing effects)? • Does the ICG prioritize which vessels to board as for following some type of risk assessment process? • How many airborne fisheries patrol hours have been conducted over the 2013/2014 fishery season? • How many prosecutions and reprimands made against skippers did these activities result in? • Have there been changes over 2013/2014 in the systems or patrolling vessels used for enforcement (i.e. new vessels or other)? • Have there been any cases of IUU fishing recorded within the Icelandic EEZ in 2013? • Changes between enforcement activities in 2013 and 2014? Any significant differences? • Tour of electronic monitoring facilities
26th October 2015	HB Grandi	Sæmundur Árni Hermannsson, Svavar Svavarsson **Assessment Team:** Sam Dignan, Dankert Skagen, Gísli Svan. Einarsson	• Reporting obligations under fisheries legislation in Iceland • Importance of sustainability and certification for business development • Brief introduction to HB Grandi's operation • HB Grandi share of quota • Utilisation of parts of fishes that would historically been seen as waste product • New fishing vessels under order by HB Grandi
27th October 2015	Fish Auction	Örn Smárason, **Assessment Team:** Sam Dignan, Dankert Skagen, Gísli Svan. Einarsson	• Review of electronic auction systems • Requirements of weighing and reporting of landings • Changes to legislation and management surrounding recording of landings?
27th October 2015	Ministry	Jóhann Guðmundsson, Erna Jónsdóttir **Assessment Team:** Sam Dignan,	• Review underway of fisheries legislation aimed at streamlining it, working group and consultative process • Coastal state have made an agreement to manage capelin using new HCR which will be reviewed after 1 year

		Dankert Skagen, Gísli Svan. Einarsson	• Role of Minister in decision making process. • Changes to legislation and management
27th October 2015	Marine Research Institute	Jóhann Sigurjónsson, Björn Ævarr Steinarsson **Assessment Team:** Sam Dignan, Dankert Skagen, Gísli Svan. Einarsson	• Any significant changes to the analytical assessments of cod/haddock/saithe the last 12 months? • Area closures: 130 - 140 in 2014/2015 season; high but as a result of strong year classes of juveniles • TAC versus landings - reasons for discrepancies include, implementation error, undersized fish only count for 50% against TAC, MRI research portion of TAC. Decision to keep fishing mortality of cod at 20% rather than increasing to 22% provides a buffer against the effects of these errors • Plans for follow up and further development of assessment and HCR revisions. • How satisfied is the MRI with the assessment data - plans for improvement? • Evidence of density dependent growth? Possible effect at larval stage? • Haddock size classes physically larger than anticipated • Reasons for undershoot of saithe TAC in 2014/15, market driven, transfers between species? • Capelin ICES benchmark, new HCR probability of stock falling below B_{lim} <95% takes into account predation on capelin stock and survey error •Capelin stock status low at present, migration further to the west? Could be exhibited as low size/weights at age in other predatory fish species • Interactions with Endangered, Threatened, Protected or depleted/low abundance species in Icelandic waters. • Interactions and bycatch of marine mammals and seabirds. Evaluation of this data has been ongoing in 2013-2015. • Any new or coral and hydrothermal vent closures implemented in the last 12 months? • Round/gutted weights conversion factors, effects of temporal changes in gut weight as a proportion of total weight
28th October 2015	Small Boat Owners	Örn Pálsson, Halldór Ármannsson, **Assessment Team:** Sam Dignan, Dankert Skagen, Gísli Svan. Einarsson	• Membership of SBO • Smalls boats and the ITQ system, coastal fishery • Landings of cod, haddock and saithe by small boats in 2014/15 • Small boats share of quota 2014/15 • Management of the coastal fishery • Measures to reduce seabird bycatch in the small boats sector
28th October 2015	Fisheries Directorate	Thorhallur Ottesen, Áslaug Hólmgeirsdóttir, Þorsteinn Hilmarsson **Assessment Team:** Sam Dignan, Dankert Skagen, Gísli Svan. Einarsson	• Management: Anything new on organization, responsibilities, legislation? • The rules for accounting for undersized fish - how does that apply to redfish? Is this an issue? • Gear restrictions applicable for redfish. (Mesh sizes, sorting grids?) • Landing in other nations? • Fishery on the stock outside the Iceland EEZ: cooperation between Iceland. Faroes, Greenland. Does Iceland claim the whole advised TAC? • TAC and catch: For what reasons does the catch exceed the TAC?
29th October 2015	Visir	Pétur Hafsteinn Pálsson **Assessment Team:** Sam Dignan, Dankert Skagen, Gísli Svan. Einarsson	• Measures to reduce seabird/marine mammal in longline fisheries • Use of logbook data by vessels to improve targeting • Greater use of catches, nutraceuticals, dried cod heads, fabrics etc. • Temporary closed areas
29th October 2015	Trackwell	Steingrimur Gunnarsson **Assessment Team:** Sam Dignan, Dankert Skagen, Gísli Svan. Einarsson	• Review of electronic logbooks systems • New sections of e-logs for reporting seabird and marine mammal bycatch • Requirements of e-log system • Changes to legislation and management surrounding electronic monitoring

5. Assessment Outcome Summary

Section 1: Fishery Management

Iceland has a well-established marine policy, specified in legislation, on the structure of fisheries management and in practical implementation. The Ministry of Industries and Innovation is the principal management organization responsible for Icelandic fisheries. The Directorate of Fisheries is responsible for the implementation of Fishery Regulations on behalf of the Ministry. The Icelandic Coast Guard performs sea and air patrols of Iceland's 200-mile exclusive economic zone and 12-mile territorial waters, and monitoring of fishing within the zone in consultation with the Marine Research Institute and Ministry of Industries and Innovation. The Marine Research Institute conducts a wide range of marine research and provides the Ministry with scientific advice. The stock is managed according to a management plan, approved by ICES, that has been in place since 2009. The main management measures include TACs in an ITQ system, area closures to protect undersized fish and mesh size regulations.

There is an established assessment method for haddock, which is approved by ICES. The method for assessing the abundance and exploitation of the haddock in Iceland is an ADAPT type model calibrated with indices from both the groundfish surveys in March and October. The assessment is somewhat problematic as the spring survey indicates a larger stock than the autumn survey, for reasons that are not fully understood. There is hardly any retrospective error (Clause 1.2 Figure 1). The stock was benchmarked by ICES in February 2013, (WKROUND 2013) and the assessment procedure used since 2007 was recommended for few more years, if major problems do not show up. In 2015 the method described by WKROUND was changed by basing prediction of growth on the average of last 2 years instead of only the last year. The effect on TAC in next fishing year is reducing it by 2000 tonnes from 38,400 tons to 36,400 tons.

Catch data in numbers at age are obtained by combining landings data with age distributions from samples. All catches of Icelandic haddock come from Icelandic waters with the majority taken by Icelandic vessels. Haddock is primarily caught in roughly equal proportions by demersal trawls and longlines; with smaller catches coming from Danish seines. Haddock is caught all around the island; however, landings from the north-east primarily come in warm years (Figure 2). Landings in Iceland are restricted to authorised ports where the amounts landed are recorded by certified weighers. The landings data are managed by the Directorate of Fisheries and used as catch data in the assessment.

There is a harvest rule in place that has been found to be according to the precautionary approach by ICES. The plan has a limit and a trigger biomass (equal to the limit) and a target harvest rate. Other reference points are considered redundant. The biomass limit reference point Blim = 45,000 t as defined by ICES is the lowest observed biomass (in 1987 as estimated in 2010) in the years covered by the assessment. There are no indications of recruitment failure but the recruitment dynamics are unknown below this level of SSB. ICES notes that the HR (catch as fraction of the biomass of haddock > 45cm) corresponding to MSY is 0.52, while in order to keep the annual probability of SSB > Blim above 5%, the HR should be below 0.46. Accordingly, a precautionary harvest rate was set at 0.46. The HR in the rule is below both these.

The precautionary approach is implemented through the harvest rule in the management plan. The plan has a standard harvest rate of 40% of the biomass of haddock > 45cm which will be reduced if the SSB falls below a trigger biomass that is equal to the limit. The HR in the rule is below both HR_{MSY} and HRpa. The reduction of HR below the limit biomass will facilitate rebuilding if the SSB should fall

below the limit. According to the evaluation of the plan, reaching the trigger (and the limit) is unlikely (<5% probability) unless stock dynamics change or fishing effort becomes out of control.

The assessment of the stock is done by the ICES North Western Working Group (NWWG) where all relevant nations are represented. ICES reviews the NWWG report and provides advice based on the report. TACs are set according to scientific advice from ICES and MRI. Icelandic haddock is exclusively within the 200 mile EEZ (ICES Area Va) and is not described as straddling of shared.

Section 2: Compliance and Monitoring

An effective legal and administrative framework has been established through various fisheries management acts. Compliance is ensured through strict monitoring, control and enforcement carried out by the Directorate and the Icelandic Coastguard.

Vessels must weigh catch within two hours of landing on the quay. The system is developed to standardize weights and tares for ice and tubs (a standard tub is used throughout Iceland for fresh fish such as cod and haddock and has a capacity of 280-300 kg). The weight registration document for each vessel is transmitted to the Directorate, which also receives the e-logbook information. These two sets of information are then compared and the appropriate reduction is made to the vessel quota. Weighed recorded landings are the main source of catch documentation. Logbook data is used as a secondary source to cross check landings. Any transfer under the ITQ system for each vessel is also monitored to ensure that any additional quota requirements are rented from other vessels within a 3 day period.

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The Icelandic Coastguard administers the VMS for all Icelandic vessels and for all foreign vessels (including fishing vessels) that enter Icelandic waters. There is an integrated system for monitoring, control and surveillance (MCS) in Iceland. The Icelandic Coastguard administers the VMS for all Icelandic vessels and for all foreign vessels (including fishing vessels) that enter Icelandic waters as part of an integrated monitoring, control and surveillance (MCS) system. The purposes of the MCS system are numerous including maritime traffic control, marine search and rescue and fisheries enforcement. The importance of the fisheries sector to the Icelandic economy and the need for greater efficiency, due to the relatively small size of the institutions involved, has led to high levels of collaboration and integration resulting in creative and dedicated approaches to fisheries management and enforcement. The fisheries MCS system in Iceland has at its core the effective use of available technology meaning relatively small staff numbers are able to achieve extensive monitoring of the Icelandic fishing industry.

In order to facilitate the matching of the species composition of the catch and the quota portfolio for individual fishing vessels or companies, and also to reduce incentives for discard, a variety of flexibility provisions are in place. Current quota share, allocation and remaining quota can be obtained from the

Directorates website for any vessels. The system is very transparent. Rules are enforced by the Directorate and the MRI. There are penalties for serious infractions.

Catch analysis includes the comparison of catch amount with figures for the amounts of sold or exported products in order to ensure independent checking of the accuracy of information about the fish that is brought ashore. If analysis reveals discrepancies between the information stated in the reports and the information received from the harbour weighing, corrective measures are taken as appropriate.

Section 3: Ecosystem considerations

Adverse impacts of the fishery on the ecosystem (e.g. bycatch, ETP species interactions, habitat and food web interactions) are considered, appropriately assessed and effectively addressed. Gathering knowledge of the marine ecosystem is a key role that has been assigned to the Marine Research Institute. There is also comprehensive research which forms the basis of the fisheries management implemented in Iceland to harvest the stocks in a responsible manner, in order to ensure and maintain maximum long-term productivity of all marine resources. The MRI monitors and researches the marine environment, including the ecosystem components.

Information is available on fishing gear used in the fishery, including the fishing gears' selectivity and its potential impact on the ecosystem. Stocks of non-target species commonly caught in the fisheries for the stock under consideration are monitored and their state assessed as appropriate. Discarding, including discarding of catches from non-target commercial stocks, is prohibited. Non-target catches, including discards, of stocks other than the "stock under consideration" do not pose serious risks of depletion to these stocks.

The Icelandic authorities have implemented an extensive array of areal closures within the Icelandic EEZ. These include permanent, seasonal and periodic closures aimed at protecting both juvenile and spawning fish and are gear or fishery specific. These closures, in particular those of a permanent nature, provide wider ecological benefits over and above their intended fisheries management objective by offering *de facto* protection from fishing activity to other elements of the marine environment. While the majority of temporary closures to protect juveniles are aimed at protecting cod, haddock and saithe, these closures are likely to have a conservation benefit for other species too.

The MRI has studied haddock, and its place in the ecosystem. Haddock are not a key prey species.

6. Conformity statement

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

7. FAO-Based Conformance Criteria Fundamental Clauses for Surveillance Reporting

7.1. Section 1: Fishery Management

Fundamental Clause:	**1.1 Fisheries Management System and Plan for stock assessment, research, advice and harvest controls**		
Supporting Clauses:	1.1.1, 1.1.2, 1.1.3, 1.1.4, 1.1.5, 1.1.6 and sub-clauses, 1.1.7 and sub-clauses		
Clause Guidance:	***There shall be a structured and effective fisheries management system, with objectives including the limiting of total annual catches for the stock under consideration. Accordingly, appropriate management measures for the conservation and management of the stock shall be adopted and effectively implemented by the competent authorities. Fishing for the "stock under consideration "shall be managed by the competent authorities in accordance with a documented and publicly available Fisheries Management Plan.***		
Evidence Rating:	**☑ High**	**☐ Medium**	**☐ Low**
Non-conformance:		**☐ Minor NC** / **☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

Iceland has an established marine policy, specified in legislation, on the structure of fisheries management and in practical implementation. The Ministry of Industries and Innovation is the principal management organization responsible for Icelandic fisheries. The Directorate of Fisheries is responsible for the implementation of Fishery Regulations on behalf of the Ministry. The Icelandic Coast Guard performs sea and air patrols of Iceland's 200-mile exclusive economic zone and 12-mile territorial waters, and monitoring of fishing within the zone in consultation with the Marine Research Institute and Ministry of Industries and Innovation. The Marine Research Institute conducts a wide range of marine research and provides the Ministry with scientific advice. The stock is managed according to a management plan, approved by ICES, that has been in place since 2013. The main management measures include TACs set according to a harvest rule, an ITQ system, discard ban, area closures to protect both spawning and undersized fish, and mesh size regulations.

EVIDENCE

Iceland has an established Marine Policy. There is a principal Act *(No 116/2006)*[1] and a number of supporting Acts and Regulations for the management of the fishery[2]. 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".*

[1] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-116-2006-on-Fisheirs-Management.pdf

[2] English translations of the key legislation is assembled in:
http://eng.atvinnuvegaraduneyti.is/laws-and-regulations/fisheries/
A paper issue is widely distributed annually by the Ministry: Stjórn fiskveiða 2015/2016. Lög og reglugerðir.

There is a structured fisheries management system adopted within Iceland for the management of fish species including haddock[3]. There are a number of inter-related government agencies within the system. The Ministry of Industries and Innovation has the ultimate responsibility for fisheries management. They act according to law issued by the parliament (Althingi), and according to advice from the Marine Research Institute (MRI). The executive body is the Fisheries Directorate (Fiskistofa). The coast guard is responsible for control at sea, both of the catches and the quality of the vessels. Policies incorporate a number of International Agreements, 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[4].

There have been only minor adjustments to the legislation and organisation of the management in the last year[5]. Work on a major revision of technical regulations has just been initiated. It is expected to take at least one year before it is ready to be implemented.

The **Ministry of Industries and Innovation**[6] in Iceland is the principal management organization responsible for Icelandic fisheries.

Limiting the total annual catch of haddock is achieved primarily by an annual TAC. This TAC is distributed to vessels as individually transferable quotas (ITQ), managed by the Directorate. In addition, there are area closures (temporary and permanent), and gear restrictions in place. There is extensive control and monitoring of landings. Discards are prohibited. Management also includes fora for consultation with stakeholders.

The Ministry sets the overall TAC for each species, including haddock. The TAC is set taking advice from MRI, which is responsible for collecting and analysing scientific data on the stock. The MRI advice is based on calculations done within the framework of ICES (The International Council for Exploration of the Sea). ICES provides advice which is normally, but not necessarily, followed by MRI and subsequently by the Ministry.

The management plan was ratified by government in 2013. Accordingly, the Minister cannot unilaterally decide to deviate from the plan[7]. The Ministry also seeks advice from ICES on management plans. . The management plan for haddock was examined and approved by ICES in 2013[8]. It is publically available on the Ministry's website[9].

The **Directorate of Fisheries (Fiskistofa)**[10] has its HQ in Hafnarfjörður, just outside of Reykjavik and offices at 6 locations in the country with staff in fields of fisheries management, monitoring and secretariat staff, as necessary. There is a total of 70 staff involved in fisheries management. The Directorate notes (in consultation meetings) that the strategy of having local offices based in the fishing regions provides the best form of intelligence, support from industry to respect and follow the control rules and provide a conduit for information from fishers' to government on the performance of fishing at any point in time.

[3] http://www.fisheries.is/management/government-policy/responsible-fisheries/
[4] http://www.fisheries.is/management/government-policy/
[5] Communicated at site visit with the Ministry, 27th October 2015.
[6] http://eng.atvinnuvegaraduneyti.is/
[7] Communicated at site visit with the Ministry, 27th October 2015.
[8] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/Iceland%20longterm%20MP%20for%20Icelandic%20haddock.pdf
[9] http://www.fisheries.is/main-species/codfishes/haddock/management-plan/
[10] http://www.fiskistofa.is/

Operationally, the Directorate of Fisheries is responsible for the implementation of Fishery Regulations on behalf of the Ministry. A large part of the at sea surveillance falls directly under the responsibility of the Icelandic Coast Guard. Key functions include of the Directorate of Fisheries include:

- Implementation of regulations
- Collection and collation of fishery catch data
- Supporting research, survey work
- Supporting Coastguard and surveillance activities
- Managing and policing the Icelandic ITQ system

All catches of Icelandic fishing vessels must be weighed and recorded at the port of landing by a certified official weigher. The port authorities record the catch in a computer that is directly linked to a centrally located database at the Directorate of Fisheries. Thus 60 ports in Iceland send electronic data daily to the Directorate. A total of approximately 50,000 landings are registered in the system every year. The data is processed in the Directorate´s database and catches are subtracted from the vessel´s quotas. The system is designed so that the Directorate can act quickly if vessels have overfished their quotas. Excess catches can result in a revocation of fishing licenses and fines. Statistics Iceland then receive copies of the data for the production of statistics regarding the economy.

The Icelandic Coast Guard[11]

The Coast Guard performs sea and air patrols of Iceland's 200 mile exclusive economic zone and 12 mile territorial waters, and monitoring of fishing within the zone in consultation with the Marine Research Institute and Ministry of Industries and Innovation. In addition to patrolling the Icelandic EEZ, the Coast Guard performs surveillance and inspection duties in international areas, e.g. the NEAFC Regulatory Area which is the area outside the EEZ towards the south, southwest, and east of Iceland. The Coast Guard is also responsible for maritime rescue operations in the Icelandic Search and Rescue Region which is an area of 1.9 million square kilometres, or more than twice the area of the EEZ. The Coast Guard operates the Icelandic Maritime Traffic Service within its operations centre. This centre is a single point of contact for all maritime related notifications, involving, for example, the Maritime Rescue Co-ordination Centre, the Vessel Monitoring Centre and the Fisheries Monitoring Centre. The Coast Guard also undertake all hydrographic surveys in Icelandic waters, including the preparation of nautical charts. In 2011 the Coast Guard received a new flagship vessel named Thor that became active in November. Thor was specially designed for Icelandic conditions, particularly for protection of resources, fisheries monitoring, law enforcement and search & rescue. The ship was designed for the rescue and salvaging of much larger ships (which are expected to start traversing the Arctic as sea ice melts).

[11] http://www.lhg.is/english/icg/

Fundamental Clause:	**1.2 Research and Assessment**			
Supporting Clauses:	1.2.1, 1.2.2, 1.2.3, 1.2.4 and sub-clauses, 1.2.5, 1.2.6, 1.2.7			
Clause Guidance:	***The relevant data collected/compiled by the relevant authorities shall be appropriate to the chosen method of stock assessment and sufficient for its execution, in line with assessing the size and/or productivity of the fish stock(s) under consideration. The determination of suitable conservation and management measures shall include or take account of total fishing mortality from all sources (including discards, incidental mortality and catches in other fisheries). Furthermore, there shall be active collaboration with international scientific organizations for stock assessment activities and review, and, in cases where the stock under consideration is a shared stock or a straddling stock or a highly migratory stock, there shall be scientific cooperation at the relevant bilateral, regional or international level for obtaining data and/or conducting stock assessments and/or providing advice, as appropriate.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

The assessment is based on catch numbers at age and the results of two extensive bottom trawl surveys. Catch numbers at age are obtained by combining landings statistics with samples from the landings, obtained through an organized sampling regime. The assessment is done within ICES by the North-Western Working Group, with a method that was recommended for the time being at a benchmark by ICES in 2013. International review is through ICES. Iceland also has a broad international cooperation on matters relevant to the fishery in several other organisations.

EVIDENCE

Assessment method

The method for assessing the abundance and exploitation of the haddock in Iceland is an ADAPT type model calibrated with indices from both the groundfish surveys in March and October. The assessment is somewhat problematic as the spring survey indicates a larger stock than the autumn survey, for reasons that are not fully understood. There is hardly any retrospective error (Figure 1). The stock was benchmarked by ICES in February 2013, (WKROUND 2013) and the assessment procedure used since 2007 was recommended for few more years, if major problems do not show up. In 2015 the method described by WKROUND was changed by basing prediction of growth on the average of last 2 years instead of only the last year. The effect on TAC in next fishing year is reducing it by 2,000 tonnes from 38,400 tons to 36,400 tons.

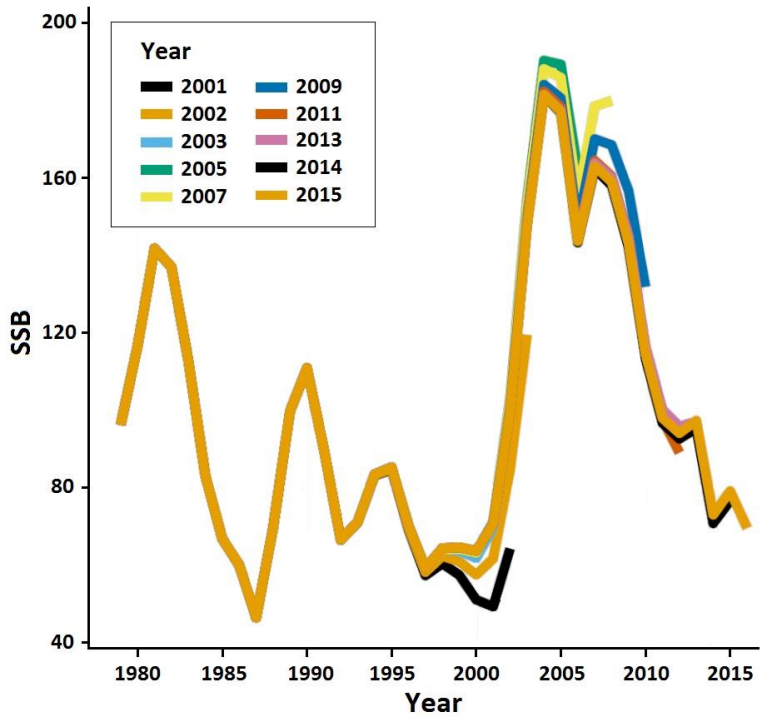


Figure 1. Retrospective error according to the haddock assessment in 2015[12].

Catch data

Catch data in numbers at age are obtained by combining landings data with age distributions from samples. All catches of Icelandic haddock come from Icelandic waters with the majority taken by Icelandic vessels; the remainder are taken by Faroese vessels. Haddock is primarily caught in roughly equal proportions by demersal trawls and longlines; with smaller catches coming from Danish seines. Haddock is caught all around the island; however, landings from the north-east primarily come in warm years (Figure 2). Catches of haddock during the 2013-2014 fishing were at their lowest since World War II. Landings in Iceland are restricted to authorised ports where the amounts landed are recorded by certified weighers. The landings data are managed by the Directorate of Fisheries and used as catch data in the assessment.

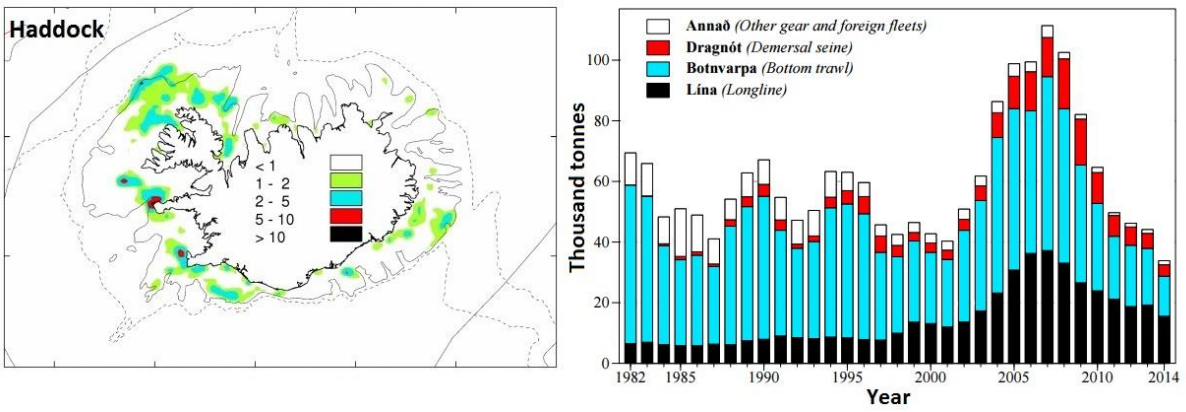


Figure 2. Distribution of catches by area (left) and gear (right) in 2014[13].

[12] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2015/NWWG/12%20NWWG%20Report%20-%20Sec%2010%20Icelandic%20haddock.pdf

[13] http://www.hafro.is/Astand/2015/ysa_2015.pdf

The sampling of catches[14] is fully computerised and directly linked to the daily landings statistics available from the Directorate of Fisheries. For each species, each fleet/gear and each landing strata there is a specific target of landings value; once the cumulative daily landings value pass the target value an automatic request is made to the sampling team for a sample to be taken.

Catch numbers-at-age are calculated using length distributions and age-length keys. Weights at age are calculated from weight-length relationships with parameters estimated for each area, season and fleet. The method has remained consistent for many years.

Discarding is prohibited[15] and is regularly monitored by comparing size distributions in self-reported catches and those taken by onboard inspectors; this method insures against high-grading, but not necessarily against discarding for other reasons. The most recent estimate for haddock were 0.24% of landings by weight in the trawl fishery with 0% discarded in other fisheries. Up to 2010, the percentage was higher, mostly 1-2% by weight annually[16].

Survey data

Iceland conducts two extensive bottom trawl surveys that are used in most assessments of demersal fish in Icelandic waters, a spring groundfish survey and an autumn groundfish survey both covering the whole Icelandic EEZ. These surveys are more extensive than most surveys that are used for routine assessments (530 stations in the spring survey, 380 stations in the autumn survey), see Figure 3 below showing all hauls in the scientific surveys in 2013[17]. There are only minor changes from year to year in the coverage. An extensive survey protocol is available[18].

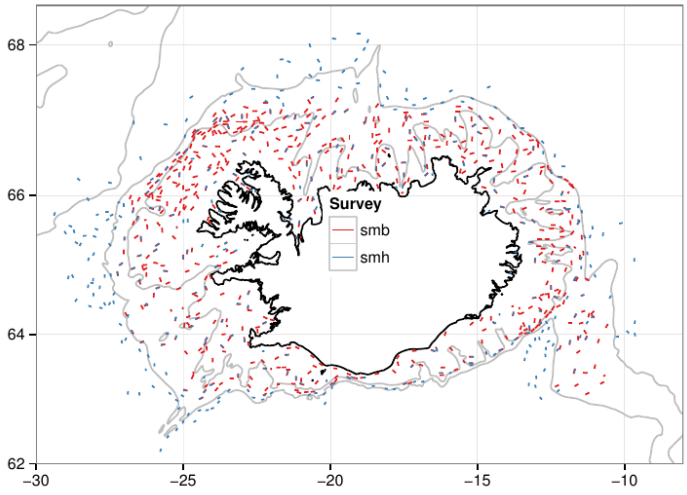


Figure 3. Stations in the bottom trawl surveys. Red: Spring survey. Blue: Autumn survey.

[14]Annex 6 (pages 84 ff) in ICES. 2015: Report of the Benchmark Workshop on Icelandic Stocks (WKICE), 26–30 January 2015, Copenhagen, Denmark. ICES CM 2015/ACOM: 31. 325 pp: http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2015/WKICE%202015/wkice_2015_final.pdf

[15]Act concerning the Treatment of Commercial Marine Stocks No. 57, 3 June 1996: http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-57-1996-Treatment-of-Commercial-Marine-Stocks.pdf

[16] Pálsson, Ó. K., Björnsson, H., Guðmundsson S., and Ottesen Þ. (2015) Mælingar á brottkasti þorsks og ýsu 2013. (Tests discards of cod and haddock 2013). Reykjavík. 12 pp. http://www.hafro.is/Bokasafn/Timarit/fjolrit-183.pdf

[17] WD17 (pp 259-313) in ICES. 2015: Report of the Benchmark Workshop on Icelandic Stocks (WKICE), 26–30 January 2015, Copenhagen, Denmark. ICES CM 2015/ACOM:31. 325 pp: http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2015/WKICE%202015/wkice_2015_final.pdf

[18] http://www.hafro.is/Bokasafn/Timarit/fjolrit-156.pdf

Conservation and management measures
A Harvest Control Rule has been developed for the annual TAC for Icelandic haddock, and has been implemented since 2013[19]. ICES evaluated the Iceland haddock FMP in 2013. ICES concluded that the harvest control rule for Icelandic haddock in the request is precautionary and in accordance with the ICES MSY approach[20].

International cooperation and review
The assessment is conducted by the ICES North-Western Working Group, where stakeholder nations participate. The assessment method was approved by ICES at a benchmark-process in 2013[21]. ICES advices on catches based on the assessment of the NWWG.

Iceland has broad international scientific cooperation through organisations such as the Northeast Atlantic Fisheries Commission (NEAFC), the Northwest Atlantic Fisheries Organization (NAFO), and the North Atlantic Marine Mammal Commission (NAMMCO). Icelandic scientists have been involved in many international projects arranged by these organizations and in co-operative projects with research institutes and universities[22].

[19] http://www.fisheries.is/main-species/codfishes/haddock/management-plan/
[20] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/Iceland%20longterm%20MP%20for%20Icelandic%20haddock.pdf
[21] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WKROUND/WKROUND%20Report%202013.pdf
[22] http://www.fisheries.is/management/research/

Fundamental Clause:	**1.3.1 The Precautionary Approach**		
Supporting Clauses:	1.3.1.1, 1.3.1.2, 1.3.1.3, 1.3.1.4, 1.3.1.5, 1.3.1.6		
Clause Guidance:	***The precautionary approach shall be implemented, as specified in the Fisheries Management Plan, to effectively protect the stock under consideration. Accordingly, relevant uncertainties shall be taken into account through a suitable method of risk assessment, appropriate reference points shall be determined, relevant uncertainties shall be taken into account through a suitable method of risk assessment, and specified remedial actions shall be taken if reference points are approached or exceeded.***		
Evidence Rating:	**☑ High**	**☐ Medium**	**☐ Low**
Non-conformance:		**☐ Minor NC** / **☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

There is a harvest rule in place that has been found to be according to the precautionary approach by ICES. The plan has a limit and a trigger biomass (equal to the limit) and a target harvest rate. Other reference points are considered redundant.

EVIDENCE

The biomass limit reference point B_{lim} = 45,000 t as defined by ICES is the lowest observed biomass (in 1987 as estimated in 2010) in the years covered by the assessment[23]. There are no indications of recruitment failure but the recruitment dynamics are unknown below this level of SSB. No other limit points are required to evaluate the management plan in relation to the precautionary approach and are therefore not proposed.

ICES notes that the HR (catch as fraction of the biomass of haddock > 45cm) corresponding to MSY is 0.52, while in order to keep the annual probability of SSB > Blim above 5%, the HR should be below 0.46. Accordingly, a precautionary harvest rate was set at 0.46. The HR in the rule is below both these.

The precautionary approach is implemented through the harvest rule in the management plan. The plan has a standard harvest rate of 40% of the biomass of haddock > 45cm which will be reduced if the SSB falls below a trigger biomass that is equal to the limit. The HR in the rule is below both HR_{MSY} and HR_{pa}. The reduction of HR below the limit biomass will facilitate rebuilding if the SSB should fall below the limit. According to the evaluation of the plan, reaching the trigger (and the limit) is unlikely (<5% probability) unless stock dynamics change or fishing effort becomes out of control.

[23] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/Iceland%20longterm%20MP%20for%20Icelandic%20haddock.pdf

Fundamental Clause:	**1.3.2.1 Harvesting rate and fishing mortality**			
Supporting Clauses:	1.3.2.1.1, 1.3.2.1.2			
Clause Guidance:	***The management target for fishing mortality (or its proxy) and the associated limit reference point, as well as the management action to be taken when the limit reference point is exceeded, shall be stated in the Fisheries Management Plan. If fishing mortality (or its proxy) is above the limit reference point, management actions shall be taken to decrease the fishing mortality (or its proxy) below the limit reference point.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

The management plan has a target harvest rate, a trigger biomass and a rule to reduce the harvest rate if SSB falls below the trigger biomass. A limit fishing mortality is considered redundant as the existing rules, together with strong mechanisms for implementation and enforcement, are regarded as sufficient to protect against overfishing.

EVIDENCE

There is a target harvest rate (40% of the biomass of haddock >45cm) in the management plan, which is a proxy for fishing mortality. This harvest rate is associated with a low (<5%) probability of bringing the spawning biomass below the limit level of 45,000 t. There is a trigger SSB below which the harvest rate will be reduced. The trigger was set equal to the limit, which implies that the reduction below the trigger will have no influence on the risk of reaching the limit, but will facilitate recovery should the limit be reached. This arrangement was deliberate with a relatively low harvest rate being preferred to a higher but frequently changing harvest rate[24].

No limit fishing mortality has been defined. It was considered redundant as harvest rate in the harvest rule is associated with a low probability of reaching the limit biomass. The harvest rate corresponding to MSY is 52% and the harvest rate with a 5% risk of reaching the limit biomass is 46%; the latter is defined by ICES as a HR_{pa}. The additional rule, by which the harvest rate is to be reduced if the SSB goes below the trigger biomass, adds to the protection of the stock by facilitating recovery should the stock biomass drop below the limit. In addition there are supportive measures (area closures, gear restrictions, discard ban, strict landings control and control at sea) that contribute to keeping exploitation under control.

[24]Communicated at the site visit at MRI 13/8- 2014

Fundamental Clause:	**1.3.2.2 Stock biomass**		
Supporting Clauses:	1.3.2.2.1, 1.3.2.2.2, 1.3.2.2.3, 1.3.2.2.4		
Clause Guidance:	***The long term management target for stock size (biomass), either explicit or implicit depending on management approach, and limit reference points consistent with the objective of promoting optimum utilization, shall be specified. Furthermore, limits or directions for stock size (or its proxy), consistent with avoiding recruitment overfishing shall be specified and should the estimated stock size approach B_{lim} (or its proxy), then appropriate management action shall be taken with the objective of restoring stock size to levels above B_{lim} (or its proxy) with high probability within a reasonable time frame.***		
Evidence Rating:	**☑ High**	**☐ Medium**	**☐ Low**
Non-conformance:		**☐ Minor NC** / **☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

The harvest rule in the management plan has a limit biomass defined. The limit also acts as a trigger biomass, below which the exploitation will be reduced. With the current rule and stock dynamics, the probability of reaching the trigger or limit biomass is low. If the biomass drops below the trigger, which is equal to the limit, rebuilding will be facilitated by a reduced harvest rate. In addition, there is the legal framework and a suite of control measures available to management to take further action If needed. A target biomass has not been defined, as the primary management tool is a harvest rate, which should lead to near maximum catches in the long term.

EVIDENCE

The management plan has the objective of ensuring, with high probability, a spawning biomass above the limit point of 45,000 t; this is the lowest biomass in the assessed time series, and there are no indications that recruitment is impaired at that stock abundance.

A long term target biomass has not been defined, and may be redundant as it has been demonstrated that the harvest rate in the management plan should lead to a yield near the maximum (Figure 4).

If the biomass drops below the trigger, which is close to the limit, rebuilding will be facilitated by a reduced harvest rate. Rebuilding the stock to above the limit if that is exceeded has not been extensively tested in the simulations done, and how rapidly the stock can be restored depends on the cause of the depletion. With the current biological properties of the stock, reaching B_{lim} with the agreed harvest rate is highly unlikely. If needed, there is the legal framework and a suite of control measures available to management to take further action.

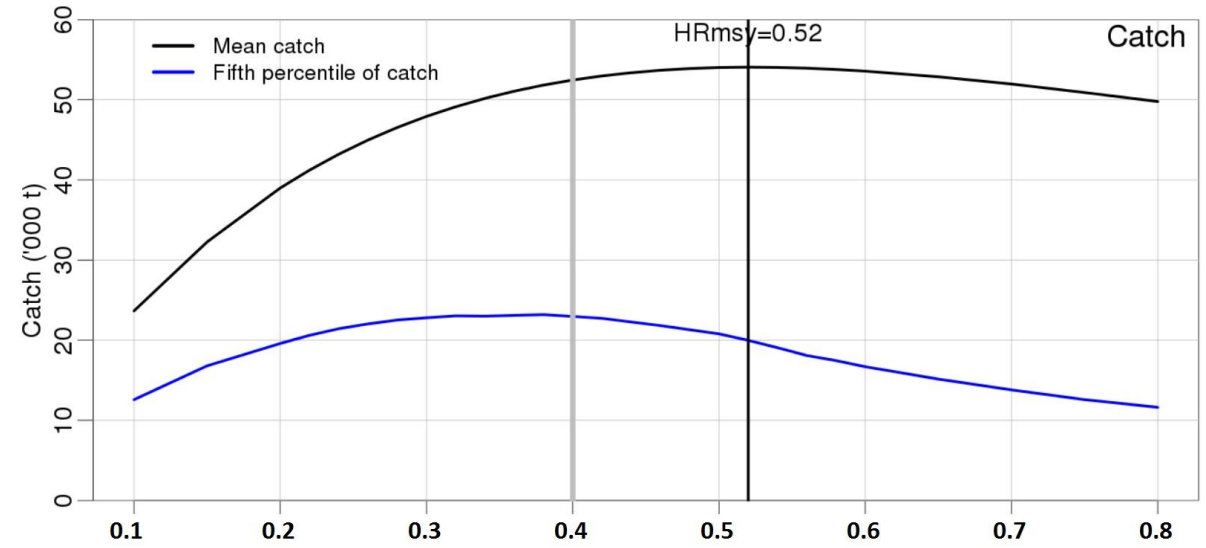


Figure 4. Yield as function of the harvest rate, for the management plan for Icelandic haddock. Copied from: ICES response to the Request from Iceland to ICES to evaluate the long-term management plan and harvest control rule for Icelandic haddock[25].

[25] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/Iceland%20longterm%20MP%20for%20Icelandic%20haddock.pdf

Fundamental Clause:	**1.3.2.3 Stock biology and life-cycle (Structure and resilience)**			
Supporting Clauses:	1.3.2.3.1, 1.3.2.3.2, 1.3.2.3.3, 1.3.2.3.4			
Clause Guidance:	***Information on the biology, life-cycle and structure of the stock shall be taken into account and consideration shall be given to measures designed to avoid excessive exploitation of spawning components at spawning time, as appropriate, especially at times when biomass (SSB) may approach the level of the limit reference point (B_{lim}). Relevant gear selectivity properties for the protection of juvenile fish shall be specified, as appropriate. Consideration shall also be given to measures designed to limit fishing mortality of juvenile fish, e.g. through temporary closures to fishing of areas containing a high proportion of juveniles of stock under consideration, with the objective of reducing the likelihood of growth overfishing and increasing the contribution of year classes to the spawning stock.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

Haddock in Icelandic waters is considered as a local stock with some thoughts that it is not able to cross the deep waters surrounding the Icelandic shelf[26].

There is an extensive system of closures to protect spawning grounds for cod. While these closures are primarily for cod, haddock have largely the same spatial and temporal spawning patterns as cod; thus the closed areas for cod likely have a substantial effect on spawning haddock as well. To avoid catching undersized fish and to reduce potential incentives relating to discarding, there are a number of measures in place including permanent and temporary spatial closures, mesh size regulations and special arrangements for payment for landing undersized haddock.

EVIDENCE

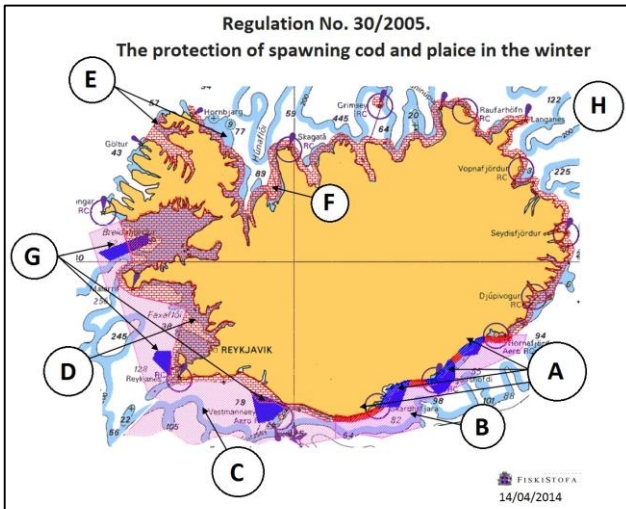
Haddock in Icelandic waters are considered as a local stock with a distribution confined to the Icelandic shelf.

There are no indications of diversity in stock structure although this has not been extensively studied. Balancing the fishery between sub-stocks has so far not been an issue, since there is nothing to indicate that such sub-stocks exist. Haddock can be found all around Iceland, although it is sparse in Northern areas except in warm years.

There is an extensive system of areal closures (Figures 5 and 6) that to a large extent are designed to avoid exploitation of cod at the spawning grounds in the spawning season. While these closures are primarily for cod, cod and haddock have largely the same spatial and temporal spawning patterns; thus the closed areas for cod likely have a substantial effect on spawning haddock as well. Some closures are permanent or regular, but areas can also be temporarily closed at short notice, in particular if concentrations of juveniles are detected. Furthermore, there are mesh size regulations in

[26] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/NWWG/Annex%2002%20Stock%20Annexes.pdf

place to protect juveniles; the standard mesh size in trawl is 155 mm (135 mm without a Polish cover). If undersized fish are caught, they have to be landed. Special rules apply for payment to encourage landing, but discourage catching of undersized fish.



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

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

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

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

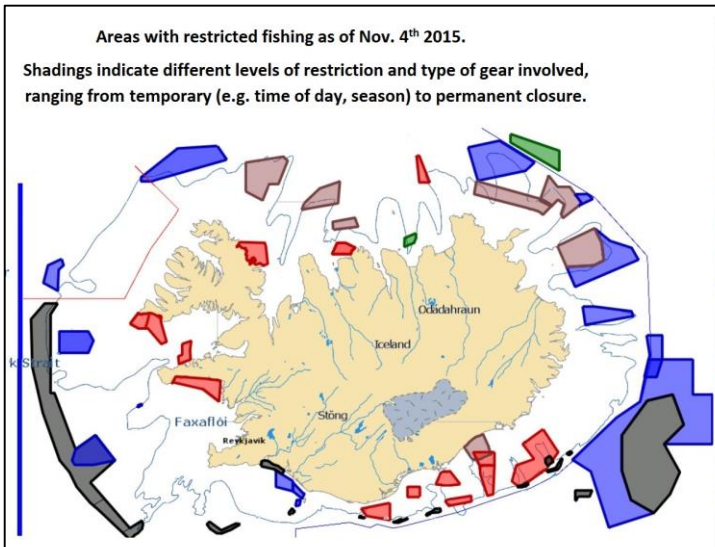
E. Regulation No. 30/2005 Northern and Eastern Regions, Article 3. A, B and C amended by Regulation No. 380/2008 from April 15th to 10:00 April 30th (A, B and C).

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

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

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

Figure 5. Permanent closures to protect spawning grounds[27].



Regulations and conserved areas in Icelandic waters (from top)

Green areas, Shrimp fishing ban. Rgl. 766/2004;335/2012

Blue areas, north of Iceland. Trawls must be equipped with separators. Rgl.749/2006 amended by Regulation 534/2013

Brown areas, Protected areas against trawling and line fishery. Rgl. 310/2007

Red areas, north of Iceland. Line and trawling ban. Rgl. 68/2003

Red areas, by the coast. Line and handline. Rgl. 742/2009

Blue area east of Ice. Blue whiting fishing ban unless bycatch separators are used. Rgl. 696/2005

Dark area east of Iceland. Blue whiting fishing ban. Rgl.794/2004

Red areas by the south coast. Coral Protection. Rgl. 1140/2005. Rgl. 1095/2011

Dark area west of Iceland. Conservation area were trawling is prohibited. Rgl. 310/2007

Blue area west of Iceland. Trawling ban but open to trawling from 20:00-08:00 from 01 Oct to 01 Apr inclusive

Figure 6. All closures according to the Fisheries directorate by November 2015[28].

[27] http://www.fiskistofa.is/media/veidisvaedi/Hrygningarstopp_2.pdf
[28] http://www.fiskistofa.is/fiskveidistjorn/veidibann/reglugerdarlokanir/

Fundamental Clause:	**1.4 External scientific review**			
Supporting Clauses:	1.4.1, 1.4.2			
Clause Guidance:	***For the stock under consideration the harvesting policy (including its consistency with the precautionary approach), stock assessments and advice shall be reviewed, by request from the fisheries management authorities at appropriate, regular intervals as well as when substantive changes are made in harvesting policy by an appropriate international scientific body or committee. Following external scientific review, the competent fisheries management authority shall review and/or revise the harvesting policy, taking into consideration the external review, as appropriate.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

Stock assessments are regularly supervised by ICES, which is considered to be the appropriate international scientific body. ICES evaluate management plans at the request of relevant fisheries managers. The stock assessment was evaluated in a benchmark process in 2013 and the management plan was reviewed and endorsed in 2013.

EVIDENCE

ICES[29] is considered to be the appropriate international scientific body. The annual stock assessments and short term predictions are performed by the ICES North-Western Working Group, and reviewed routinely as part of the ICES advisory process. This is done according to the Memorandum of Understanding between ICES and NEAFC. ICES have developed routines for more in-depth review of assessment methods and data that go into the assessment (benchmark assessments). Ideally, this should be done approximately every 5 years, or if there are reasons to alter the assessment practises; Icelandic haddock was benchmarked in 2013[30].

ICES evaluate management plans at the request of responsible managers. Normally, the work is done outside ICES and reviewed and endorsed by ICES. The evaluation work for the current management plan for Icelandic haddock was done by MRI, and reviewed by ICES. The review was undertaken with respect to the HCR's consistency with precautionary and MSY approaches[31].

[29] http://www.ices.dk

[30] http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/acom/2013/WKROUND/WKROUND%20Report%202013.pdf

[31] http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/Iceland%20longterm%20MP%20for%20Icelandic%20haddock.pdf

Fundamental Clause:	**1.5 Advice and Decisions on TAC**			
Supporting Clauses:	1.5.1, 1.5.2, 1.5.3, 1.5.4, 1.5.5, 1.5.6, 1.5.7, 1.5.8, 1.5.9, 1.5.10			
Clause Guidance:	***Appropriate scientific advice shall be provided to the competent fisheries management authority including on the appropriate value(s) for precautionary reference points. For shared stocks the setting of TAC shall take into consideration international agreements and scientific advice. Decisions on TAC shall be made and implemented in such a way as to ensure that the actual catch is as close to the intended catch as practically possible.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

The Minister of Fisheries and Agriculture decides on the TAC of the haddock stock for each fishing year (September to August) in accordance to law (Fisheries Management Act 116), based on the advice by MRI. The MRI advice is based on work and advice by ICES and on the management plan for haddock.

EVIDENCE

The Minister of Fisheries and Agriculture decides on the TAC of the haddock stock for each fishing year (September to August) in accordance to law (Fisheries Management Act 116), based on HCR and the advice mentioned below. Since the introduction of the HCR in the 2013-2014 fishing season the scientific advice has been according to the rule, and the TAC has been set equal to the advice.

The MRI advises the Minister of Fisheries and Agriculture on the exploitation of the haddock stock in June each year; ICES also provide advice. Both ICES and the MRI advise on research and harvesting policy in general. The recommendation given by the MRI is peer reviewed by the Advisory Committee (ACOM) of ICES every year.

7.2. Section 2: Compliance and Monitoring

Fundamental Clause:	**2.1 Implementation, compliance, monitoring, surveillance and control**			
Supporting Clauses:	2.1.1			
Clause Guidance:	***An effective legal and administrative framework at the local, national or regional level, as appropriate, shall be established for the fishery, and compliance shall be ensured through effective mechanisms for monitoring, surveillance, control and enforcement.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE
An effective legal and administrative framework has been established through various fisheries management acts. Compliance is ensured through strict monitoring, control and enforcement carried out by the Directorate and the Icelandic Coastguard.

EVIDENCE
The primary legislative instrument relating to fisheries management in Iceland, the **Fisheries Management Act No.116/2006**[32] superseded the Fisheries Management Act 1990 and establishes the requirement for all commercial fishing vessels to be permitted. These permits represent the initial legal requirement without which a vessel may not obtain the quota necessary to fish for Icelandic quota stocks, such as haddock. There are two categories of permit; a general permit with quota and a general permit with a hook-and-line quota. A register of all vessels permitted to fish in Icelandic waters is administered by the Maritime Division of the Icelandic Transport Authority.

The Act governing fishing activities within the Icelandic EEZ (Act No. 79/1997)[33] is the foundation for the Icelandic system of Individual Transferrable Quotas (ITQs) and grants powers relating to its administration to the Minister. The Act outlines the administration of fees where appropriate, the provision of powers to the Fisheries Directorate, penalties for breaches of the regulations and criteria for enacting temporary provisions. It further provides for the efficient utilisation of commercial stocks, specifies the Icelandic EEZ and prohibits foreign vessels from fishing within Iceland's EEZ (unless by prior Agreement). Under the Act the Ministers powers include, but are not limited to, the ability to limit gear types, fishing areas, fishing for certain stocks, prevent fishing in areas where the proportion of undersized fish in the catch exceeds agreed upon reference levels, and set rules surrounding the minimum legal saleable size of marine animals.

Penalties for violation of the provisions of the Act include up to 6 months imprisonment, confiscation of fishing gear and catch, temporary suspension of licenses and fines for violations of up to ISK 4,000,000 for a first offence and between ISK 400,000 and ISK 8,000,000 for repeat violations.

[32] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-116-2006-on-Fisheirs-Management.pdf
[33] http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-79-1997-Fishing-in-Iceland-Exclusive-Fishign-Zone.pdf

The Treatment of Commercial Marine Stocks **Act No. 57 1996** prohibits discarding and fishing without sufficient quota. In addition 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 which need not necessarily be Icelandic.

Within 2 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 Control and Inspection of Fish and Fish Produce **Act No. 55 1968** and **Regulation No. 224 2006** on Weighing and Recording of Catch[34]; the Act[35] also makes provisions for processing at sea, weighing by auction houses and the transfer of quotas to cover landings.

During the surveillance site visit assessors witnessed the landing, transfer to auction, weighing, tipping, re-icing and sale of fish using the electronic auction system as well as the labelling of catch for the purposes of traceability. The official weights are the sold and registered weights recorded on the calibrated scales and these are then submitted to the central database.

Each landing generates a weighing receipt recording:

- Vessel name, registration number and district number;
- Landing port and date of landing;
- Name of seller, buyer and recipient of the catch;
- Official weight by species of catch;
- Proportion of undersize fish in catch;
- Number, type and weight of tubs/boxes/barrels;
- Fishing gear used;
- Total number of pallets of platforms;
- Registration number and tare of transport vehicle;
- Whether catch is to be re-weighed;
- Whether any of the catch is un-gutted and needs to be either weighed after gutting or converted to a gutted weight using coefficients provided by Directorate.

The officially licensed scale operator then immediately enters the data into Directorates catch registration system.

The Directorate of Fisheries is responsible for the day-to-day implementation of Fishery Regulations; however, at sea surveillance is primarily the remit of the Icelandic Coast Guard. The Directorate is based in Hafnarfjörður and comprises approximately 70 staff split between its HQ and 6 other locations around the country. Surveillance is a big part of the work of the Directorate and it may be shore based, at sea or electronic using Vessel Monitoring Systems (VMS) and e-logbooks. In 2014/15, inspectors from the Directorate were present on 65 fishing trips (395 in 2013); the reason behind the sharp drop in at-sea inspections in the past fishing season was the non-availability of a RIB that would usually contribute the majority of boardings, the RIB is again available and inspections are expected to return to a more normal level (communicated to the surveillance team during the site visit with the Icelandic Coast Guard).

[34] http://eng.atvinnuvegaraduneyti.is/laws-and-regulations/fisheries/
[35] http://www.fisheries.is/management/fisheries-management/the-fisheries-management-act/

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 with using VMS systems) and the reporting of catch on entering or leaving Icelandic waters. Assessors visited the coastguard HQ during the surveillance audit site visit and were given a tour of the various monitoring and enforcement systems in place which represent effective mechanisms for the monitoring, surveillance, control and enforcement of fishing, and related activities, within Icelandic waters.

Vessel logbooks are inspected during random unannounced boardings both at sea (by the coastguard) or at the quayside (by Fisheries Directorate inspectors) which may include a comparison of catch and logbook entries. The main reasons for the generation of remarks during Coast Guard inspections have remained consistent across the period from 2005 to present (Figure 7); Note in this instance equipment relates to safety equipment and not to fishing gear which has a separate category.

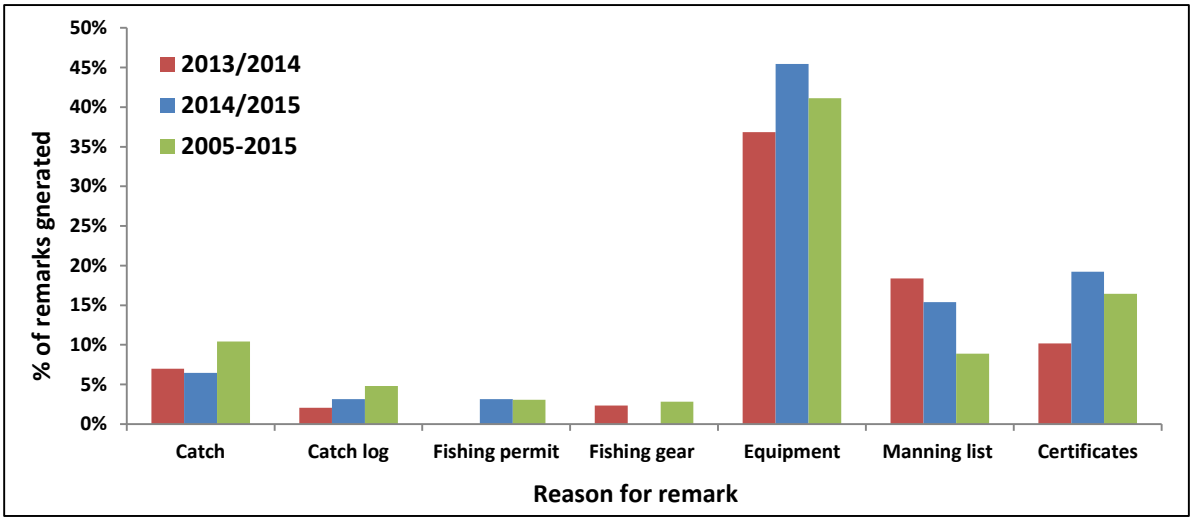


Figure 7. Reasons for the generation of remarks during Coast Guard inspections during the 2013-2014 (Red) and 2014-2015 (Blue) fishing seasons and the period from 1st January 2005 to 31st August 2015 (Green).

Fundamental Clause:	**2.2 Concordance between actual catch and allowable catch**			
Supporting Clauses:	2.2.1, 2.2.2, 2.2.3, 2.2.4 and sub-clauses			
Clause Guidance:	***Concordance between the Total Allowable Catch (TAC) and actual total catch from the stock under consideration shall be ensured through monitoring, control, enforcement, documentation, correction and verification activities. Accordingly, all participating companies engaged in fishing operations shall take responsibility and operate in compliance with the relevant rules and regulations.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

Catch must be weighed by an official weigher within 2 hours of landing. Standardised weights and tares for ice and tubs (with a capacity of 208-300kg) are used throughout the fishery. The registered weight for each landing is sent to the Fisheries Directorate, where it is compared to the e-logbook data for the fishing trip, before the appropriate amount is subtracted from the vessels quota. The official weights used are the standardised registered landing weight with logbook records being used as a supplementary source to cross-check landings. ITQ transfers are also monitored to ensure that in cases where vessels do not have sufficient quota to cover the entirety of their catch additional quota is rented in from other sources within 3 days of the landing date.

EVIDENCE

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

The Fisheries Directorate have at their disposal a number of IT based monitoring, reporting and recording systems developed and serviced by TrackWell, an Icelandic electronic systems based service company; these include satellite Vessel Monitoring Systems (VMS), e-log systems and electronic reporting systems both of which are legal requirements and generate mandatory reports to the Directorate. Data on catches and landings is available in near real-time providing a valuable management reporting system for fleet management. The vessel log book system requires that the operator of a vessel reports information for each haul of the fishing gear to the Directorate including; haul number, date, time, latitude, longitude, catch by species, zone, water depth, seafloor, wind direction, wind speed, gear used, as well as other information. There are also other elements of the system which allow fishing companies to compile the data from their vessel(s) in order to facilitate better targeting of fishing activity in terms of area, species or size class of product dependent on the market demands at the time and also to ensure better traceability of product.

Information is fed from a secure central server to a shared database that is accessible by both the Directorate (for management/enforcement purposes) and the MRI (for scientific purposes). Information from fresh fish landings is collected through the portside official weighing system which is carried out by official staff and calibrated systems.

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 days. 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)[36].

Fishing seasons in Iceland run from 1st September to 31st August the following year. Seasonal Total Allowable Catches (TACs) are set by the Minister of Fisheries and Agriculture, based on the recommendations from the Marine Research Institute (MRI); the International Council for the Exploration of the Sea (ICES) also provides advice on important Icelandic stocks, such as cod, haddock, saithe and golden redfish. Following the setting of the overall TAC each vessel is allocated a certain share of the overall TAC based on the number of shares in the Icelandic system of Individual Transferrable Quotas (ITQs) it possesses. Before catch is allocated proportions of the TAC of some species is removed for various reasons such as for the coastal fisheries which any small boat in possession of a licence may access, for research purposes or for chartered angling vessels.

ICES advised in 2014 that catches for the 2014-2015 season should be no more than 30,400 t. The TAC set by Icelandic authorities for the haddock in the quota year 2014-2015 was 30,400 tonnes. Actual catches in the 2014-2015 fishing season were approx. 34,000 tonnes. Catches of haddock in the quota year 2014-2015 were ~12% in excess of TAC recommendations.

In June 2015 ICES advised that catches of haddock in the 2015-2016 fishing season, based on the 2015 stock assessment and in accordance with the accepted HCR and management plan, should be no more than 36,400 t. The TAC of haddock in the 2015-2016 fishing season has been set at 36,400 t by the Icelandic Authorities. Evidence presented by the Fisheries Directorate and the Icelandic Coast Guard shows that vessel operators and companies are compliant with the relevant legislation and ensure catches by their vessels are in accordance with their catch quota.

In recent fishing seasons catches of haddock in Icelandic waters have generally been in excess of scientifically advised TACs; however, it should be noted the new HCR has only been implemented since the 2013-2014 fishing season. There appear to be a number of factors contributing to these overshoots including inter-annual and inter-species transfers, VS catches, research catches and catches by foreign vessels. There may also be some legacy haddock quota that has yet to work its way through the quota system from when the fishery was managed under the old HCR.

A review of the composition of excess catches in the 2014-2015 fishing season, conducted by the Icelandic Ministry of Industries and Innovation, revealed that the two largest contributory factors to excess catches were the Ministry's inability to obtain sufficient quota from the quota exchange "pot" to balance allocations, the exchange "pot" being one mechanism by which interspecies transfers are managed, and greater than anticipated catches by foreign vessels. The Ministry has advised that excess catches in 2014-2015 as a result of issues with the exchange "pot" have already been compensated for in the allocation of quota for 2015-2016 with 1,100 tonnes of haddock quota not being allocated and instead being retained by the Ministry as a "reserve".

Historically, catches of Icelandic haddock by foreign vessels as a percentage of overall catches have been minimal and as a result there has, until now, been no deduction to account for these prior to the allocation of Icelandic haddock quota. Pre-allocation deductions in quota to account for fishing by foreign vessels are practiced in most other demersal species within the Icelandic quota system.

[36] http://eng.atvinnuvegaraduneyti.is/media/reglugerdir/Regulation-224-2006-on-weighing-and-recoding-of-catch.pdf

Haddock is not generally a target species for foreign vessels fishing in Icelandic waters and is instead by-caught by vessels targeting cod. Recent changes in the spatial distribution of haddock around Iceland have led to an increase in encounter rates and a resultant increase in catches of haddock by foreign vessels. As a result of haddock TACs which have fallen, from a high of 105,000 tonnes in 2005-2006 and 2006-2007 to 30,400 tonnes in 2014-2015, these catches now make up a much greater component of overall catches of Icelandic haddock.

The combination of rising catches and decreasing TACs has increased the overall significance of catches by foreign vessels within the Icelandic haddock management system. As a result of their increased significance the Icelandic Ministry of Industries and Innovation is currently reviewing its policy of not compensating for catches by foreign vessels prior to the allocation of haddock quota. The aims of this policy revision are twofold; 1) to facilitate between species consistency within the Icelandic quota system considering the fact that pre-allocation compensations for fishing by foreign vessels are a component of quota management for most other demersal species and 2) to ensure that in the future actual catches align more closely with TACs. Evidence of past actions to compensate for excess catches in previous years include, in the case of the cod fishery, the setting of TACs by the Minister at levels below that implied by HCRs.

The MRI will issue a new haddock stock assessment and TAC recommendation according to HCR in June 2016 following which the Minister will set the overall haddock TAC for the 2016-2017 season and the quota allocations resulting from existing and any additional quota allocation rules will be made. Given that under the current haddock management plan HR_{MGT} is set at an additionally precautionary 0.4, below both HR_{pa} (0.46) and HR_{MSY} (0.52), the management system for haddock is inherently robust to the fact that catch-balancing mechanisms may in any year result in catches of haddock which exceed recommended TACs

Considering the relevant Clauses 2.2.1 and 2.3.5.1 of the Iceland Responsible Fisheries Management Specification:

Clause 2.2.1 – "*Concordance between the Total Allowable Catch (TAC) and actual total catch from the stock under consideration shall be ensured through monitoring, control, enforcement, documentation, correction and verification."*

Clause 2.3.5.1 – *"Analysis shall be carried out with the aim of detecting any deviations that may occur of the actual total catch from the Total Allowable Catch (TAC). Measures are available and are adopted when indicated."*

It is clear that; 1) monitoring is continually taking place; 2) analysis has been carried out which has both detected deviations of actual total catch from TAC and demonstrated the reasons behind these deviations; and, 3) management authorities have recognised the issue and are reviewing the quota allocation policy for haddock to facilitate the implementation of additional management measures to ensure the situation does not repeat itself in the future.

While concordance between TAC and actual total catch in 2014-2015 was less than desired given a TAC overshoot of ~12% the Management Authorities have recognised and reacted to the issue; however, as of yet there is no data to suggest future levels of concordance will increase. Levels of concordance will be reviewed during the second surveillance activities in late 2016 with a particular focus on the effectiveness of new management measures designed to take account of the contribution of foreign vessels to overall catches of haddock around Iceland.

Fundamental Clause:	**2.3.1 Vessel registration and catch quotas**			
Supporting Clauses:	2.3.1.1, 2.3.1.2, 2.3.1.3, 2.3.1.4			
Clause Guidance:	***Allocated catch quotas by species to registered vessels are assigned in such a way that the combined quotas conform to the currently effective decision on TAC. Accordingly, information on the size and composition of the fleet of fishing vessels shall be available and documented, and the catch quota of each vessel or vessel group for each fish species and fishing year shall be recorded in the official central database in a transparent manner.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

As the share of the TAC allocated to vessels is based on the number of shares for that particular species that the vessel owns the overall value of quota allocated cannot in the first instance exceed the TAC set by the Icelandic authorities; additional transfers either between years or between species may cause the amount vessels are allowed to catch to increase (Note cod is an exception in that there is no species from which quota may be converted into cod).

The overall TAC for the 2014/15 fishing season for haddock was set at 30,400 t live weight, of this 24,182 t (gutted weight) was allocated via the quota system. In addition to the initially allocated quota there was an additional 3,624 t allocated as a result of compensations totalling 1,317 t and a balance transfer of 2,307 t from the 2013/14 fishing season[37]. During the season 1,931 t of additional quota was transferred from other species. 1,871 t of haddock quota was transferred to the 2015/16 season.

EVIDENCE

Quotas conform to the overall decision on TAC, through the individual vessel quota share. Catches by vessel are monitored and recorded in near real-time in a central database curated by the Fisheries Directorate. The official weight of the catch is subtracted from that vessels individual quota share for a particular species. Should a vessel not have sufficient quota to cover its landings it may rent in quota, transfer quota between species based on the cod equivalent values of each species, keep 20 % of the value of the overage while forfeiting the remainder to scientific research or transfer a limited amount to the following fishing season where it is taken off that vessels individual quota share for that species.

Only vessels in possession of a valid permit from the Directorate of Fisheries are eligible to fish commercially. A register of permitted vessels is maintained by the Minister of Transport and Communications and the Icelandic Maritime Administration (IMA). By regulation only Icelandic licensed vessels (with some exceptions) are permitted to fish in Iceland EEZ. A small number of Norwegian and Faroese Islands vessels are allowed to fish for haddock in the Icelandic EEZ, with strict regulations in place. Information on size, composition of the fleet is available by vessel.

538 vessels recorded landings of haddock in the 2014/15 fishing season. Of these 440 received haddock quota through an initial quota allocation only (188), compensations only (96) or a

[37] http://www.fiskistofa.is/english/quotas-and-catches/total-catch-and-quota-status/?skipnr=0&timabil=1415&fyrirspurn=UmSkip&landhelgi=i

combination of the above (156); the remainder transferred haddock quota from other vessels or species to cover their catches. 292 vessels (totalling 2,047 t) undershot their quota in 2014/15 and had excess quota to transfer to the 2015/16 season while 215 vessels (totalling 2,080 t) overshot their quota and had the balance subtracted from their initial quota allocation for the 2015/16 season; in overall terms there was a quota overshoot of 33 t for haddock in the 2014/15 fishing season. For illustrative purposes Table 1 shows the first 10 lines of the publically available[38] data on individual vessels' quota allocations of haddock in the 2015/16 fishing season.

Table 1. First 10 lines of table showing the Icelandic haddock fleet TAC allocation (in kg of gutted catch), transfer, balances and catches for the fishing season 2014 – 2015.

Reg. no.	Vessel	Class	Alloc. quota	Compen-sations	Trfr. prev. year	Trfr. b/t vessels	Allowed catch	Catch	Balance	Over fished
13	Happasæll KE 94	A	21,849	0	0	-21,849	0	0	0	0
67	Hera ÞH 60	A	0	2,509	0	-2,509	0	0	0	0
78	Ísborg ÍS 250	A	0	0	0	0	0	0	0	0
89	Grímsnes GK 555	A	4,926	0	929	-5,385	470	690	-220	0
173	Sigurður Ólafsson SF 44	A	33,269	8,705	6,247	-23,371	24,850	19,860	4,990	0
177	Fönix ST 177	A	0	1,602	0	-1,602	0	0	0	0
182	Vestri BA 63	A	26,789	1,680	0	-10,675	17,794	28,065	-10,271	0
233	Erling KE 140	A	80,009	0	15,006	-81,150	13,865	1,688	12,177	0
237	Fjölnir GK 657	A	283,829	0	53,500	-16,812	320,517	277,942	42,575	0
239	Tjaldanes GK 525	A	0	0	0	0	0	51	-51	0

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 for haddock, along with the fishing year is recorded in the official central database in a transparent manner and is publically accessible.

Registered catches are based on information from ports of landing and information on catcher exported unprocessed. The catch statistics are published, subject to change once they have been compared to submitted reports from buyers, and are available at:
http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/aflastodulisti.jsp?lang=en

[38] http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/aflastodulisti.jsp?lang=en

Fundamental Clause:	**2.3.2 Fishing vessel monitoring and control systems**			
Supporting Clauses:	2.3.2.1, 2.3.2.2, 2.3.2.3, 2.3.2.4, 2.3.2.5, 2.3.2.6, 2.3.2.7, 2.3.2.8, 2.3.2.9, 2.3.2.10, 2.3.2.11, 2.3.2.12, 2.3.2.13, 2.3.2.14, 2.3.2.15, 2.3.2.16,			
Clause Guidance:	***A program for the monitoring and control of fishing vessel activities shall be operated and enforcement shall be in place to prevent fishing by unauthorised vessels. Closed areas shall be monitored, the fishing gear and fishing logbooks shall be subject to inspection, as well as the composition of the catch and its handling onboard the fishing vessels. Catch amounts by species and fishing area shall be estimated and continually recorded in fishing logbooks on-board the fishing vessels. Discarding of catch from the stock under consideration shall be prohibited, those that may occur shall be monitored and all catches shall be landed in authorised fishing ports where harbour officials and fisheries inspectors shall monitor the correct weighing and registration of the catch. Accordingly, vessels must comply with all relevant National Fishery Management measures.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

The Icelandic Coastguard administers the VMS for all Icelandic vessels and for all foreign vessels (including fishing vessels) that enter Icelandic waters as part of an integrated monitoring, control and surveillance (MCS) system. The purposes of the MCS system are numerous including maritime traffic control, marine search and rescue and fisheries enforcement. The importance of the fisheries sector to the Icelandic economy and the need for greater efficiency, due to the relatively small size of the institutions involved, has led to high levels of collaboration and integration resulting in creative and dedicated approaches to fisheries management and enforcement. The fisheries MCS system in Iceland has at its core the effective use of available technology meaning relatively small staff numbers are able to achieve extensive monitoring of the Icelandic fishing industry.

EVIDENCE

The Icelandic Coastguard administers the VMS for all Icelandic vessels and for all foreign vessels (including fishing vessels) that enter Icelandic waters as part of an integrated monitoring, control and surveillance (MCS) system. The purposes of the MCS system are numerous and it incorporates several related services including maritime traffic control, marine search and rescue, fisheries enforcement, coastal radio and border control in a single operations centre. The importance of the fisheries sector to the Icelandic economy and the need for greater efficiency, due to the relatively small size of the institutions involved, has led to high levels of collaboration and integration resulting in creative and dedicated approaches to fisheries management and enforcement. The fisheries MCS system in Iceland has at its core the effective use of available technology meaning relatively small staff numbers are able to achieve extensive monitoring of the Icelandic fishing industry.

The integrated system uses all available data such as identification of the vessel, its movements, IUU lists, notifications, reports, fishing licenses, permits, port State control reports, etc. and has proved to be effective in combating and eliminating illegal, unreported and unregulated (IUU) fishing in the Icelandic Exclusive Economic Zone (EEZ) and the North Atlantic Ocean. Bilateral tracking agreements

are in place with Greenland, Faroe Islands, Norway and Russia whose vessels must follow automatic procedures and report catches daily.

The ICG uses several different but complementary electronic vessel monitoring systems including satellite-based systems including VMS and satellite radar images, the monitoring of coastal activity through a dedicated land-based very high frequency (VHF) system and the use of the Automatic Identification System (AIS). The VHF and AIS systems have a range of 30–60 nautical miles while the satellite-based VMSs can be used anywhere in the world. The use of complementary systems ensures that the limitations that arise when any one system is used in a standalone capacity are mitigated. These electronic MCS systems are further backed up by more traditional methods of surveillance such as patrol vessels and aircraft; indeed the use of electronic systems in the effective targeting of traditional surveillance methods increases the efficiency of these systems. Emphasis is placed on data analysis including the use of VMS data in conjunction with other sources (e.g. IUU vessel lists, vessel registries, fishing licences, permits, port State control reports); the below schematic outlines the inputs which make up the integrated MCS system in Iceland (Figure 8).

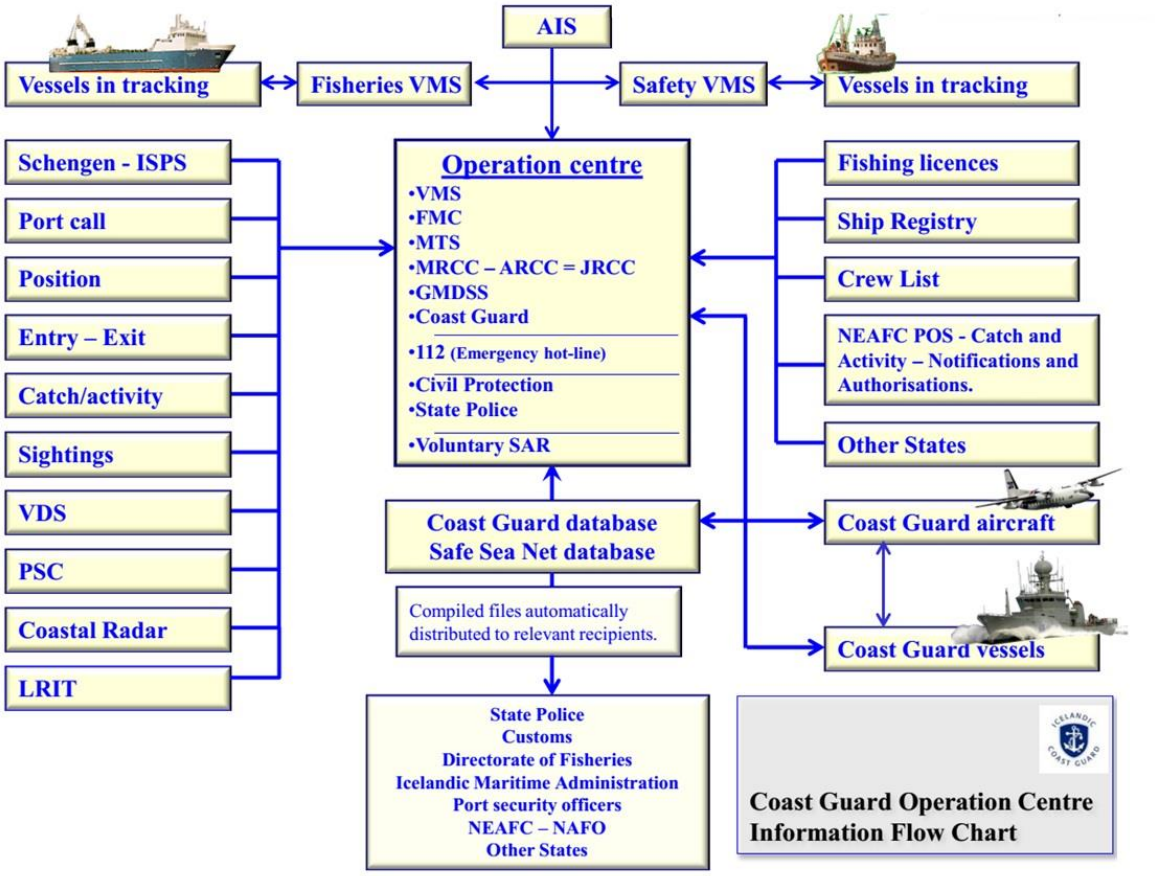


Figure 8. Schematic outlining the inputs which make up the integrated Monitoring, Control and Surveillance (MCS) system in Iceland.

The Coastguard conduct unannounced at-sea vessel boarding's in order to inspect gear, catch and catch records including logbooks as well as to perform inspections of mandatory safety equipment while log books may be subjected to in-port inspections by inspectors from the Fisheries Directorate. Data on coastguard enforcement activity in the past year has been provided in Clause 2.1.

Fisheries Directorate Inspectors also measure the length of the fish caught and if the percentage of fish below the minimum legal size in the catch exceeds a specified threshold, a proposal is submitted to the MRI to temporarily close the fishing grounds with immediate effect and generally lasts for two

weeks; the decision to temporarily close an area does not require Ministerial approval. If there is considered to be sufficient reason to close the fishing grounds for a longer period such as three temporary closures in the same area, the Minister may issue a regulation to this effect. Both short and long term closures are primarily monitored and enforced by the Icelandic Coast Guard using the VMS system; while the main role of VMS tracking is geared towards safety the spatial nature of the available data allows closed areas to be monitored remotely. Vessels fishing in proximity to closed areas are monitored at the Coast Guard operation centre and vessels are directly contacted if the encroach on prohibited areas; this is the first point at which the Coast Guard operator may issue a warning to the vessel and decide to escalate if necessary.

Further information relating to fishing vessel monitoring and control systems may be found at:
http://www.fao.org/docrep/013/i2099e/i2099e00.pdf
and
http://www.fiskistofa.is/media/utgefid_efni/DOF.pdf.

Fundamental Clause:	**2.3.3 Catches are subtracted from relevant quotas**			
Supporting Clauses:	2.3.3.1, 2.3.3.2, 2.3.3.3, 2.3.3.4, 2.3.3.5			
Clause Guidance:	***Landed catches shall be subtracted from the relevant quotas (allowable catch) of the vessel or vessel group. Limited allowance may be made for the use of quota for one species to count against landings of another species, with the objective of providing the necessary minimum flexibility and discouraging discards. Transfer of quota between vessels shall take effect only after it has been authorised and recorded to the official central data base and information on each vessels catch quota and quota use shall be updated regularly and made public and accessible to all on the official website, thus ensuring transparency.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

As the Icelandic groundfish fishery is a mixed fishery it is necessary to incorporate a degree of flexibility in the quota management system so that the species composition of catches may be matched with the quota portfolio available to individual fishing vessels. There are a variety of provisions in place to facilitate flexibility and reduce any potential incentives relating to the discarding of fish. Current quota share ad TAC allocations by species as well as running catch totals and remaining quota for the season for each vessel are freely available on the Directorates website meaning the system is very transparent.

EVIDENCE

As the Icelandic groundfish fishery is a mixed fishery it is necessary to incorporate a degree of flexibility in the quota management system so that the species composition of catches may be matched with the quota portfolio available to individual fishing vessels. There are a variety of provisions in place to facilitate flexibility and reduce any potential incentives relating to the discarding of fish.

A vessel is allowed to exceed its allocation for a particular species in a fishing season by up to but not exceeding 5%; the excess is then deducted from that vessels allocation for that species in the following fishing season.

A vessel is allowed to postpone fishing up to 15% of its quota for a particular species in a fishing season and transfer the balance to the following season; this measure may be particularly beneficial to the growth of long-lived species in maximising the return from strong year classes.

The results some of inter-vessel and inter-seasonal transfers aimed at balancing catches and quotas may be seen in the table provided under clause 2.3.1.

In addition to within-species quota transfers between vessels and/or fishing seasons the systems also makes provision for some limited quota transfer between different species; note that it is not possible to convert quota of other species for cod quota (e.g. cod quota may be exchanged for haddock quota but haddock quota may not be exchanged for cod). Interspecies transfers of quota are based on cod-

equivalents a nominal value based around the market value of cod. The cod-equivalent values of a number of representative species during the 2014/15 season are presented in Table 2. As can be seen the cod-equivalent value for more commercially valuable species is higher e.g. high commercial value species Monkfish = 2.05 V Capelin = 0.12 low commercial value species; therefore 1 kg of monkfish quota buys you 17 kg of capelin quota. Cod equivalents change seasonally; for the 2015/16 season the cod-equivalent value of haddock has increased to 1.3 meaning that whereas in 2014/15 1 t of cod quota was worth 0.81 t of haddock quota in 2015/16 it is only worth 0.77 t.

Table 2. Cod-equivalent values of representative species during the 2014 – 2015 fishing season.

Species	**Cod Equivalents**	**Species**	**Cod Equivalents**
Cod	***1***	***Cod***	***1***
Deep sea redfish	1.04	Capelin	0.12
Greenland halibut	2.48	Plaice	0.81
Golden redfish	0.79	Monkfish	2.05
Lobster	5.98	Catfish	0.79
Inshore Shrimp	1.43	Saithe	0.77
Blue whiting	0.1	Shrimp	1.21
Ling	0.68	**Haddock**	**1.23**
Redfish	0.36	Lemon sole	1.44

Current quota share and TAC allocations by species as well as running catch totals and remaining quota for the season for each vessel are freely available on the Directorates website meaning the system is very transparent. In the 2015/16 fishing season to date, as of November 19th 2015, 7,362 t of gutted haddock have been caught in the fishery[39].

All transfers of quota must be authorised by the Fisheries Directorate. Application forms for the transfer of quota are available online and must be transmitted directly to the Directorate for authorisation of the transfer. If a fishing company wishes to transfer quota between two or more of its own vessels they may do so within all the relevant laws and regulations. All the necessary application forms for transfer of quota are available online[40].

[39] http://www.fiskistofa.is/english/quotas-and-catches/quota-status-and-catches-of-species-by-vessel/aflastodulisti.jsp?lang=en

[40] http://www.fiskistofa.is/eydublod/flutningurveidiheimilda/

Fundamental Clause:	**2.3.4 Rules are enforced**			
Supporting Clauses:	2.3.4.1			
Clause Guidance:	***Rules shall be enforced. There shall be penalties for serious infractions.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE
Surveillance and enforcement of rules are carried out by the Icelandic Coastguard, the Marine Research Institute and the Fisheries Directorate. There are various penalties for serious infractions depending on the nature of the infraction and the number of times the offender has contravened the regulations.

EVIDENCE
There is a clearly established legal framework which sets out rules and regulations relating to fishing activity within Icelandic waters and gives powers to the Ministry, the Fisheries Directorate, the Coast Guard and the MRI to monitor fishing activities and enforce these rules.

On a day-to-day basis rules are primarily enforced by the Directorate through powers to collect levies, monitor, inspect, report and gather evidence for prosecution purposes where violations are suspected. All prosecutions resulting from enforcement activities are conducted via the Icelandic legal process (Ministry of Justice and Human Rights). In addition, within the remit of the overall Ministry of Industries and innovation, the MRI also has the legal power to enact temporary spatial closures.

A breakdown of enforcement activities from 2011-2015, including the number of vessel inspections carried out, was submitted by the Icelandic Coast Guard and is presented in the supporting evidence for Clause 2.1.

Fundamental Clause:	**2.3.5 Analysis is carried out**			
Supporting Clauses:	2.3.5.1, 2.3.5.2, 2.3.5.3			
Clause Guidance:	***Analysis shall be carried out with the aim of detecting any deviations that may occur of the actual total catch from the Total Allowable Catch (TAC). Measures are available and are adopted when indicated. Anyone purchasing and/or selling catches shall be obligated to present reports to the appropriate authorities, containing information on the purchase, sale and other disposition of fish catches.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

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.

EVIDENCE

Export documentation provides an independent comparative check on catch quantities for different species. Analysis of catches includes the comparison of reported catches with the amount of sold or exported products to verify independently that 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. All processors purchasing fish, be it directly or at auction, are obliged to submit monthly reports to the Directorate. In addition, the fish auction reports all sales of fish directly to the Directorate.

There are effective systems in place to ensure the traceability of catch. The detailed spatial information available for each fishing trip means catch may be traced directly from whence it was caught through subsequent processing, export and delivery to final market. Information relating to the provenance of the catch is communicated both to the Directorate's website and directly to the purchaser.

The official registration of landings contains a unique vessel identifier relating to the fishing vessel that landed the catch allowing traceability to individual vessels. In most cases, the unique vessel identifier remains with the batch throughout production and often on the final pack. For wet fish sales, from the auction, a vessel unique number is registered within the central e-auction for tracking purposes.

Full traceability is possible using all the tools within the system, however, not all buyers require full traceability from fishing vessel to the final product.

7.3. Section 3: Ecosystem Considerations

Fundamental Clause:	**3.1 Guiding principle**			
Supporting Clauses:	3.1.1, 3.1.2			
Clause Guidance:	***Adverse impacts of the fishery on the ecosystem (e.g. bycatch, ETP species interactions, habitat and foodweb interactions etc.) shall be considered, appropriately assessed and effectively addressed. Those impacts that are likely to have serious consequences shall be addressed. This may take the form of an immediate management response or further analysis of the identified risk.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE
Adverse impacts of the fishery on the ecosystem (e.g. bycatch, ETP species interactions, habitat and foodweb interactions etc.) are considered, appropriately assessed and effectively addressed.

EVIDENCE
The Marine Research Institute of Iceland is the key institution charged with the gathering of scientific knowledge of the marine ecosystem. There are extensive studies and assessments conducted annually to determine the status of fish species in Icelandic waters and enable management to make informed decisions so that stocks may be harvested in a responsible manner such that the long-term productivity of marine resources is maximised and maintained.

In addition to species specific research the MRI also conducts monitoring of the wider marine ecosystem with programs aimed at:

- Collection and analysis of **oceanographic and physical data** to enhance the understanding of environmental drivers of fluctuations in species assemblages within the Icelandic EEZ including their effects on inter-specific interactions such as the cop-capelin predator-prey relationship
- Measurement of all species comprising **retained catches** with commercial fisheries. Most commercially fished species in Iceland are now part of the ITQ system for which individual vessels have a specific quota. Discard is prohibited and comparison between observer measured catch compositions and self-reporting by fishers ensures that a high level of compliance with the ban on discarding is maintained. Discards are not included in the fisheries assessments as they are generally considered to be negligible; however, should the situation change and discards increase then these changes should be detectable within the system.
- Interactions between **Endangered, Threatened and Protected Species (ETP)** and fishing gears are monitored and reported.
- Fishers are now required by law to report non-ETP **bycatch of non-fish species** such as marine mammals and seabirds; there are specific sections of the electronic logbook system aimed at accomplishing this.

- **Habitat interaction** between demersal fishing gears and the seabed. The level of interaction varies with gear type with towed bottom gear such as demersal trawls and dredges having a greater impact than static gear such as set nets or pots. Of the total catch of haddock in the 2014/15 season including landings from the Barents Sea (37,851 t), 47% (17,937 t) was taken by bottom trawls, 41% (15,361 t) by longlines, 10% (3,912 t) by Danish seines, and the remaining 2% (641 t) by other methods. As previously described there are numerous measures in place for the protection of grounds thought to be important as nursery areas for juveniles of various fish species.
- **Ecosystem interactions** of commercial fisheries such as the effects of the commercial fisheries for cod on inter-specific dynamics such as the cop-capelin predator-prey relationship.

Environmental conditions in Icelandic waters, 2014

Estimates of seasonal conditions in Icelandic waters have been partially based on data collected during the annual spring cruise in May/June; the methodology used is consistent between years so that fluctuations in environmental conditions can be evaluated. Analysis has shown that seasonal conditions vary markedly between years. Studies indicate that in general warm currents to the north of Iceland result in increased overall production; however, there is a complex web of environmental factors which drive fluctuations in the abundance and distribution of commercial stocks around Iceland.

The following is a brief discussion of recent seasonal conditions in Icelandic waters based on information provided in Environmental section of the Marine Research Institute report State of stocks 2013/2014 - Prospects 2014/2015.

Temperature

Following a warm period in the North Atlantic, 1965 – 1971 became known as the "Sea Ice Years" as a result the influence of cold, low salinity polar currents around Iceland; since then there have been alternating warm and cold years with 1979 and 1995 being the coldest on record. Since 1995 measurements have shown a generally warming trend in the North Atlantic with temperatures at or above the long term average. From 2006 – 2008 spring surface (0–50 m) temperatures and salinities hovered around the long term average, but from 2009–2014 they were well above it; 2015 represented a slightly cooler year with SST just above the long term average (Figure 9).

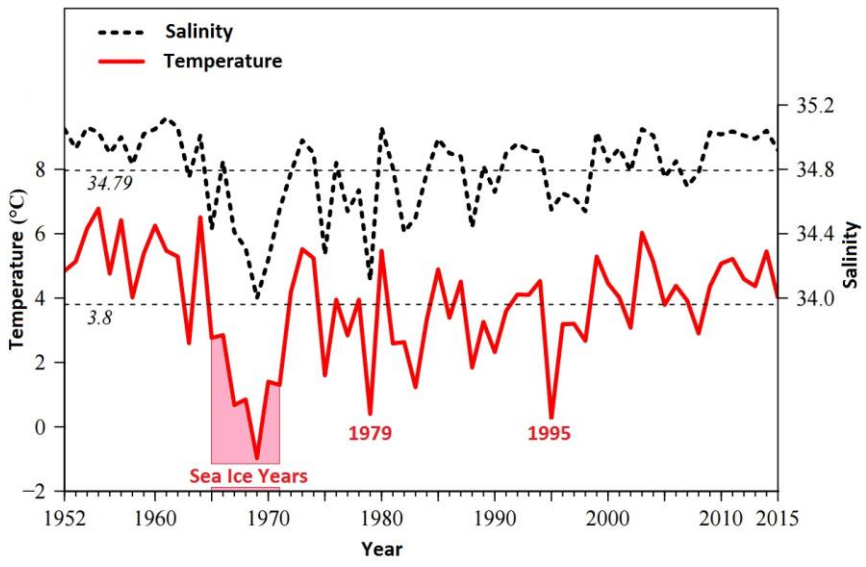


Figure 9. Temperature and salinity in spring surface temperatures (50m depth) at station 3 of the Siglunes section from 1952 – 2015; the horizontal lines represent the long term averages. (Figure adapted from Nytjastofnar sjávar 2014/2015 og aflahorfur 2015/2016).

Bottom water temperature

Bottom temperatures in Icelandic waters are usually lower to the north and east of the island due to the influence of cold waters from the north, whereas waters to the south and west are warmed by waters from the south. Bottom temperatures on the continental shelf generally reach their minimum from February to March and peak in August, September or sometimes even later. Due to the waters on the shelf being shallower they are generally thermodynamically less stable with greater fluctuations in bottom temperature when compared to deeper areas; beyond the shelf margin bottom temperatures are always below 0°C (Northern Seas deep water). Off the north of Iceland, in Eyjafjarðarál where depths reach as much as 700m, cold water comes close to land dividing the northern fishing grounds in two. On the continental slope south and west of Iceland bottom temperature decreases with depth, but rarely drops below 4°C.

For the past decade in Icelandic waters temperatures have generally been above average; 2005 was an exception in some areas in the southeast of the island due to the southeast current shifting for a short period. Measurements taken in spring 2014 showed the near-bottom water temperature to be around the long term average (Figure 10).

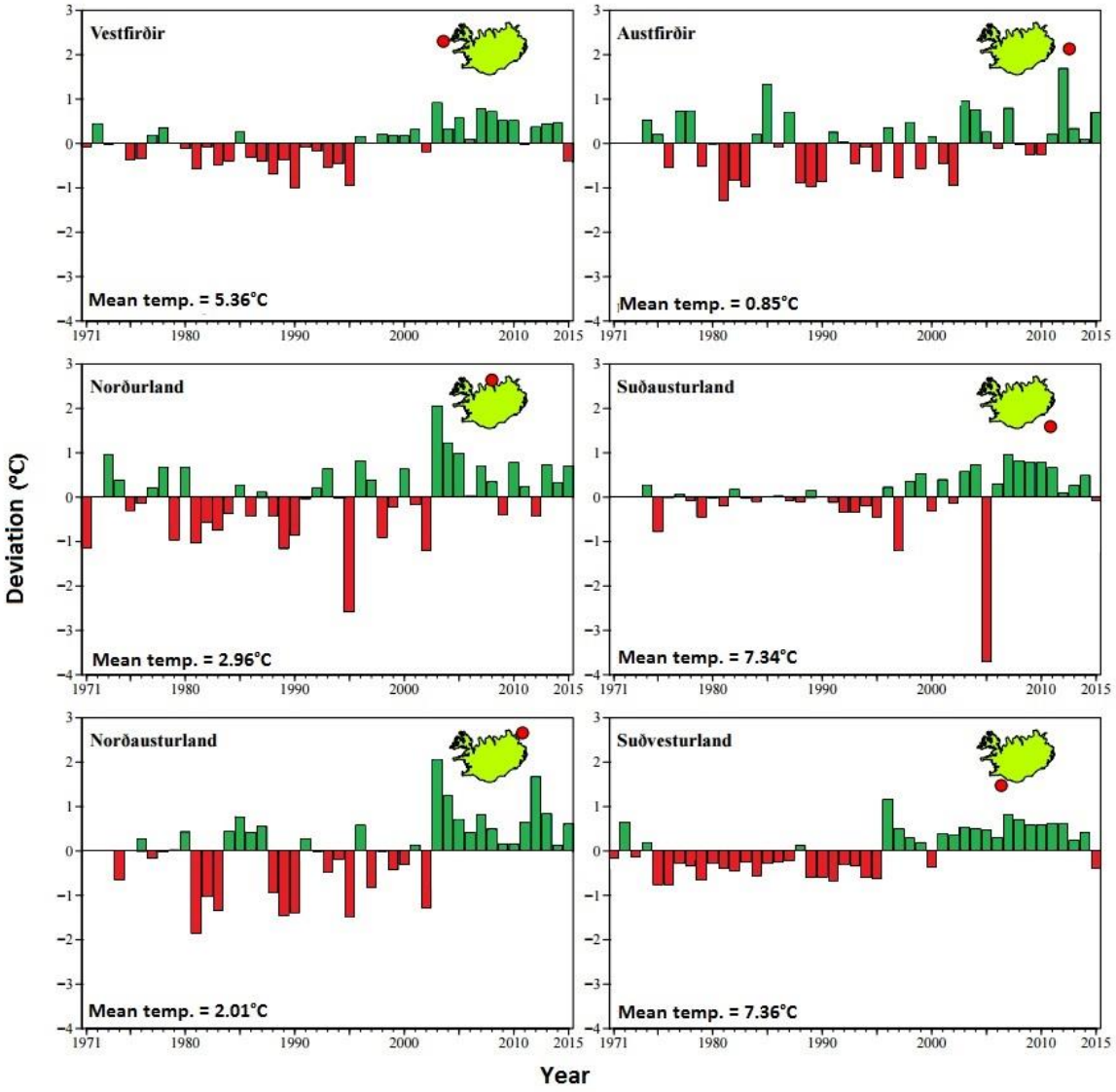


Figure 10. Deviations from mean near-bottom water temperature in Icelandic waters from 1971 to 2015; mean temperatures for each station are presented in the lower left of each panel. (Figure adapted from Nytjastofnar sjávar 2014/2015 og aflahorfur 2015/2016).

Zooplankton

Zooplankton represent an important prey species for forage species such as capelin and herring as well as being a primary food source for other commercial species during the larval stages of their life cycles. The availability of sufficient zooplankton is considered to be an important factor which contributes to rates of larval mortality and research by the MRI has shown a correlation between spring zooplankton levels and the abundance of cod fry the following August indicating interconnectivity between species at different trophic levels.

Studies aimed at following the long term trends in zooplankton abundance began around 1960. Recent years, 2013 – 2015, have seen zooplankton abundances off North Iceland below the historical average[41] (Figure 11).

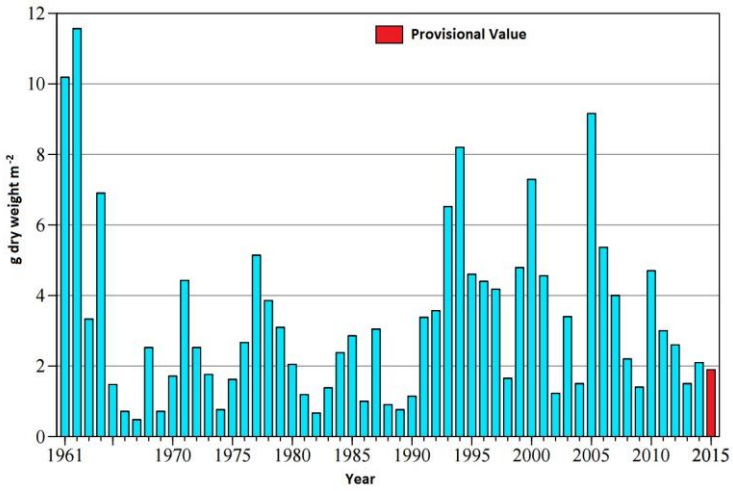


Figure 11. Mean Zooplankton biomass (g dry weight m^{-2}, 0–50 m) in spring across all stations within the Siglunes section from 1961 to 2015. Data for 2015 represent provisional values. (Figure adapted from Nytjastofnar sjávar 2014/2015 og aflahorfur 2015/2016).

Retained catch

Landings of haddock in the 2014-2015 season totalled 37,851 t; of this ~47% (17,937 t) was taken by bottom trawls, ~41% (15,361 t) by longlines, ~10% (3,912 t) by Danish seines and the remaining ~2% (641 t) by various other methods including handlines, gillnets, nephrops trawls, pelagic trawls, lumpsucker nets and angling (Figure 12).

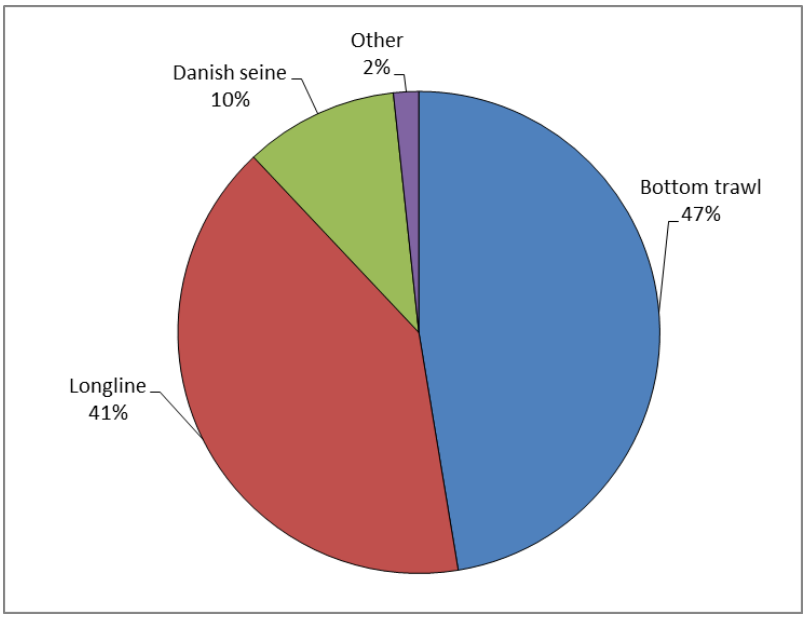


Figure 12. Proportion of total landings of haddock by gear type during the 2014 – 2015 fishing season other includes. (Source Fisheries Directorate website: www.fiskistofa.is).

[41] http://www.hafro.is/Astand/2015/umhverfi_2015.pdf

Three fishing gears, bottom trawls, longlines and Danish seines accounted for a cumulative 98% of haddock catches. Major retained species accounting for >1% of the cumulative total for each of these three gear types are presented below (Table 1). These 14 species (ordered by total catches in the 3 gears previously listed); cod, golden redfish, saithe, Greenland halibut, deepsea redfish, ling, greater argentine, Atlantic wolffish, plaice, tusk, starry ray, lemon sole, witch(flounder) and dab were taken to be major bycatch species in the haddock fishery; further information on the status of these stocks is presented.

Table 3. Total catches and % contribution, by gear type, for species that represent >1% of the overall catch for the major gear types used to fish for haddock.

Gear type	Species	Total catches (t)	% Contribution to total catches by gear type
Bottom trawl	**Cod**	111,323	44%
	Saithe	44,545	17%
	Golden redfish	44,062	17%
	Haddock	17,937	7%
	Greenland halibut	10,017	4%
	Deepsea redfish	8,959	4%
	Greater silver smelt	6,803	3%
Longline	**Cod**	77,394	67%
	Haddock	15,361	13%
	Ling	7,836	7%
	Atlantic wolffish	4,627	4%
	Tusk	4,022	3%
	Starry ray	1,389	1%
	Golden redfish	1,303	1%
Danish seine	**Cod**	10,796	46%
	Plaice	4,327	18%
	Haddock	3,912	17%
	Lemon sole	1,277	5%
	Atlantic wolffish	1,101	5%
	Witch	603	3%
	Dab	520	2%
	Golden redfish	449	2%
	Ling	301	1%

Cod

Total landings of Atlantic cod (*Gadus morhua*) in 2014 were 221,000 t, compared to 223,000 t in 2013. The total allowable catch (TAC) for cod in the quota year 2014/15 was set according to the harvest control rule (HCR) at 218,000 t. Biomass indices in the spring survey have more than doubled in the last seven years, mostly due to increased abundance of older cod. Mean weights at age in the landings and spring survey have increased in recent years and are presently around the long-term average. The reference biomass (age 4 and older) in 2015 is estimated 1,302,000 t and the spawning stock is estimated at 547,000 t, compared to Blim = 125,000 t and Btrigger = 220,000 t. The reference biomass has increased in recent years and is now larger than observed in the last three decades. The spawning stock has not been larger since the early 1960s. During the last decade, the harvest rate has declined from 34 – 40% to around 20% and the fishing mortality from above 0.7 in 2000 to 0.3 in 2014. Recruitment during this period has been around two thirds of the long-term average. The decrease in

harvest rate, imposed by management action, has hence been the main reason for the increase in stock size. Based on the present assessment, the TAC in 2015/16 should be set at 239,000 t according to the management plan. It is expected that catches in the next few years will remain around that level. The Marine Research Institute (MRI) iterates the importance that catches are constrained within that specified in the HCR. There appears to be a high degree of spatial overlap between cod and haddock fishing grounds meaning technical interaction between the two stocks is highly likely (Figure 13).

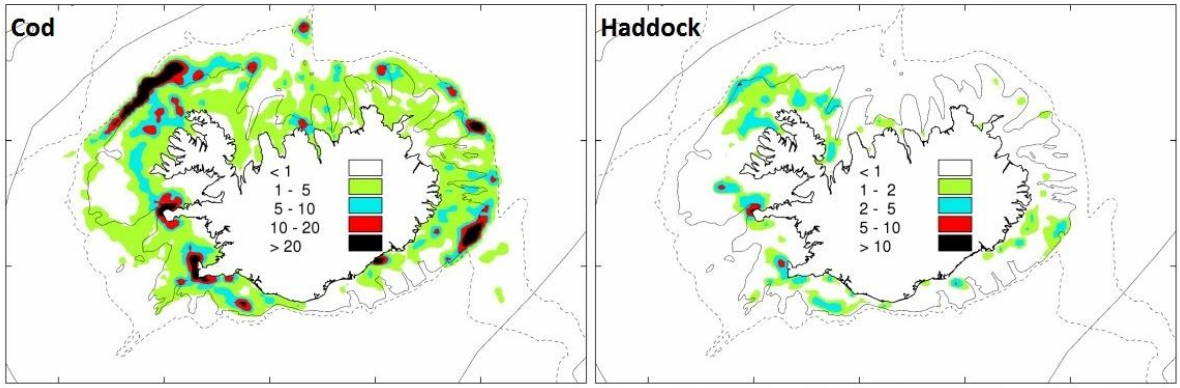


Figure 13. Cod (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Saithe

In 2014, landings of saithe (Pollachius virens) were 46,000 t, compared to 58,000 t in 2013. The TAC for the quota year 2014/15 was set according to the harvest control rule (HCR) at 58,000 t. The catch weights have decreased for ages 4–6 in recent years but are close to average for other ages. Biomass indices from the spring trawl survey were high in 2012 – 2013 but lower in 2014 – 2015. The reference biomass of age 4 and older is estimated as 255,000 t at the beginning of 2014, with a harvest rate of 18% in 2014. In spring 2013, the Icelandic government adopted a management plan for the saithe fishery. ICES has evaluated this management plan and concluded that it is in accordance with the precautionary approach and the MSY framework. It is based on a HCR that sets the upcoming TAC as an average of the last TAC and 20% of this year's reference biomass. A lower harvest rate is applied if the spawning stock biomass goes below the reference point Btrigger (65,000 t). The 2008 and 2009 year classes are large but recruitment has been lower since then. Short-term projections based on the HCR indicate that the reference biomass at the beginning of 2016 will be around 238,000 t. According to the HCR, the saithe TAC for the quota year 2015/16 will be 55,000 t. Spatial overlap between haddock and saithe fishing grounds appears limited meaning levels of technical interaction between the two stocks are likely to be low (Figure 14).

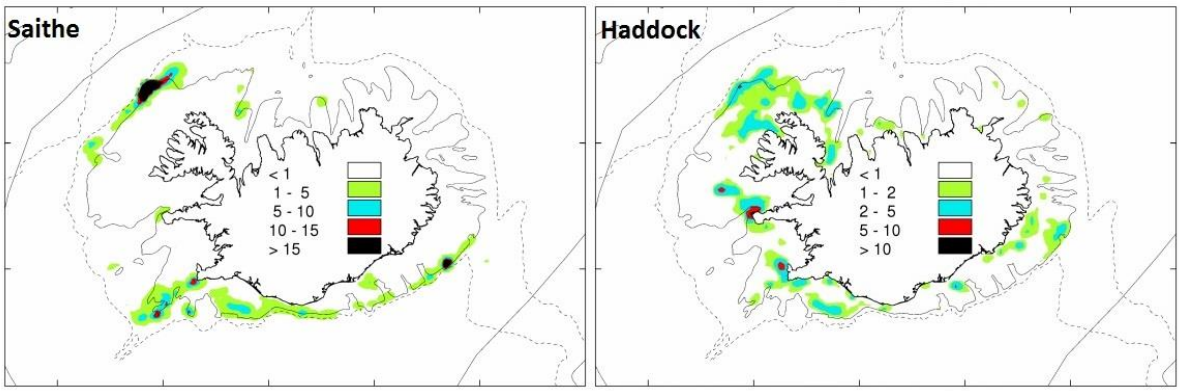


Figure 14. Saithe (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Golden Redfish

In 2014, approximately 51,000 t of golden red- fish (*Sebastes norvegicus*) were landed from the East-Greenland, Iceland and Faroese waters, about 2,500 t less than in 2013, and of which about 48,000 t were caught in Icelandic waters. According to an age-length based model (Gadget) the spawning stock has increased since 2005 after a considerable reduction from 1985 – 1995. Fishing mortality has decreased in recent years and is now close to $FMSY_{9-19}$ = 0.097. There are indications from surveys conducted in Icelandic and East-Greenland waters that recruitment in recent years has been poor. In 2014, the Icelandic government adopted a formal management plan for the golden redfish fishery in East Greenland/Iceland/Faroes area. ICES have evaluated this management plan but Greenland and the Faroes have not yet adopted it. The management plan is based on a HCR of $FMSY_{9-19}$ = 0.097, reducing linearly if the spawning stock is estimated below 220,000 t ($B_{trigger}$). According to the HCR, the golden redfish TAC for the quota year 2015/16 will be 51,000 t for the East Greenland/Iceland/Faroes area. There appears to be a minimal spatial overlap between haddock and golden redfish fishing grounds meaning technical interaction between the two stocks is unlikely (Figure 15).

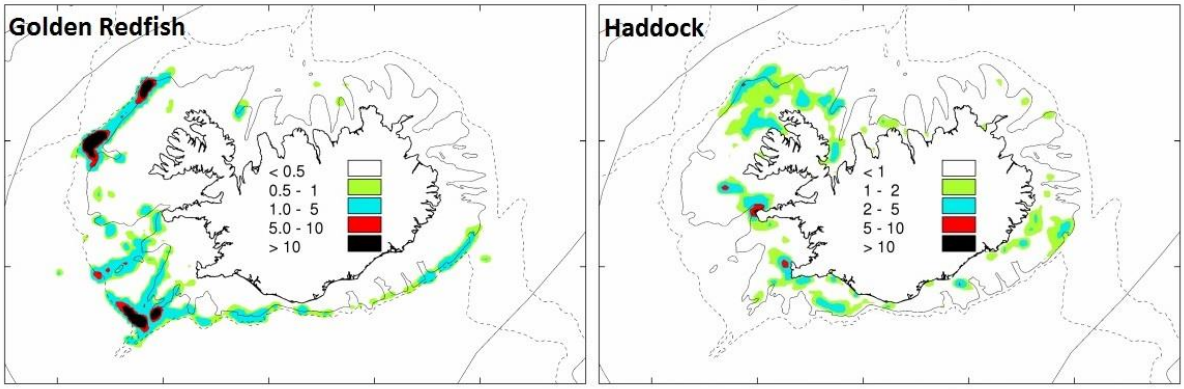


Figure 15. Golden redfish (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Greenland halibut

Greenland halibut (*Reinhardtius hippoglossoides*) from the East Greenland/Iceland/Faroe Islands region (GIF) is considered a single stock, so stock assessments and advice from ICES and the MRI have referred to it as such. At the end of May 2014, Iceland and Greenland adopted a bilateral five-year management plan for Greenland halibut. The management plan declares their agreement that both nations should fish the stock with consideration of an international precautionary approach to management and using the F_{MSY} provided by ICES. Agreement was reached between the two nations that Iceland should have rights to 56.4% of the recommended TAC and Greenland would have rights to 37.6%. Agreement between these two nations and the Faroe Islands was not reached, so Faroese effort and landings will not be bound by the Icelandic/Greenlandic agreement. In 2014, approx. 21,000 t of Greenland halibut (*Reinhardtius hippoglossoides*) were landed from the East Greenland, Iceland, and Faroese waters, of which the Icelandic fleet caught 10,000 t. CPUE of the Icelandic trawler fleet has been slowly increasing from a historical low in 2005. Biomass indices from combined surveys in Icelandic and Greenlandic waters have been increasing in recent years and are close to the high levels observed in 1998 – 2001. ICES and MRI recommend that effort should be reduced to a level corresponding to the long-term maximum sustainable yield. Such effort corresponds to a total catch of no more than 22,000 t for the East Greenland, Icelandic and Faroese waters in the 2015/16 quota year. There appears to be no spatial overlap between the fishing grounds for haddock and Greenland halibut (Figure 16).

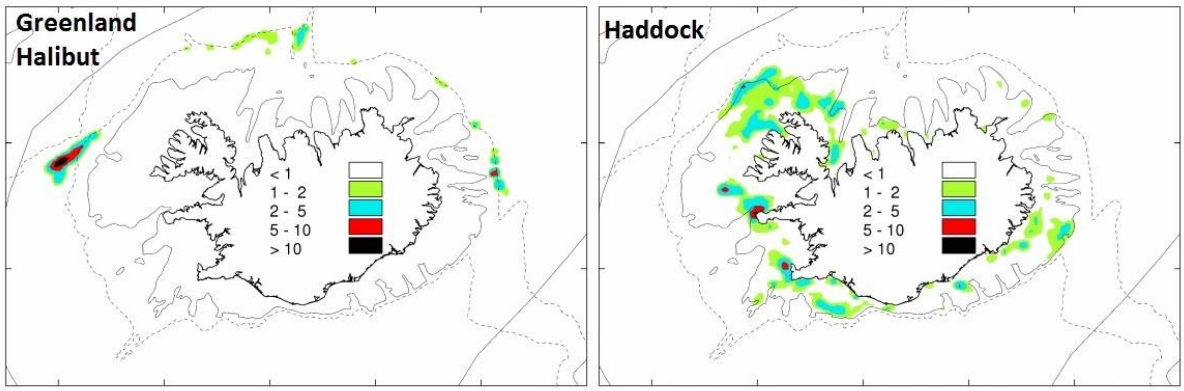


Figure 16. Greenland halibut (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Ling

Landings of ling (*Molva molva*) in 2014 were 14,000 t, having increased steadily since 2001. Survey indices of harvestable biomass have remained high since 2007; however, the juvenile index has been at low levels for the last three years. Estimates from an analytical stock assessment indicate that SSB has increased in recent years and at the same time fishing mortality has decreased and was at FMSY in 2014. SSB and catches are projected to decline in coming years due to the low estimates of recent recruitment. MRI and ICES recommend a TAC of no more than 16,200 t on the basis of FMSY in the quota year 2015/16, including catches of foreign fleets which have been about 1,500 t in recent years. There appears to be some spatial overlap between haddock and ling fishing grounds to the south and west of Iceland; the range of ling does not extend to the north and east of the country (Figure 17).

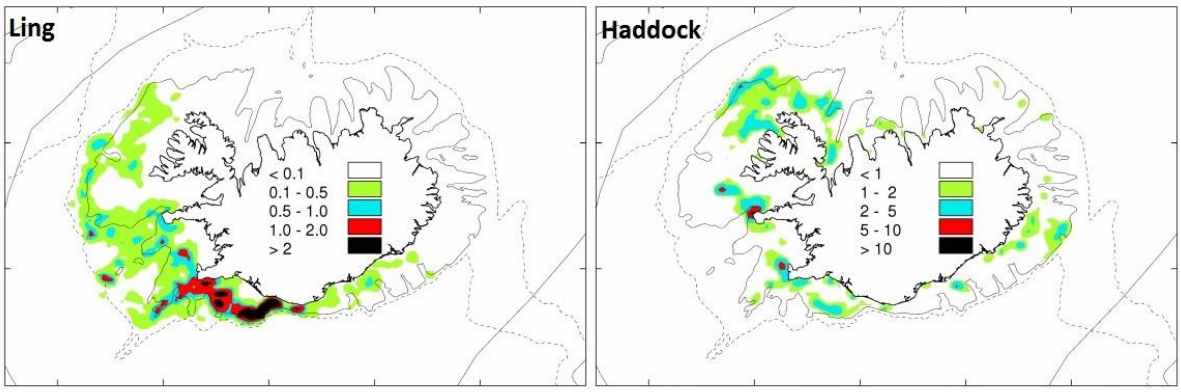


Figure 17. Ling (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Deepsea redfish

In 2014, about 9,500 t of Icelandic demersal deep sea redfish were landed, about 700 t more than in 2013. The lack of long-term indices of abundance prevent analytical assessment, but survey indices from the autumn survey since 2000 are used as basis for the advice. The index of fishable biomass decreased in 2000 – 2014. ICES and MRI recommend that effort should be kept low and the TAC in Icelandic waters should not exceed 10,000 t for the quota year 2015/16. There appears to be no spatial overlap between haddock and deep sea redfish fishing grounds (Figure 18).

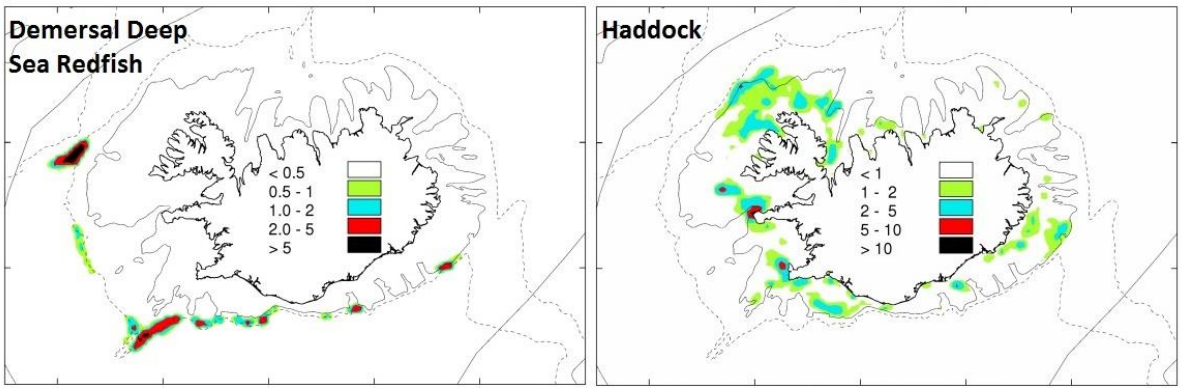


Figure 18. Deep sea redfish (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Atlantic wolffish

Landings of Atlantic wolffish (*Anarhichas lupus*) in 2014 were about 7,300 t, the lowest landings since before 1950. The index of fishable biomass is above average but recruitment indices are at historically low levels. The fishable part of the stock has been decreasing since 2006 and is not expected to increase much in the coming years, since recruitment to the fishable stock will be low. MRI recommends a TAC of no more than 8,200 t for the quota year 2015/16, based on F_{MAX} = 0.29. In addition, MRI recommends a continued closure of the major spawning area off West Iceland during the spawning and incubation season in autumn and winter. There appears to be a moderate degree of spatial overlap between haddock and Atlantic wolffish fishing grounds with areas of highest intensity in both fisheries occurring apart from each other (Figure 19).

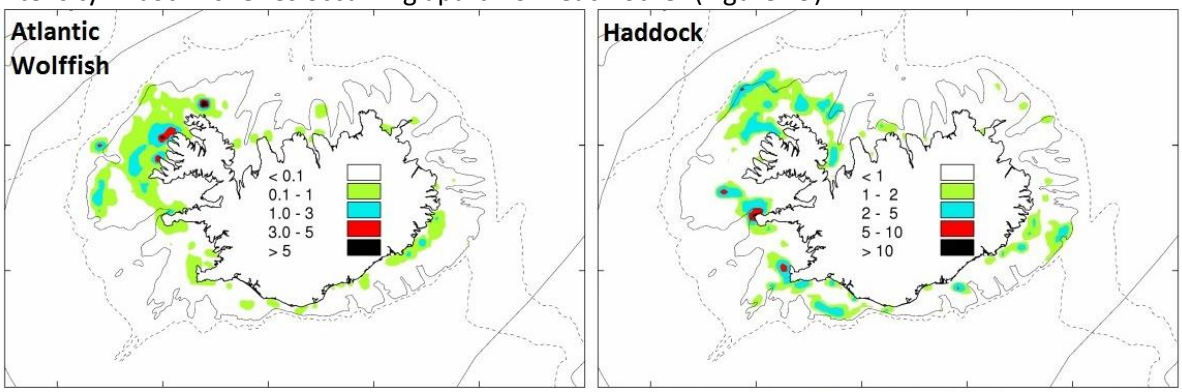


Figure 19. Atlantic wolffish (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Greater Silver Smelt

Historically, in Icelandic waters, greater silver smelt had been caught in bottom trawl fisheries following the commencement of direct targeting in 1997 landings increased from 800 tonnes in 1996 to over 13,000 t in 1998. Between 2000 and 2007 landings ranged from 2,500 t to 4,800t, before increasing and peaking at more than 16,000 t in 2010. Following the peak in 2010 landings decreased partly due to improved management and in 2013 landings decreased to about 7,200 t. ICES considers the significant increase in greater silver smelt fishing in recent years to be well beyond the limits of a precautionary approach to stock management.

ICES recommend that greater silver smelt landings in 2016 should not exceed 6,477 t. The advice is based on a biomass index from the Icelandic autumn survey, used as an indicator of stock size and a derived F_{proxy} based on catch/survey biomass. The index in 2014 was very high due to few large hauls in the Icelandic autumn survey. Therefore, the index used for advice in the last three years was re-calculated using Winsorization (truncation) of the data (ICES, 2010). In spite of this the change in the

index from 2013 to 2014 is unlikely to be driven by changes in biomass. The 2014 value is thus capped at 1.2 times the 2013 value and the F_{proxy} target is not reduced by 20% as it was in the 2014 advice. This approach is intended to give a more stable advice that better fits with the dynamics of the stock.

According to the MRI in 2014, about 6,300 t of greater silver smelt (*Argentina silus*) were landed, compared to the historical maximum of 16,400 t in 2010. The fishable biomass index increased in 2014; however, this change is unlikely to be driven by changes in biomass. The stock is assessed with limited data and must therefore be harvested with caution. MRI recommends a TAC of 8,000 t for the quota year 2015/16. The MRIs advice is based on the fact that there is little variation in both the fishable stock biomass index between years and in the average age of greater silver smelt in landings from 2010 – 2013; in addition the recommendation is near F_{max} according to the Gadget model. There appears to be minimal spatial overlap, and hence technical interaction, between the Icelandic haddock and greater silver smelt commercial fisheries (Figure 20).

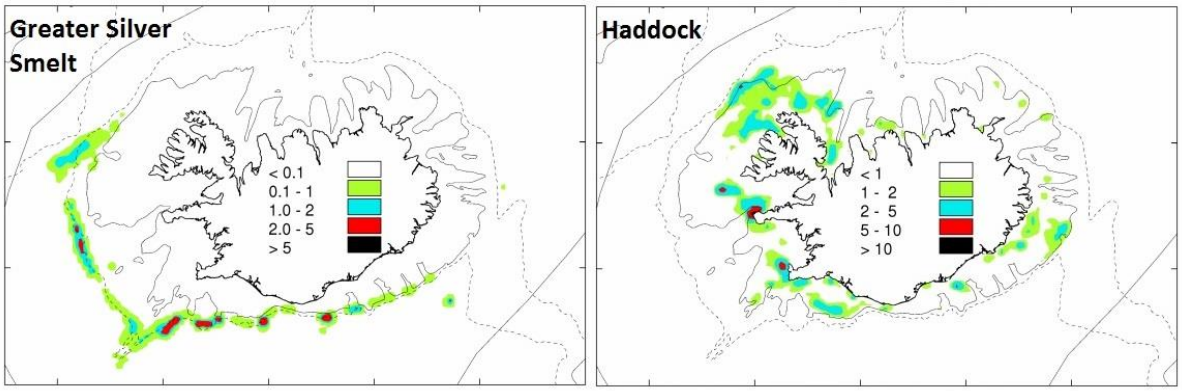


Figure 20. Greater silver smelt (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Plaice

In 2014, about 6,000 t of plaice (*Pleuronectes platessa*) were landed. Survey biomass indices have been stable and increased somewhat in recent years. Stock assessment indicates a decrease in fishing mortality since 1996 and an increase in biomass since 2000. MRI recommends that the catch should not exceed 6,500 t in the quota year 2015/16, and that regulations regarding area closures on spawning grounds remain in effect. There appears to be significant spatial overlap, and hence technical interaction, between the Icelandic commercial fisheries for haddock and plaice making technical interactions likely (Figure 21).

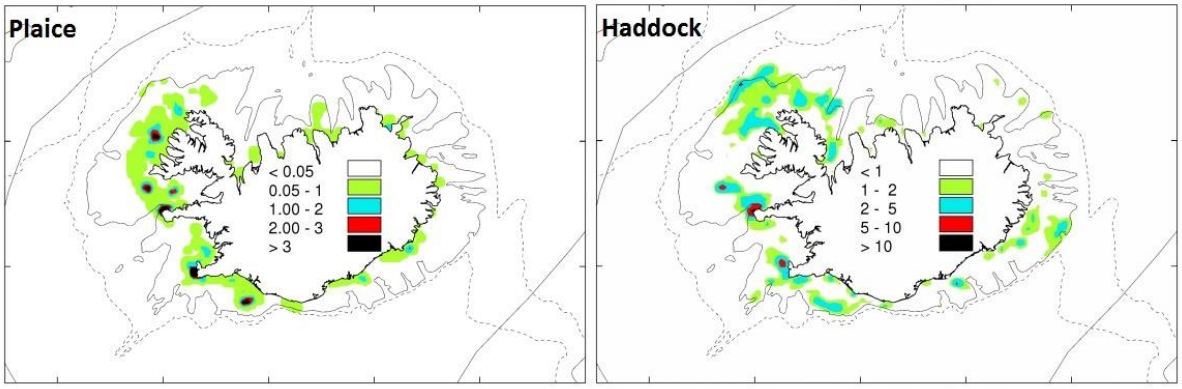


Figure 21. Plaice (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Tusk

Landings of tusk (*Brosme brosme*) from Icelandic waters were 6,000 t in 2014. Indices of the fishable biomass in the spring survey increased considerably in 2001 – 2012, but have varied at high level in the last three years. According to ICES recruitment peaked in period from 2004 to 2006 but declined to a historical low level in 2013; there are signs of increased recruitment since then. Fishing mortality has declined in recent years and is above the current F_{MSY} estimate. SSB has been increasing in recent years and is likely above any candidate MSY Btrigger.

The tusk stock assessment is based on the Gadget model as recommended by ICES. Following the advice of ICES, MRI recommends that the catches be no more than 3,440 t in the quota year 2015/16, including catches of foreign fleets. This advice is based on F_{MSY} = 0.20. It is furthermore recommended that the closure of nursery areas off the southeast and south coast is continued. There appears to be minimal overlap between areas of highest intensity in haddock and tusk fisheries (Figure 22).

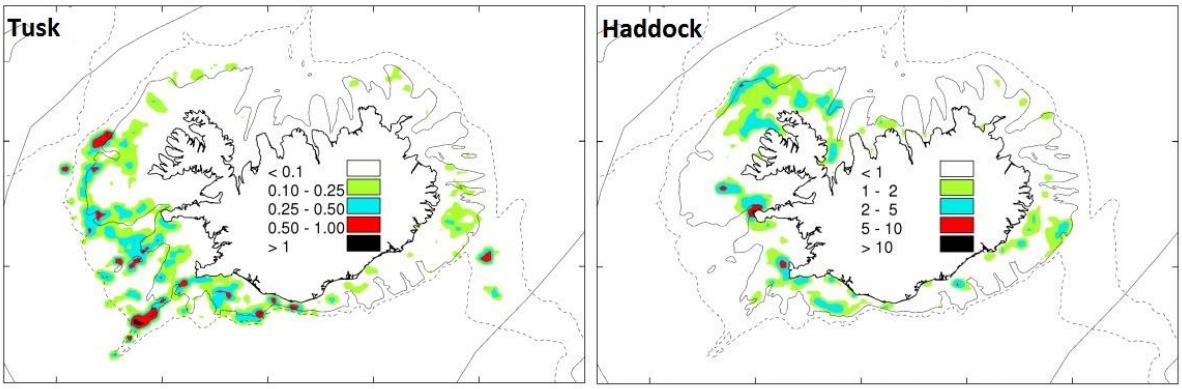


Figure 22. Tusk (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Lemon sole

In 2014, about 1,200 t of lemon sole (*Microstomus kitt*) were landed. Survey indices of the fishable stock were high from 2003 to 2010, but have decreased in 2011 to 2015. Recruitment indices have been high since the early 2000s. CPUE in the demersal seine fishery off Southwest Iceland has doubled from the period 1993 to 1998 to the present. Preliminary stock assessment indicates a high fishing mortality rate. MRI recommends a TAC of no more than 1,300 t for the quota year 2015/16. There appears to be a moderate level of spatial overlap between areas of highest catches of haddock and lemon sole around Iceland (Figure 23).

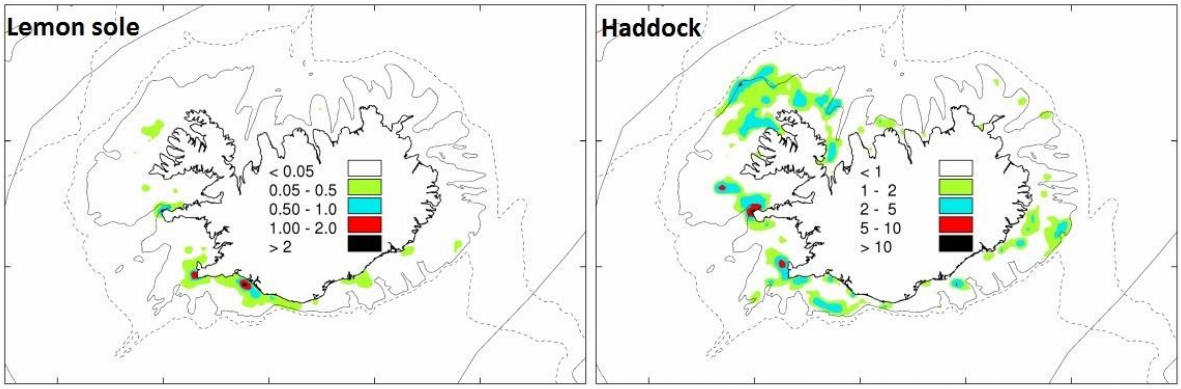


Figure 23. Lemon sole (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Starry ray

Starry ray are not a quota species in Iceland and hence are not subject to formal assessment. The starry ray has always been fished as bycatch in a variety of fishing gear around Iceland and until recently been discarded as trash fish. The increase in landings in recent years can therefore mostly be explained by increased retention (this species has no TAC). The landed catch has grown from virtually nothing in 1980 to more than 1,000 tonnes annually after 1995; catches have declined again in recent years. A relatively large share of the catch goes to local consumption as the grey skate which Icelanders have traditionally consumed has become very rare with starry ray being used as a replacement in local dishes. The starry ray is fairly abundant all around Iceland, but no formal stock assessment is conducted on this species. While catches of starry ray totalled 9% of longline catches of haddock by weight, catches of starry ray across the three main haddock fishing gears demersal trawls, longlines and Danish seines only encompassed 4% of the corresponding haddock catches.

Witch flounder

Since 1988, landings of witch (*Glyptocephalus cynoglossus*) have ranged between 900 and 3,000 t, with landings in 2014 amounting to about 1,200 t. The abundance index for the fishable stock reached a maximum in 2005, declined in 2005–2008 but has since been stable. CPUE shows a similar trend, although it has increased since 2012 concurrent to a decrease in fishing effort. Survey data indicate a considerable decline in recruitment in recent years. MRI recommends a TAC of no more than 1,100 t for the quota year 2015-2016. There appears to be a moderate level of spatial overlap between areas of highest catches of witch flounder and haddock around Iceland (Figure 24).

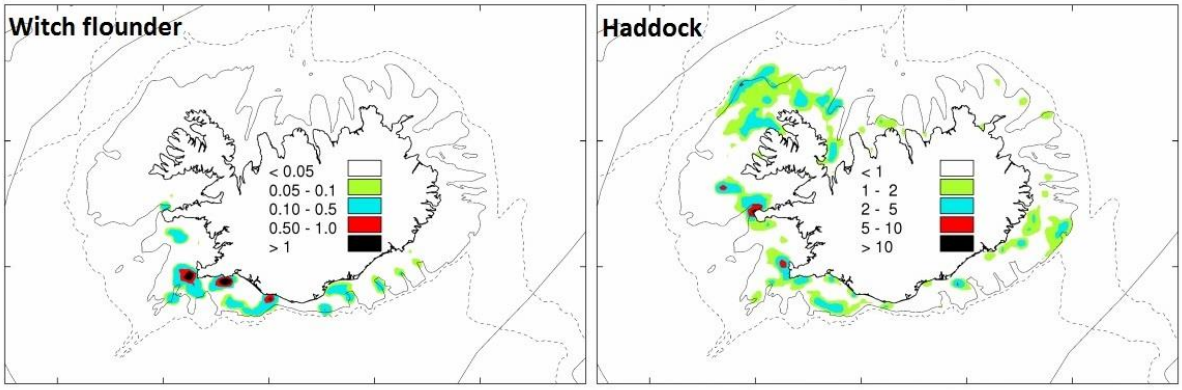


Figure 24. Witch flounder (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Dab

In 2014, 505 t of dab (*Limanda limanda*) were landed. Between 1987 and 1997, landings of dab increased from 1,200 to 8,000 t, but have since decreased substantially. Survey indices of fishable biomass and juvenile abundance declined considerably in 2015. There currently no directed fishery for dab but Figure 17 shows where dab catches came from in 2014. MRI recommends a TAC no higher than would result from bycatch in other fisheries of 500 t in the defined management area for the quota year 2015/16. There appears to be a moderate level of spatial overlap between areas of highest catches of dab and haddock around Iceland in 2014 (Figure 25).

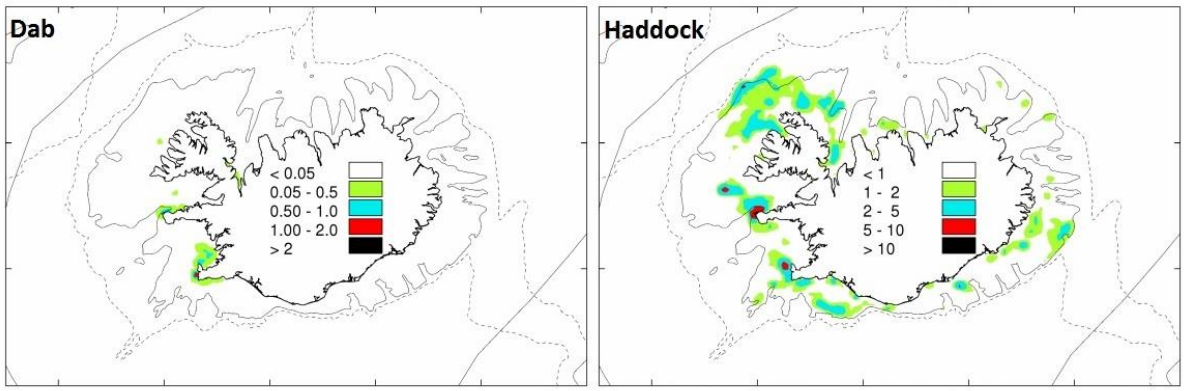


Figure 25. Dab (left) and haddock (right) fishing grounds in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Vulnerable or Endangered/Threatened/Protected (ETP) Species Interactions

Other species that do not encompass a major component of catches in the main gear types targeting haddock but are seen to be either vulnerable or ETP species include the common skate (*Dipturus batis*), Atlantic halibut (*Hippoglossus hippoglossus*) and Greenland shark (*Somniosus microcephalus*).

Common/Grey skate

The grey skate used to be fairly common in Icelandic waters, but has been overfished as catches are now only about 10% of catches 50 years ago. There is no TAC on the grey skate as it is primarily a bycatch in a variety of fisheries. The status of the grey skate stock can be compared to the halibut stock as both species are at a low level. Both are widely distributed, fished in many types of fishing gear, very large and mature late**.** In 2014/15 the total catch of common skate (*Dipturus batis*) in Icelandic waters was 117 t. No TAC is available for this species because there is no directed fishery for it.

MRI will continue to report on incidences of capture and distribution of skate during the spring bottom trawl survey as they have been doing since the survey began in 1985. In addition, catches in commercial fisheries will continue to be collected and the MRI will monitor whether significant changes either the survey results or the level of landed catches occur. Currently the catches are stable, if low (Figure 26).

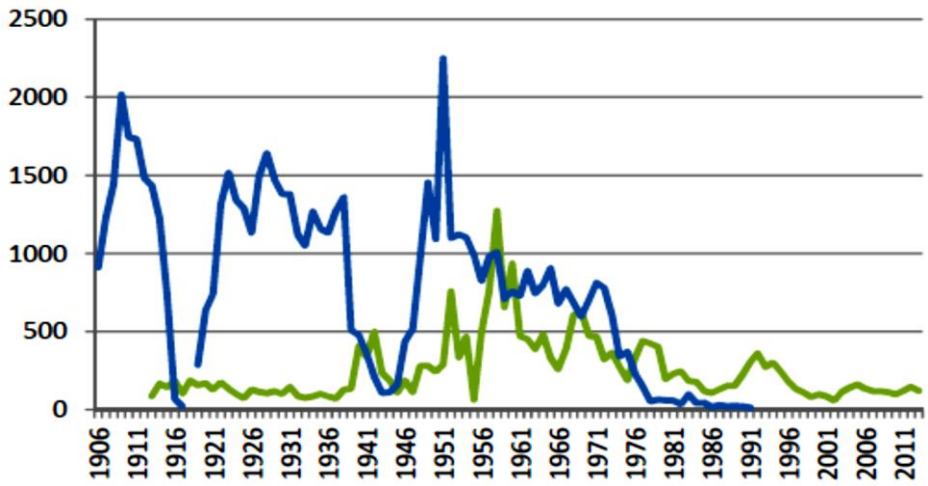


Figure 26. Landings of common skate by Icelandic (Green) and international vessels (Blue) from 1906 to 2012 (Landings 2014/15 =117t).

The common skate is listed as Critically Endangered to Extinction on the IUCN Red list but not officially listed as a stock of concern in Iceland. Catches and indices of abundance are, as for other stocks, reviewed to consider if there are potential concerns to the stock status; incidences of capture of skate in the MRI spring groundfish surveys have been increasing in recent years (Figure 27).

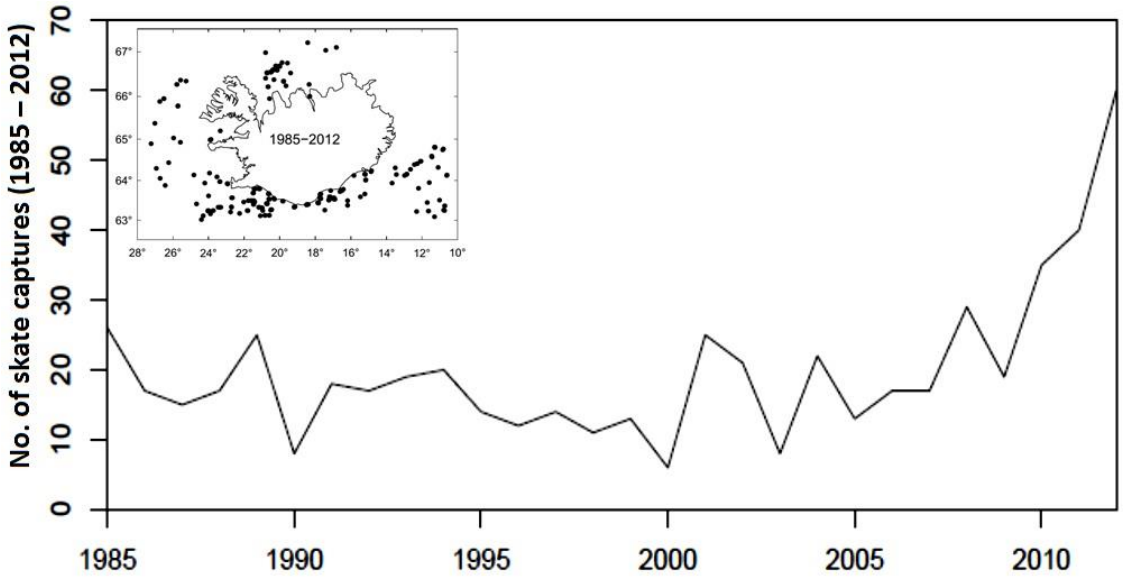


Figure 27. Spring groundfish survey incidences of skate (*D. flossada*) captures per year (1985-2012). Y axis represents the number of skate caught. The inset panel shows the survey catch locations for the species in question.

Halibut

In 2012, a regulation was issued to ban all directed fishery for halibut (*Hippoglossus hippoglossus*) and that all viable halibut must be released in other fisheries; the effects of this regulation can be seen in Figure 21 (Left panel). Landings totalled 53 t in the 2014/15 fishing season, compared to 555 t in 2011, with 51 t coming from demersal trawls. Historically, halibut has mainly been taken as bycatch in the bottom trawl and longline fisheries. In the years immediately preceding the 2012 regulation, a directed longline fishery for halibut was developing, coinciding with a sharp decline in the survey biomass index. In recent years, the biomass indices from the groundfish survey have declined to a very low level. Currently, the halibut stock seems to be severely depleted (Figure 28), with very little recruitment into the spawning stock in recent years. MRI recommends that these regulations should be maintained until clear indications of improvement in the stock are evident.

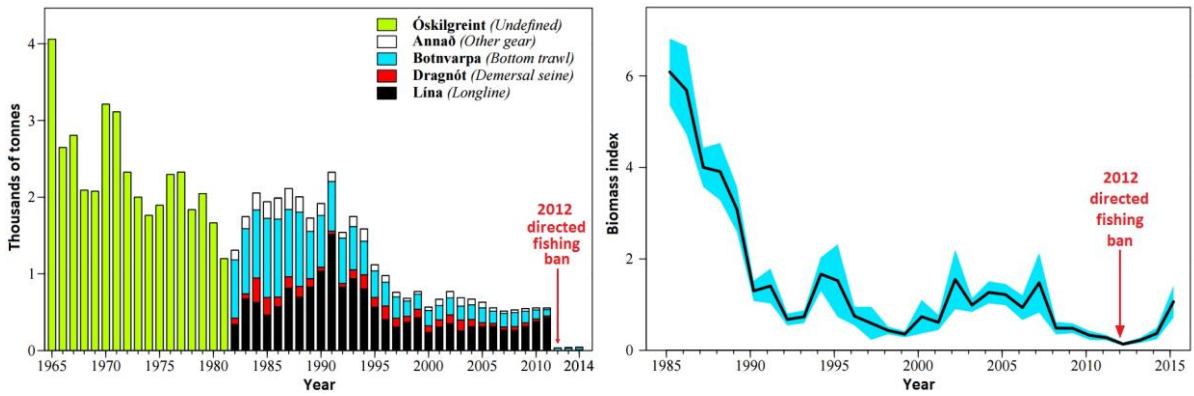


Figure 28. (Left Panel) Landings of Atlantic halibut from 1965 to 2014 (split by gear type after 1982); 2014/15 landings = 53 t. (Right Panel) Fishable biomass index in the Icelandic groundfish survey in March, along with the standard deviation.

While there is currently no directed fishery for Atlantic halibut Figure 29 shows where catches came from in 2014 in relation to catches of haddock; there appears to be no spatial overlap so technical interaction between the two fisheries should be minimal.

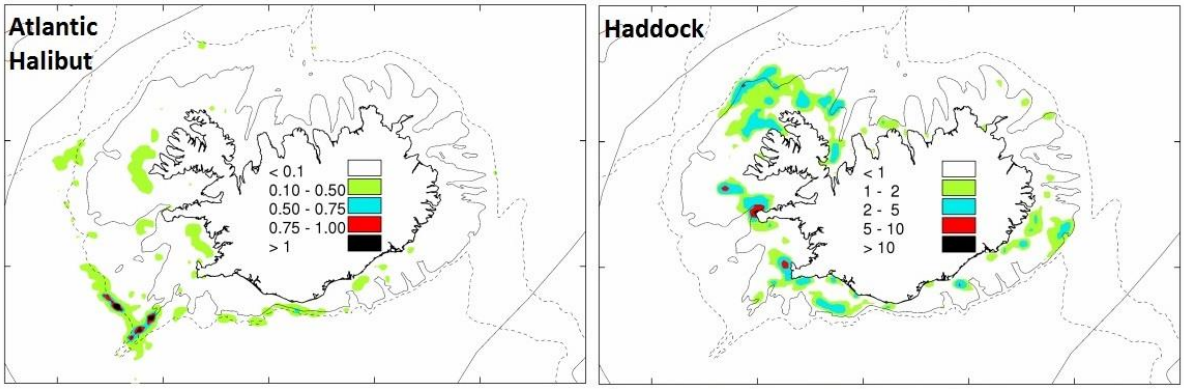


Figure 29. Spatial location of Atlantic halibut (left) and haddock (right) catches in 2014. Dark areas indicate highest catch (tonnes/nmi^{-2}).

Greenland shark

Historically Greenland sharks (*Somniosus microcephalus*) were fished in Icelandic waters with the fishery reaching its peak in 1867 when 13,100 barrels (each approx. 62l) of shark oil were exported. The main focus of the fishery was the liver which contained valuable oil used at the time as fuel. When whale oil and later fuel oil became more available the markets for the shark oil disappeared and direct fisheries for the Greenland shark ceased by about 1910. Since the cessation of commercial fishing catches have been low at or about 40 tonnes annually, mostly bycatch in bottom trawls but a few individuals are caught each year in direct longline fisheries. Most of the catches are during spring and early summer[42]. No information is available on the stock status of this species and it is unclear whether there is any direct or technical interaction between this species and those fisheries associated with haddock.

Discards

Since 1996 discarding is prohibited and subject to penalty[43]. Practically, if vessels do not have sufficient quota to cover the species they have caught they are required to quota through the quota transfer system. Consequently if vessels do not have sufficient catch quotas for their probable catches they must suspend all fishing activities; this means that under the ITQ system, the discard policy primarily affects the composition of landings and not the aggregate volume.

The discard ban has some inbuilt flexibility, as any 5% of demersal catches from a fishing trip (called VS catch), irrespective of fish species or size, may be excluded from quota restriction (which means that VS catches are **additional** to the TAC). On sale of VS catches in public fish markets 20% of the revenue generated is paid to the vessel with the remaining 80% going to a designated research and development fund (the VS fund, under the auspices of the Ministry). The maximum of 20% return on VS catches means that there are limited incentives to land it; however, having the VS catch provisions within the fisheries management system allows the flexibility for vessels to land small catches which are outside their specific quota, preventing discards, improving the treatment of the fishery resource and promoting responsible fishing practices. VS catches of haddock in 2014/15 totalled 746 t[44].

Interactions of bottom contact gear with benthic ecosystem

[42] http://www.fisheries.is/main-species/cartilaginous-fishes/greenland-shark/

[43] Act concerning the Treatment of Commercial Marine Stocks No. 57, 3 June 1996: http://eng.atvinnuvegaraduneyti.is/media/acts/Act-no-57-1996-Treatment-of-Commercial-Marine-Stocks.pdf

[44] http://www.fiskistofa.is/veidar/aflastada/vs-afli/vsafli.jsp

The Icelandic groundfish fishery is multispecies in nature with vessels simultaneously targeting numerous species; as such the effects of bottom contact fishing gears are not separable by species and thus are generally attributed to the fishery as a whole rather than to any species in particular.

The most widely used bottom fishing gear in Icelandic waters are demersal otter trawls which consists of a large net bag rigged with ground rope and a headline to keep the net open vertically and otter boards which achieve the same in the horizontal plane while simultaneously keeping the trawl on the seabed. The effects of demersal trawling are dependent on seabed and community type with effects on large emergent epifauna more severe than on smaller encrusting organisms; areas subject to regular hydrodynamic disturbance, such as winter storms in shallower areas, have also been shown to be more naturally resilient to fishing disturbance.

The available data on fishing effort of the Icelandic fleet is very accurate and have made it possible to map in detail the distribution of effort by the major bottom contact fishing gears used to catch haddock around Iceland (Figure 30).

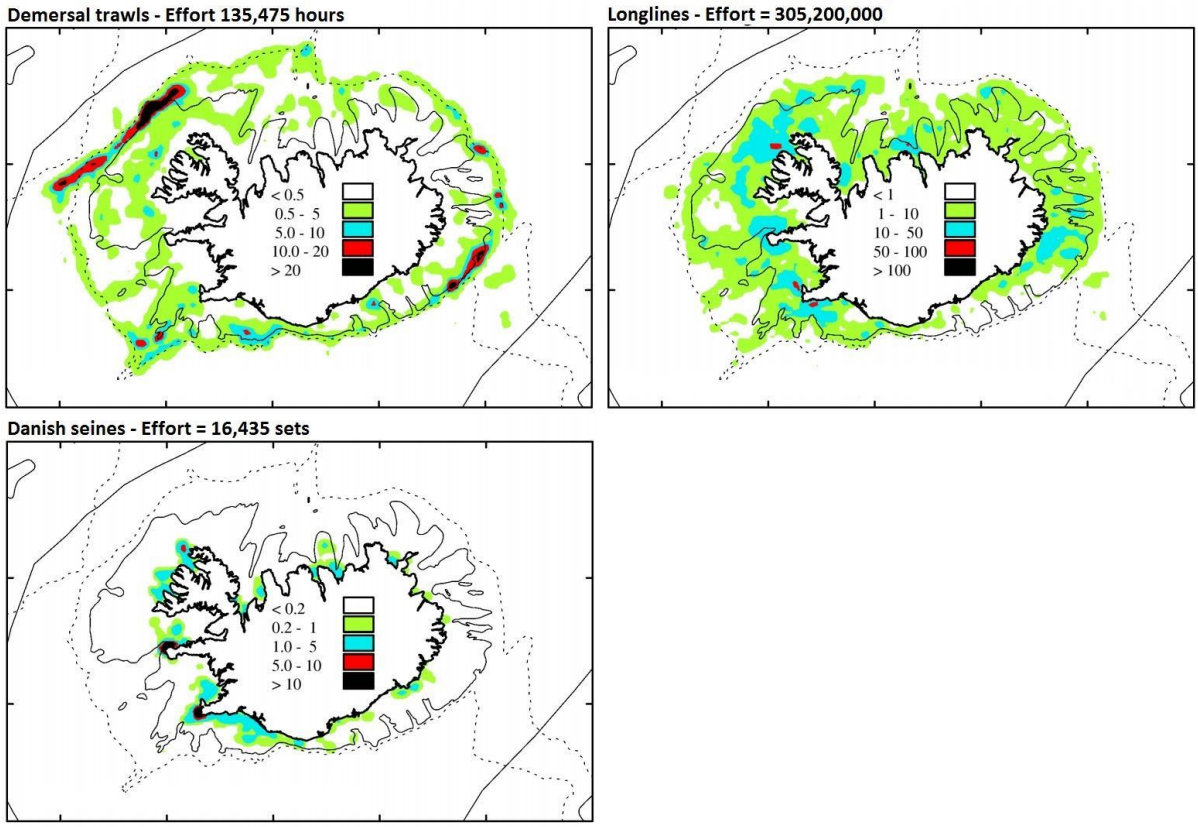


Figure 30. Distribution of effort by the major bottom contact fishing gears used to catch haddock around Iceland in 2014. The relevant effort metric for each gear type is presented above panels. Source: http://www.hafro.is/Astand/2015/vidaukar_2015.pdf

Protection of Vulnerable Marine Ecosystems (VMEs)

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

Seabed mapping is a key aspect of this policy and is the remit of the MRI. Emphasis has been on mapping fishing grounds and benthic communities and habitats; in the coming years the mapping of benthic assemblages considered to be sensitive to disturbance by bottom gear will be prioritised. The available data on fishing effort around Iceland is very accurate with maps of the spatial distribution of fishing effort around Iceland available. The combination of data relating to the distribution of sensitive habitats and fishing effort is important in order to predict species and habitats at risk from fishing activity. Two VMEs of particular importance within Icelandic waters are sponge and cold water coral communities.

Sponge communities

The waters around Iceland, at least down to 500 m depth, are very rich in habitat forming sponge communities (Klitgaard and Tendal, 2004). Bycatch analysis carried out during the 2002 groundfish survey enabled the estimation of the distribution of mass sponge occurrences on the Iceland shelf (Ragnarsson and Steingrimsson, 2003) with the authors speculating that sponge bycatch, a proxy for distribution, was lower in areas of high fishing effort (Figure 31).

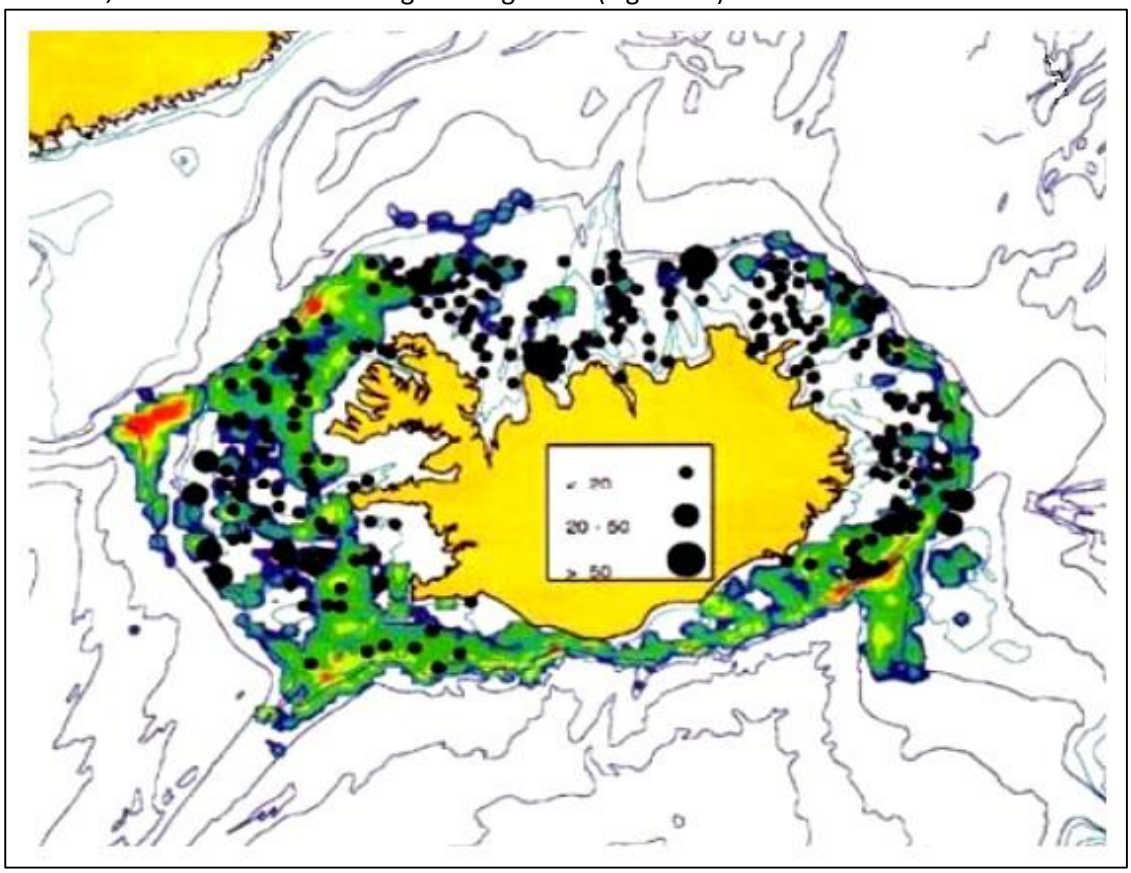


Figure 31. Biomass of sponge bycatch in 2002, superimposed on fishing effort as mean annual swept area (nm^2 per 1° latitude x 1° longitude cell). Black dots indicate total biomass (kg/h otter trawl haul) of sponges in the 2002 groundfish survey by the Marine Research Institute. Source: http://qsr2010.ospar.org/media/assessments/Species/P00485_deep_sea_sponge_aggregations.pdf

There are no strategic conservation plans in place specifically for sponges; however, coastal areas within 4 – 12 nm of the coast are closed to bottom trawls (total area of 45,290 km^2) offering protection to benthic organisms such as sponge communities. In addition, outside of 12 nm, several permanent regulatory fisheries closures (total area 13,094 km^2) exist within Icelandic waters where otter trawls, and in most cases long-lines, are banned (Clause 1.3.2.3. Figure 1). While the primary aim of these closures is to protect important nursery grounds for key commercial species they also, by excluding bottom gear, provide de facto protection for benthic organisms. Finally, ten closed areas, some of

which have considerable abundance of sponges, have been established in Icelandic waters to protect cold water corals, (see below); within those areas all activities with the potential to impact the seabed are prohibited.

Cold water coral communities

The coral (*Lophelia pertusa*) closures protect a species of cold-water coral which grows in the deep waters throughout the North Atlantic ocean and is associated with diverse communities. *L. pertusa* is extremely slow growing and may be harmed by destructive fishing practices. In 2004 a research project using a Remote Operated Vehicle ROV to map coral areas off Iceland was started, with survey effort targeted based on questionnaires results from fishermen. As a result of the survey 10 areas in to the southeast of Iceland were permanently closed to fishing in order to protect coldwater corals (see Figure 32).

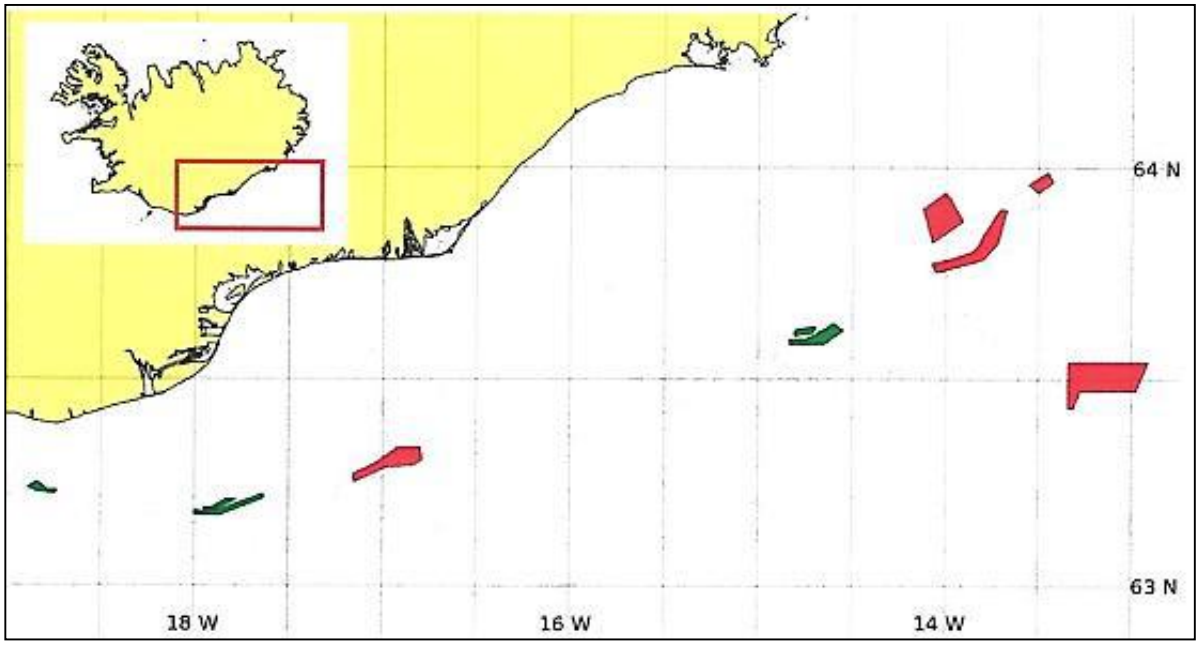


Figure 32. Location of closed areas for the protection of cold water corals in water to the southeast of Iceland.

Hydrothermal vent areas

There are two known hydrothermal vent areas on the Icelandic continental shelf with series of chimneys and fissures, both inside Eyafjord, North Iceland (Figure 33). In addition, there are known hydrothermal vents deep north of Iceland on the Grimsey-Kolbeinsey ridge and at Steinakoll, south of Melsa at the Reyjkjanes ridge, Southwest Iceland. The chimney areas in Eyjafjord area are fully protected by environmental law/regulation. The other vents are in more remote areas and with less surface structure and have thus not been considered under serious threat by fishing activities.

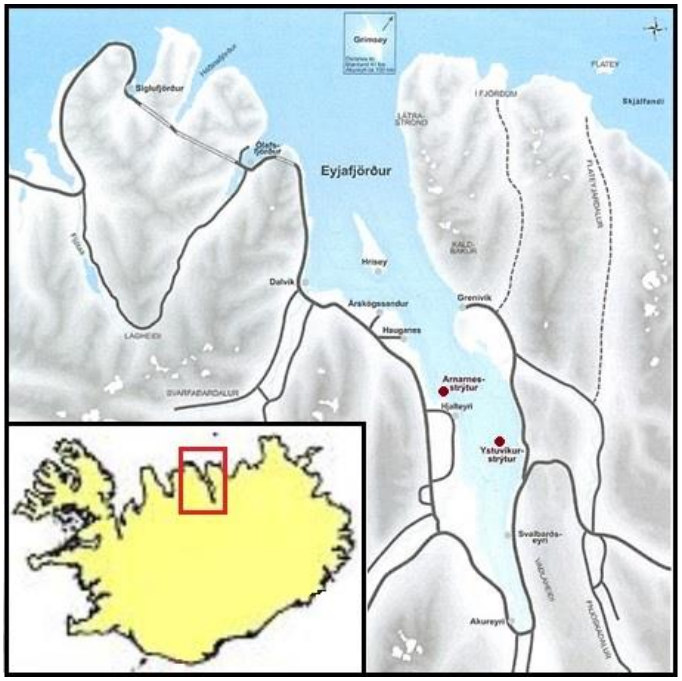


Figure 33. Location of closed areas for the protection of cold water corals in water to the southeast of Iceland.

Cumulatively approx. 58,000 km^2 of the 109,000 km^2 of Icelandic shelf area within which fishing activities occur is closed to bottom trawling; trawl closures make up in excess of half the total fishable area. Furthermore, not all the fishable shelf areas outside closed areas are trawlable, as some parts of the seabed are unsuitable for trawl gear; this can be seen in Figure 11 (top left panel). While a closed area may be designed to protect one particular species/group of species within an ecosystem the benefits are not exclusive to that species and the closure may offer *de facto* protection to other ecosystem components. Therefore, while areas may not be specifically designed to benefit VMEs, with a total effective closed area in excess of 50% it is felt that suitable protection for VMEs is in place within the Icelandic EEZ.

Icelandic marine ecosystem and the haddock fishery

The main spawning grounds of most of the exploited fish stocks in Iceland are in the Atlantic water south of the country while nursery grounds are off the north coast. The physical oceanographic character and faunal composition in the southern and western parts of the Icelandic marine ecosystem are different from those in the northern and the eastern areas. The former areas are more or less continuously bathed by warm and saline Atlantic water while the latter are more variable and influenced by Atlantic, Arctic and even Polar water masses to different degrees. Mean annual primary production is higher in the Atlantic water than in the more variable waters north and east of Iceland, and higher closer to land than farther offshore. Similarly, zooplankton production is generally higher in the Atlantic water than in the waters north and east of Iceland.

In Iceland, Capelin (*Mallotus villosus*) is the most important pelagic stock and cod (*Gadus morhua*) is by far the most important demersal fish stock. Whales are an important component of the Icelandic marine ecosystem, and Icelandic waters are an important habitat for some of the largest seabird populations in the Northeast Atlantic. In the waters to the north and east of Iceland, available information suggests the existence of a simple bottom-up controlled food chain from phytoplankton through *Calanus spp.*, capelin and to cod. Less is known about the structure of the more complex southern part of the ecosystem. The Icelandic marine ecosystem is highly sensitive to climate variations as demonstrated by abundance and distribution changes of many species during the warm period in the 1930s, the cold period in the late 1960s and warming observed during the recent years.

Interactions with Seabirds and Marine Mammals

A minor non-conformance (text below), regarding the lack of clear data to assess the effects of the haddock fishery on seabirds and marine mammals, was assigned during initial assessment of the Icelandic haddock fishery and corrective action was initiated.

Text of the non-conformance:

"Although data collection on marine mammals and seabirds is in the process of being improved, the fishery dependent data system (logbook) to assess the bycatch level of marine mammals and seabirds are not available yet".

The Icelandic government implemented a process to improve data collection relating to fisheries interactions and bycatch of marine mammals and seabirds. Measures taken to date include:

- Formation of a steering group of the Ministry of Industries and Innovation (MII), the Directorate of Fisheries and the MRI to formulate a plan aimed at improving the documentation of seabird and marine mammal bycatch
- Revision of the regulation on logbook reporting making it mandatory to report bycatch of marine mammals and seabirds.
- Improved returns of bycatch data from e-logbooks
- Changes to paper logbooks to enhance recording possibilities
- Increased enforcement of documentation of the bycatch of birds and marine mammals
- Evaluation of results obtained

The electronic logbook system designed by TrackWell allows for marine mammal and seabirds to be recorded along with normal catch; the below screen grab shows the section of the e-log designed to record bycatch of marine mammals and seabirds (Figure 34). In total there are 171 marine mammal and seabird species pre-programmed into the e-log system that are selectable by fishers.

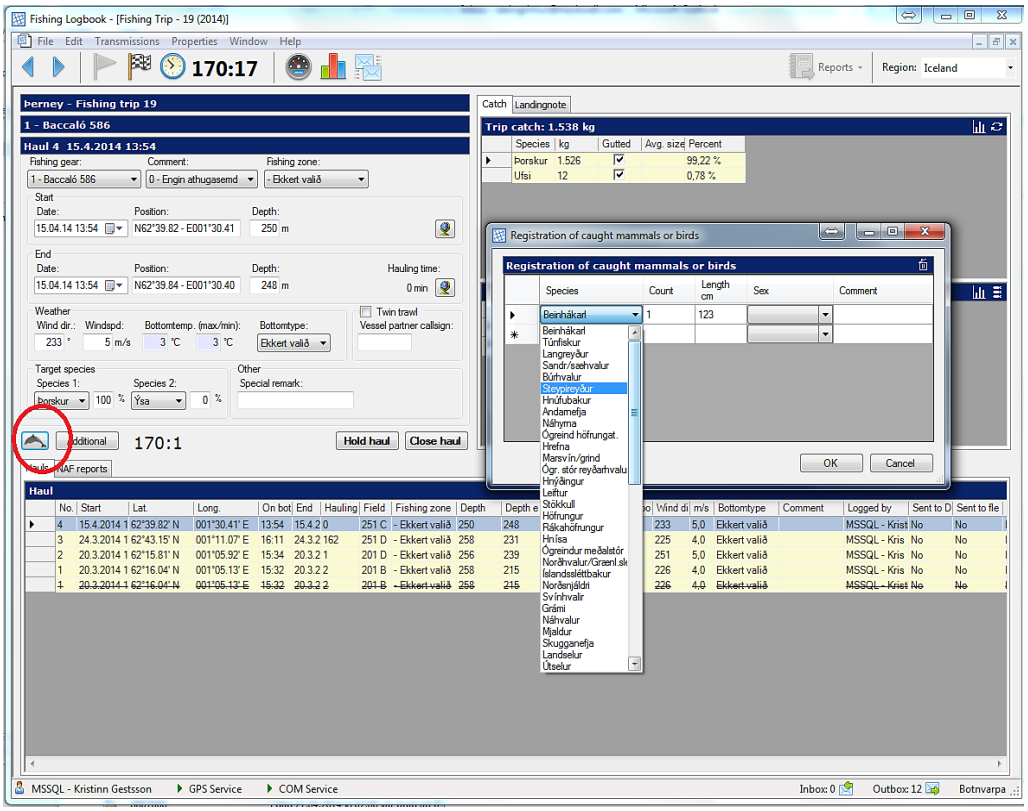


Figure 34. Screen grab showing the section of the Iceland electronic logbooks designed to record bycatch of marine mammals and seabirds.

The remaining step in the agreed corrective action related to the original non-conformance, overall appraisal by the steering group, of both the operational aspects of the changes to the reporting system as well as the results obtained is due to be completed shortly.

In a report on seabird and marine mammal bycatch in Icelandic fisheries, Pálsson *et al.,* (2015)[45] found that reports of seabird and marine mammal bycatch were very few in all gear types with the exception of gillnets; note many other species including haddock are also caught in gillnets targeting cod. However, the report also stated that it has been reported that sea birds are attracted to the baited hooks in longline fisheries, and that seals and small whales occasionally get caught in bottom trawls. In an update provided to the assessment team MRI summarized records of seabird and marine mammal bycatch in the Icelandic longline and bottom trawl fisheries in 2014 and 2015 based on data from both onboard observers (representing approx. 1% coverage of the entire fleet) and records from the electronic monitoring system described above.

Seabird Interactions

Longlines

Currently, long-liners in Iceland utilise bird scaring devices [acoustic cannons; scaring (tori) lines] to shield baited hooks as gears are shot in order to prevent encounters with seabirds and use night setting of longlines to minimise bird interactions.

Based on the MRI update both observer and electronic logbook data from the longline fishery is dominated by fulmars, with lesser numbers of northern gannets, cormorants, black guillemots and great black-backed gulls also being reported. Over the two years, the observers reported 47 birds caught in the longline fishery; 37 fulmars, 3 northern gannets, 2 cormorants, 3 black guillemots and 2 great black-backed gulls (Table 4). When these numbers are extrapolated to estimate total numbers caught in the longline fishery over the two years, it was estimated that in total 5128 seabirds were caught, 4037 of which were fulmars; this corresponds to approx. 3 birds per million hooks set.

Far fewer incidences of seabird bycatch were reported via the electronic logbook system over the same period, 169 for the entire fleet over the two years. In addition only two species were reported, 168 fulmars and a single northern gannet. However, almost all of those birds (157 out of 169) were reported in 2015 which suggests increasing reporting via the electronic system; a trend the MRI expects to continue. No seabird species were observed in the bottom trawl fishery.

Table 4. Reported/observed seabirds caught in the longline fishery around Iceland in 2014-2015 as recorded by at-sea observers or reported via e-logbook system.

Year	Report method	Species	Est. total number	Number/million hooks
2014	Observers	Fulmar	2490	2.55
2014	Observers	Northern gannet	113	0.12
2014	Observers	Cormorants	113	0.12
2015	Observers	Fulmar		2.00
2015	Observers	Black guillemot		0.41
2015	Observers	Northern gannet		0.28
2015	Observers	Great black-backed gull		0.28
2015	Observers	Cormorants		0.14
2014-2015	Observers	All	5128	2.97
2014-2015	E-logbook	All		0.10

[45] http://www.hafro.is/Bokasafn/Timarit/fjolrit-178.pdf

Gillnets

According to Pálsson *et al.* (2015), which examined bycatch of seabirds and marine mammals in Icelandic fisheries, the annual MRI cod gill net survey mimics fleet effort and represents approx. 2% of the total effort in the fishery. The study found that seabird bycatch in gillnets (excluding the lumpsucker fishery) was composed of 11 species and was dominated by common guillemots and northern fulmars (Table 5); note haddock does not comprise a significant percentage of gillnet catches around Iceland.

Table 5. Calculated bycatch of seabirds in 2013 in gillnet fisheries (excluding lumpsucker gillnets).

Seabird species	Estimated total number	IUCN Listing
Common guillemot	4,402	Least Concern
Thick billed guillemot	87	Least Concern
Auk	135	Least Concern
Atlantic puffin	8	Vulnerable
Razorbill	32	Least Concern
Black guillemot	8	Least Concern
Northern fulmar	1,144	Least Concern
Northern gannet	191	Least Concern
Common eider	64	Least Concern
Red-throated loon	8	Least Concern
Long-tailed duck	24	Vulnerable

Of the seabird species reported in the fishing gears catching haddock all, except for Atlantic puffin and long-tailed duck, are listed as species of least concern on the IUCN Redlist; both Atlantic puffin and long-tailed duck are listed as vulnerable. The majority of seabird catches are composed of common guillemots and northern fulmars both of which, according to Pálsson *et al*., (2015), have a population of between 2 and 3 million individuals. While listed as vulnerable throughout its range the Atlantic puffin is the most common seabird in Iceland and its population is estimated to consist of 2 to 3 million breeding pairs. Declines in seabird species around Iceland are thought to be as a result of fluctuations in available food sources due to environmental variation. Given the numbers of seabirds caught compared to the overall populations and the level of natural variation in seabird populations as a result of environmental drivers it is unlikely that Icelandic haddock fisheries are having significant negative impacts on any seabird species.

Marine mammal interactions

Marine mammal interaction are minimised by the fleet avoiding sites and adopting fishing and hauling techniques that minimise the interaction between fishing gear and these animals. Catches from gillnets made up only 0.82% of total haddock catches in the 2014/15 season meaning that fishing for haddock is likely having little impact on pinnipeds and cetaceans.

Bottom trawls

Overall, there were few instances of by-catch of marine mammals in the groundfish bottom trawl fishery, with only one harbor seal recorded by the on-board observers and likewise one harbor seal reported in the electronic log books in 2014 and 2015. Using the number of seals recorded by the observers to estimate the number of seals caught by the entire fleet, it was estimated that a total of approx. 75 harbor seals were caught in the fishery in 2014 and 2015 combined; corresponding to 0.36 harbor seals/1000 hours of trawling. It is however, important to note that this seal was caught outside of the main fishing areas for haddock by a trawler targeting Greenland halibut (Figure 35), and the numbers presented here might therefore be an overestimate for the haddock fishery. No other catches of marine mammals were observed in the bottom trawl fishery and no incidences of marine mammal bycatch were recorded in the longline fishery.

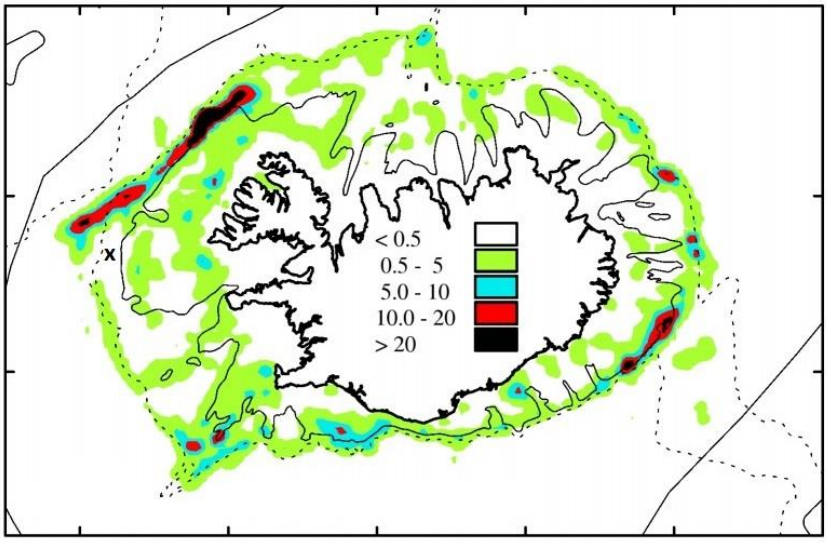


Figure 35. Location of the single harbor seal caught (marked with an x) in the Icelandic bottom trawl fishery in 2014-2015. Bottom trawl effort for haddock in 2014 is shown with the colored contours, where warmer colours indicate higher fishing intensity.

Gillnets

Bycatches of cetaceans particularly harbour porpoises are more prevalent in the mixed gillnet fishery when compared to seal bycatch. Available population estimates for porpoises are relatively old, but Stenson (2003) notes that the population of harbour porpoise around Iceland in the late 1980's to be in the order of 27,000 individuals which is likely to be an underestimate. As previously stated Pálsson *et al.* (2015) used data from the annual MRI cod gill net survey, which represents approx. 2% of the total effort in the fishery, to estimate bycatch from the fishery as a whole; mean bycatch per net in the gill net fishery was assumed to be the same as in the MRI gillnet survey. The study found that harbour porpoise were the most commonly bycaught marine mammal in gill nets. The annual estimate of porpoise bycatch has decreased in recent years in line with decreased gillnet effort from a high of 7,300 animals in 2003 to between 1,400 and 1,600 animals from 2009 to 2013 (Table 6). Bycatches of harbour and grey seals in the gillnet fishery in 2013 were estimated at 470 and 33 respectively with an additional 235 harbour and 107 grey seals being taken in the lumpsucker gillnet fishery (Table 7).

Table 6. Calculated bycatch of harbour porpoises from 2002 to 2013 in gillnet fisheries (excluding lumpsucker gillnets). Total bycatch estimated in proportion to porpoise bycatch estimate in MRI gillnet survey.

Year	Nets Pulled	Estimated total number
2002	1,240,988	4,797
2003	1,286,079	7,301
2004	1,388,808	6,289
2005	1,070,369	4,849
2006	836,893	3,142
2007	479,831	2,717
2008	549,331	2,064
2009	594,268	1,454
2010	447,269	1,639
2011	434,905	1,640
2012	414,686	1,492
2013	345,443	1,637

Table 7. Calculated bycatch of marine mammals (excluding harbour porpoises) in 2013 in the cod gillnet fishery.

Marine mammal species	Estimated total number	IUCN Listing
Dolphin spp.	51	Least Concern
White-beaked dolphin	9	Least Concern
Humpback whale	1	Least Concern
Harbour seal	470	Least Concern
Grey seal	33	Least Concern
Harp seal	13	Least Concern
Bearded seal	11	Least Concern
Hooded seal	7	Vulnerable
Ringed seal	12	Least Concern

Of the marine mammal species reported in the fishing gears around Iceland all, except for hooded seals which are listed as vulnerable, are listed as species of least concern on the IUCN Redlist; hooded seal bycatch across the gillnet fleet in 2007 was estimated to total 7 animals. Marine mammal bycatch in the cod gillnet fishery from 2003 to 2008 was dominated by two species harbour porpoises and harbour seals which made up 73% and 21% of gillnet bycatches respectively.

Harbour porpoises are the most commonly bycaught marine mammal with annual estimates of bycatch having decreased, in line with decreased gillnet effort, since 2003 from 7,300 animals to about 1,600 animals annually from 2009 to present. With an additional 400 harbour porpoises caught in lumpsucker nets, the total has likely been about 2000 animals annually since 2009 or between 1.2% and 6.0% of the total population based on best available estimates. Estimates of the total population of harbour porpoises are at this stage almost 30 years old and Pike *et al*. (2009)[46] stated that, in addition to estimates of the present by-catch of harbour porpoises, absolute abundance estimates for the area are urgently required in order to estimate the sustainability of the ongoing bycatches of harbour porpoises. It is thought that increasing frequency of bycatches of porpoises in the MRI gillnet survey may indicate an increasing population in the light of decreasing gillnet effort in Icelandic fisheries. According to Pálsson *et al*., (2015) if the recent increase seen in the MRI gill net survey numbers is factual the replacement potential must be higher than the 1.7% precautionary reference point usually used.

According to a management plan for the harbour seal population in Iceland drafted in 2010 efforts are to be made to keep the population at or above the 2006 population estimate of 12,000 animals. Should the population decrease considerably strict measures are to be taken to curb the decline and promote recovery; a definition of a considerable decrease was not provided. According to the MRI if a 25% decrease is considerable, there is a 15% chance that the population was below that mark at the time of the last full count in 2011; a total count is planned for the summer of 2015. The 2015/2016 report also states that it is important to monitor Icelandic harbour seal populations and improve the recording of all seal deaths. The MRI reports states that it does not have enough data relating to overall population estimates to assess whether or not the current population is in accordance with the governmental management plan of 2010[47].

As previously stated gillnets account for a very small proportion (0.82%) of haddock catches around Iceland meaning directed fisheries for haddock, which primarily use demersal trawls, longlines and Danish seines, are unlikely to be having major impacts on Icelandic populations of marine mammals. In addition while longlines account for 41% of total haddock catches and are a major contributor to

[46] http://www.hafro.is/~thg/NAMMCO/NAMMCO-publ/nass/ch08_web.pdf
[47] http://www.hafro.is/Astand/2015/english/seals_2015.pdf

bycatches of seabirds, the total numbers of bycaught seabirds do not comprise significant proportions of overall seabird populations meaning Icelandic haddock fisheries are unlikely to be having major impacts on seabirds around Iceland.

Following the implementation of new mandatory logbook reporting procedures and the presentation of new data (see above) on the levels of seabird and marine mammal bycatch in the Icelandic haddock commercial fishery the assessment team are highly confident that sufficient evidence is available to demonstrate conformance to guiding principle 3.1.1; therefore, this element is re-scored to the high confidence level; the non-conformance previously assigned is now closed.

However, in the data supplied by the MRI far fewer incidences of seabird and marine mammal bycatch were reported via the electronic logbook system than would be expected given the levels reported by onboard observers during the corresponding period. While reporting of seabird bycatch via the e-log system increased in 2015 levels of seabird and marine mammal bycatch were still significantly below what would be expected. Accordingly levels of self-reporting of bycatch will be reviewed during the second surveillance activities in late 2016.

At present, due to the low level of gillnet use, the Icelandic haddock fishery is less likely to pose a threat to marine mammal species than other fisheries; however, the proportion of total landings contributed by gillnets should continue to be monitored in future in case this is seen to change.

Fundamental Clause:	**3.2.1 Information gathering and advice**			
Supporting Clauses:	3.2.1.1			
Clause Guidance:	***Information shall be available on fishing gear used in the fishery, including the fishing gears' selectivity and its potential impact on the ecosystem. Stocks of non-target species commonly caught in the fisheries for the stock under consideration may be monitored and their state assessed as appropriate.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE
Information is available on fishing gear used in the fishery, including the fishing gears' selectivity and its potential impact on the ecosystem. Stocks of non-target species commonly caught in the fisheries for the stock under consideration are monitored and their state assessed as appropriate.

EVIDENCE
There is information available on the legal specification of fishing gear in the Icelandic groundfish fishery. The primary aim of fishing gear regulations is size selectivity of the gear with a secondary aim being species selectivity. Gears are regulated in several ways to regulate both size and species selectivity.

Demersal otter trawls are the most important gear in use in Icelandic fisheries. Cod, demersal redfish, haddock, saithe and Greenland halibut make up the majority of bottom trawl catches but large amounts of plaice, Atlantic catfish, spotted catfish, ling, blue ling, tusk, great silver smelt and lemon sole are also caught; catch composition may vary depending on season and area fished. In the mixed groundfish fishery, the minimum mesh size is 135 mm, the largest minimum mesh size in the north Atlantic, with selectivity devices also required in some areas. The minimum allowed mesh size has been consistent since 1976 when it was upped from 120 mm; it had previously been 110 mm up until 1963.

Even with a minimum mesh size of 135 mm small and immature fish may be retained by the gear. The retention rate of the gear is species specific and may change depending on the volume of catch already in the net. In order to further reduce the risk of unwanted bycatch a range of selectivity devices has been developed that exclude the bycatch from the trawl; these devices generally consist of sorting grids or square mesh panels that exclude bycatch larger than the target species, such as excluding catches of undersized haddock from trawls used to target nephrops.

The MRI routinely conducts selectivity experiments to assess the performance of the main fishing gears and to assess ways in which selectivity might be improved. While MRI studies have shown codend selection to be appropriate, there has been a shift in the types of materials used to construct the trawls which may potentially impact the trawls performance when it comes to excluding unwanted catches.

Long-liners in Iceland are obliged to use protective devices to shield baited hooks as gears are shot in

order to prevent encounters with seabirds. Fishermen tend to use automatic gas guns and night settings (i.e. haul gear at night minimizing seabird interaction), generally in the winter period. The requirement follows Regulation 456 issued in 1994.

Since the introduction of electronic log-books in the Icelandic fleet, more technical details of fishing gear construction have been routinely gathered. The gear technology group have also investigated the utility of this type of data in terms of refinements in CPUE estimates and trawl footprint (swept area)[48].

Stocks of non-target species commonly caught in the fisheries for the stock under consideration are monitored and their state assessed as appropriate; non-target species in this instance refer to other commercially fished stocks and not to other marine organisms that may be retained. The MRI provides annual catch advice for 35 different species, while catch statistics are routinely collected and publically available for 72 species. Note that for many of the species listed there is limited spatial overlap with haddock catches and therefore the technical interaction between these species and redfish will be limited or absent. See discussion and figures relating to associated species in clause 3.1 for further details.

[48] http://www.ices.dk/reports/SSGESST/2011/WGFTFB11.pdf

Fundamental Clause:	**3.2.2 By-catch and discards**		
Supporting Clauses:	3.2.2.1, 3.2.2.2, 3.2.2.3		
Clause Guidance:	***Discarding, including discarding of catches from non-target commercial stocks, is prohibited. Where relevant, appropriate steps shall be taken to avoid, minimize or mitigate encounters with seabirds and marine mammals. Accordingly, non-target catches, including discards, of stocks other than the "stock under consideration" should not threaten these non-target stocks with serious risk of extinction; if serious risks of extinction arise, effective remedial action shall be taken.***		
Evidence Rating:	**☑ High**	**☐ Medium**	**☐ Low**
Non-conformance:		**☐ Minor NC** / **☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE
Discarding, including discarding of catches from non-target commercial stocks, is prohibited. Non-target catches, including discards, of stocks other than the "stock under consideration" do not pose serious risks of depletion to these stocks.

EVIDENCE
Icelandic fishery law prohibits the discarding of all commercial stocks. Commercial species are listed yearly in documents such as the annual MRI advice[49]. Catches of these species are subjected to a discard ban (regulation no. 57/1996) with inbuilt flexibility measures as previously discussed in Section 3.1. There has been one prosecution case of discarding witnessed by the Coast Guard in the last 10 years. Monitoring for compliance is a feature of the at sea inspectors and the Coast Guard.

Non-target catches, including discards, of stocks other than the stock under consideration, in this case haddock, do not threaten these non-target stocks with serious risk of depletion. Details of this have been provided under clause 3.1.

As of February 2014, all interactions between fishing gears and marine mammals/seabirds including the number and species of the animal in question must be reported[50]. Bycatches of marine mammals and seabirds are not considered a significant problem in the haddock fisheries further information provided under clause 3.1.

The MRI is in the process of improving the recording and data collection for these species groups and an up to date evaluation is due. See the evidence provided under clause 3.1 for specific details.

[49] http://www.hafro.is/Astand/2015/summary_2015.pdf
[50] http://www.reglugerd.is/interpro/dkm/WebGuard.nsf/key2/557-2007

Fundamental Clause:	**3.2.3 Habitat Considerations**			
Supporting Clauses:	3.2.3.1, 3.2.3.2, 3.2.3.3, 3.2.3.4			
Clause Guidance:	***If studies show that the spawning or nursery areas or other essential habitats in the fishing area are at risk and highly vulnerable to negative impacts of particular fishing gear, such impacts shall be limited in range relative to the full spatial range of the habitat or else action is taken to avoid, minimise or mitigate such impacts. Management measures must take into account and protect through closures significant continuous stony coral areas, identified through scientific and formal methods. Known thermal vents shall be protected through area closures to fishing activities with gear that has significant bottom impact during normal operation.***			
Evidence Rating:	**☑ High**	**☐ Medium**		**☐ Low**
Non-conformance:		**☐ Minor NC**	**☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

The Icelandic authorities have implemented an extensive array of areal closures within the Icelandic EEZ. These include permanent, seasonal and periodic closures aimed at protecting both juvenile and spawning fish and are gear or fishery specific. These closures, in particular those of a permanent nature, provide wider ecological benefits over and above their intended fisheries management objective by offering *de facto* protection from fishing activity to other elements of the marine environment. While the majority of temporary closures to protect juveniles are aimed at protecting cod, haddock and saithe, these closures are likely to have a conservation benefit for other species too.

EVIDENCE

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The effects of bottom contact fishing gears are subject to ongoing research by the MRI and have been subject to review for all Nordic Seas, including Iceland (Garcia, 2007). The most vulnerable habitats were identified as those with long-lived benthic structures such as corals, sponge communities and maerl (*Lithothamnion* spp.), all of which can act as keystone species for diverse benthic communities. Garcia (2007) also drew attention to the fact that trawling can alter the age, size and community structure of fish populations. To counter some of the potential adverse effect of bottom contact gear a variety of technical measures (minimum mesh sizes, sorting grids) and closed areas are in force. For more information relating to closed areas within the Icelandic EEZ see supporting evidence for clause 3.1.

Fundamental Clause:	**3.2.4 Considerations**		
Supporting Clauses:	3.2.4.1, 3.2.4.2		
Clause Guidance:	***Foodweb considerations - If the stock under consideration is a key prey species in the ecosystem, the harvesting policy and management measures shall be directed to avoid severe adverse impacts on dependent predators. Management plans shall be developed and implemented in a timely fashion for avoiding, minimizing or mitigating any ecosystem issues properly identified, based on risk analysis and scientific advice, as being of serious concern in the fishery in question.***		
Evidence Rating:	**☑ High**	**☐ Medium**	**☐ Low**
Non-conformance:		**☐ Minor NC** / **☐ Major NC**	**☐ Critical NC**

SUMMARY EVIDENCE

The MRI has studied haddock, and its place in the ecosystem. haddock are not a key prey species but a major predator, and the magnitude of the haddock stock is likely to have an inverse impact on capelin, herring and shrimp stocks.

EVIDENCE

There is a growing international focus on food web considerations in fisheries management; this is evidenced by the Marine Research Institute's involvement in the development of ecosystem based understanding of the relationship between multi-species stocks and other ecosystem components – a so called 'multi-species stock system and management approach'.

Haddock are not a key prey species in Icelandic food webs[51]. Unlike cod, haddock are not heavily reliant on capelin as a primary food source and are mainly benthivores i.e. feeding on a mix of bottom dwelling organisms that live in coarse sand or gravel seabeds. The diet of haddock varies with the size of the fish, the time of year, and with the area. They feed mainly on worms, small molluscs, sea urchins and brittle stars, although if available they do feed on sandeels and capelin, although fish species are not considered as a significant component of their diet[52].

Management measures relevant to ecosystem effects of the fishery

As previously mentioned, for a variety of reasons large areas within the Icelandic EEZ are closed for fishing; various gear restrictions are also in effect. It is the policy of the Icelandic government to protect vulnerable marine ecosystems (VMEs; cold-water corals and hydrothermal vents), from significant adverse impact from bottom contacting gear. Known cold-water coral reefs and hydrothermal vents are protected through permanent closures. The MRI provides advice on closures to protect VMEs which are promptly processed within the Ministry of Industries and Innovation (Fisheries department).

[51]Jaworski, A., and Ragnarsson, S. A. 2006. Feeding habits of demersal fish in Icelandic waters: a multivariate approach. ICES Journal of Marine Science, 63: 1682-1694.

[52]http://firms.fao.org/firms/resource/10329/en

8. Performance specific to agreed corrective action plans

A minor non-conformance, regarding the lack of clear data to assess the effects of the haddock fishery on seabirds and marine mammals under Clause 13.1.1 of the Icelandic RFM Specification (version 1, September 2010), was assigned during the Icelandic haddock fishery Initial Assessment (Oct 2013) process and period; corrective action was initiated details below. When the haddock fishery was reassessed against the revised specification (version 1 revision 1 March, 2014) of the FAO Based Icelandic Responsible Fisheries Management (IRFM) Certification Program Specification the non-conformance remained active under Clause 3.1.1 of the revised specification and the corrective action plan was retained.

Clause 13.1.1 of the Icelandic RFM Specification (version 1, September 2010)
Adverse environmental impacts on the resources from human activities are assessed and, where appropriate, corrected.

Clause 3.1.1 of the Icelandic RFM Specification (version 1, revision 1, March 2014)
Adverse impacts of the fishery on the ecosystem shall be considered and appropriately assessed and effectively addressed.

Text of the non-conformance:

"Although data collection on marine mammals and seabirds is in the process of being improved, the fishery dependent data system (logbook) to assess the bycatch level of marine mammals and seabirds are not available yet".

After issuing the minor nonconformance to the client representative, the client responded formally, as part of a requested corrective action:

"*A Steering group of the Ministry of Industries and Innovation (MII), the Directorate of Fisheries and the MRI has laid out a detailed date-marked operation plan which has the aim of improving the shortcomings which have occurred with respect to the documentation of seabirds and marine mammal bycatch into logbooks in fishing operations. The plan entails increased enforcement of documentation of the bycatch of birds and marine mammals by the fishery inspectors themselves. The returns of data from e-logbooks will also be improved and changes made in paper logbooks to enhance recording possibilities along a revision of the regulation on logbook. The plan furthermore entails an annual compiling and processing of bycatch data and an annual evaluation results obtained with the aim of improving the plan. The plan also provides for an overall appraisal of the operations undertaken and results obtained as well as an evaluation of the magnitude of bycatch before the end of 2015, which will be issued by the Steering group".*

Timetable for corrective actions:

- **January 2013**: a Steering group has been created by the Ministry for coordinating the work of the Directorate and the MRI with the objective to ensure effective monitoring of seabirds and marine mammals.
- **March 2013**: improvement of the Directorate neutral documentation of seabirds and marine mammals bycatch independent of the vessel's logbook when fisheries inspectors operating on board a vessel along with technical improvements of transfer of bycatch data from the Directorate to the MRI.

- **April 2013**: changes in communication applications which will enable direct automatic transfer of bycatch data into the MRI database.
- **Prior to May 15th 2013**: the Steering group will have finished a review of Regulation no. 557/2007 on logbook which has objective to evaluate, whether the obligation to register all seabirds and marine mammals into the logbook is clear enough and satisfactorily stipulated.
- **Autumn 2013**: bycatch data will be compiled and processed for final analysis of results.
- **January 2014**: evaluation of the 2013 bycatch data recording.
- **Autumn 2014**: bycatch data will be compiled and processed for final analysis of results.
- **January 2015**: evaluation of the 2014 bycatch data recording.
- **Autumn 2015**: bycatch data will be compiled and processed for final analysis of results.
- **End of 2015**: the Steering group shall make an overall appraisal of the bycatch data recording and report along with an estimate of the bycatch of seabirds and marine mammals in the haddock fishery.

Progress towards non-conformance

The Icelandic government has implemented a process to improve data collection relating to fisheries interactions and bycatch of marine mammals and seabirds. Measures taken to date include the formation of a steering group aimed at improving the documentation of seabird and marine mammal bycatch, revision of the regulation on logbook reporting making it mandatory to report bycatch of marine mammals and seabirds, changes to logbooks to enhance recording possibilities, increased enforcement of bycatch reporting and regular evaluation of bycatch data obtained. The electronic logbook system used aboard Icelandic vessels allows for marine mammal and seabirds to be recorded along with normal catch; in total there are 171 marine mammal and seabird species pre-programmed into the e-logbook system that are selectable by fishers.

Pálsson et al., (2015) analysed reports of seabird and marine mammal bycatch in Icelandic gillnet fisheries and an update provided to the assessment team by the MRI summarised records of seabird and marine mammal bycatch in Icelandic longline and bottom trawl fisheries.

Based on the MRI update both observer and electronic logbook data from the longline fishery is dominated by fulmars, with lesser numbers of northern gannets, cormorants, black guillemots and great black-backed gulls also being reported. Over the two years, the report estimated that in total 5128 seabirds were caught, 4037 of which were fulmars; this corresponds to approx. 3 birds per million hooks set. In the data supplied by the MRI far fewer incidences of seabird bycatch were reported via the electronic logbook system than would be expected given the levels reported by onboard observers during the corresponding period. However, almost all reports of seabird bycatch reported via the e-log system were in 2015 which suggests increasing reporting; a trend the MRI expects to continue.

According to Pálsson et al. (2015), seabird bycatch in gillnets (excluding the lumpsucker fishery) was composed of 11 species and was dominated by common murre and northern fulmar.

The primary gear type for interactions with marine mammals are gillnets but some incidences of pinniped bycatch in bottom trawls have been recorded. Catches from gillnets made up only 0.82% of total haddock catches in the 2014/15 season meaning that fishing for haddock is likely having little impact on pinnipeds and cetaceans.

Overall, there were few instances of by-catch of marine mammals in the groundfish bottom trawl fishery, it was estimated that a total of approx. 75 harbor seals were caught in the fishery in 2014 and

2015 combined corresponding to 0.36 harbor seals/1000 hours of trawling; however, it is important to note that this is probably an overestimate for the haddock fishery. No other catches of marine mammals were observed in the bottom trawl fishery and no incidences of marine mammal bycatch were recorded in the longline fishery.

Bycatches of cetaceans particularly harbour porpoises are more prevalent in the mixed gillnet fishery when compared to seal bycatch. Pálsson *et al*. (2015) found that estimated bycatches of porpoises have decreased in recent years in line with decreased gillnet effort from a high of 7,300 animals in 2003 to between 1,400 and 1,600 animals from 2009 to 2013. Bycatches of harbour and grey seals in the gillnet fishery in 2013 were estimated at 470 and 33 respectively.

Following the implementation of new mandatory logbook reporting procedures and the presentation of new data on the levels of seabird and marine mammal bycatch in the Icelandic haddock commercial fishery (see above and Evidence section of Clause 3.1 for further details) the assessment team are confident that sufficient evidence is available to demonstrate conformance to guiding principle 3.1.1; therefore, this element is re-scored to the high confidence level; the non-conformance previously assigned is now closed.

9. Unclosed, new non-conformances and new corrective action plans

The non-conformance previously assigned, regarding the lack of clear data to assess the effects of the haddock fishery on seabirds and marine mammals under Clause 3.1.1 of the Icelandic RFM Specification (version 1 revision 1, March 2014), no longer applies. There are no new new-conformances.

10. Future Surveillance Actions

The non-conformance previously assigned, regarding the lack of clear data to assess the effects of the haddock fishery on seabirds and marine mammals under Clause 3.1.1 of the Icelandic RFM Specification (version 1 revision 1, March 2014), is now closed. However, in the data supplied by the MRI far fewer incidences of seabird and marine mammal bycatch were reported via the electronic logbook system than would be expected given the levels reported by onboard observers during the corresponding period. While reporting of seabird bycatch via the e-log system increased in 2015 levels of seabird and marine mammal bycatch were still significantly below what would be expected. Accordingly levels of self-reporting of bycatch will be reviewed during the second surveillance activities in late 2016.

In addition reported bycatches and the population status of both harbour seals and porpoises will be reviewed to assess whether Icelandic haddock fisheries are having significant impacts on these species.

While concordance between TAC and actual total catch in 2014-2015 was less than desired given a TAC overshoot of ~12% the Management Authorities have recognised and reacted to the issue. However, as of yet there is no data to suggest future levels of concordance will increase, accordingly levels of concordance will be reviewed during the second surveillance activities in late 2016 with a particular focus on the effectiveness of new management measures designed to take account of the contribution of foreign vessels to overall catches of haddock around Iceland.

Table 8. Key future surveillance actions.

Clause No.	Surveillance Action
3.1.1.	Review of levels of self-reporting of bycatch
3.1.1.	Review of harbour seal and porpoise bycatch
2.2.1. and 2.3.5.1.	Review of management system mechanisms to ensure concordance between TAC and actual total catch

11. Client signed acceptance of the action plan

See Section 8 and Appendix 2 for acceptance of the action plan aimed at addressing the non-conformance raised during initial assessment.

12. Recommendation and Determination

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

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14. Appendix 1.

Based on the technical expertise required to carry out the above fishery assessment, Global Trust Certification Ltd., is pleased to confirm the Surveillance Assessment team members for the fishery as follows.

Sam Dignan, (Lead Assessor)

Sam Dignan is a fisheries scientist who has previously worked with the Department of Environment, Food and Agriculture (DEFA), Isle of Man and Bangor University Fisheries and Conservation Science Group (Wales). He has a BSc in Biological and Chemical Sciences with Zoology from University College Cork and an MSc in Marine Environmental Protection from Bangor University. He has experience conducting stock assessments, from the survey design and implementation phases through to final analysis and report presentation; from 2013 to 2015 he was a member of the ICES working group on scallop stock assessment. He has been involved in providing scientific data to ensure fishery compliance with the Marine Stewardship Council's (MSC) certification framework and has participated in MSC surveillance audits from a client's perspective. Sam has extensive experience of interacting directly with fishers and their representative organisations as well as members of scientific and government institutions. He was previously an advisor to the Isle of Man Queen Scallop Management Board that manages the MSC certified Isle of Man queen scallop fishery. He has also worked on the spatial analysis of fishing activity, using Vessel Monitoring System (VMS) and logbook data, to spatially quantify fishing activity and fisheries-ecosystem interactions.

David Garforth, (Assessor)

Dave Garforth, BSc, HDip. (Applied Science), MSc has been involved in fisheries and aquatic resources for over 20 years. He has been engaged directly in the enforcement of fisheries legislation as a SOAFED (then DAF's) Fishery Officer operating in the UK. Duties included vessel monitoring, statistical assessment and routine surveillance for demersal, shellfish and pelagic fisheries and transhipments. Commercial fisheries experience includes fishery quality standards development and market auctioning at Belgium based PEFA, global industrial fishery supply for agri and aquaculture (Nutreco) and operational management. Fisheries research experience at Universities of Hull, UK and Cork, Ireland including reviews of salmon fisheries in the UK using fixed engines and nets, sea trout fishery sampling, assessment on the western seaboard of Ireland, and catch per unit effort studies under the Operational Research Programme for Fisheries and Aquaculture. Activities at the Irish Sea fisheries Board included review and development of aquaculture systems, operational management and environmental profile, as part of an environmental and quality team for the development of industry Codes of Practice and bay management systems (Coordinated local management systems). Dave is a lead IRCA approved auditor since 2005.

Dankert Skagen, (Assessor)

Dankert has recently retired from the Institute of Marine Research (IMR), Bergen, where he worked for 22 years. His responsibilities included stock assessment, multispecies work, in particular in the North Sea, work connected to the introduction of the precautionary approach in fisheries and recently, on development of harvest control rules and management strategies. He was leader of the IMR research program for population dynamics and multispecies investigations in 1996-97 and for the development of new assessment tools for North-East arctic cod in 1998-99 and the assessment package TASACS in 2007-08. In addition, he has developed several programs for simulating harvest control rules that are commonly used in fisheries management today. Within ICES, he has participated in a wide range of working groups and been chairman of several of them, including the Study Group

of Management Strategies. He was chairman of the Resource Management Committee for 3 years and member of ACFM for 7 years.

Gisli Svan Eirnasson, (Assessor)

Gísli Svan Einarsson has in depth knowledge of the management system and operational management of Icelandic ground fish fisheries during his previous employment as a Fleet Manager of FISK Seafood for 18 years. Specialist assessor skills stem from his knowledge of quota setting, allocation and monitoring and compliance. Local knowledge of fishery management concerns, current knowledge, fleets, organizations, fleet structure and supply chains. Gísli Svan has been a Project Manager of many Projects concerning the Fishing Industry and a specialist in fish traceability. Gisli is currently employed as Manager by VERID Science Park, Iceland. Qualifications include a BA from the University of Bifröst and Diploma in Administration in Fishing Industry from “Tækniskóli Íslands” now the University of Reykjavík.

15. Appendix 2.

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The Fisheries Association of Iceland
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105 Reykjavík.

6 March 2013

Reference is made to the letter from Global Trust that you forwarded to the Directorate of Fisheries (DoF) and the Marine Research Institute (MRI). Following are the answers to the questions 1 and 2 in the letter.

1. Non-conformance

Regarding the non-conformance raised against Fundamental clause 13 issued during surveillance 1, relating to the absence of data collection for non-fish bycatch species, the Committee has requested more clarification and a formal output to confirm that action has been taken to correct the non-conformance identified during the assessment process. The Certification Committee requested the following from the Client of the fishery in question:

1.1 *What formal and verifiable actions have been taken to date since the issue of the non-conformance in regards to the closure of the non-conformance?*

In order to fulfill their supervisory role the fishery inspectors of the Directorate of Fisheries take part in fishing trips on board many vessels. Normally the inspectors stay on-board for the whole length of the fishing trip irrespective of its length. In carrying out their surveillance duties the inspectors' main role is to ensure good and responsible management of the fisheries resource by preventing discards, taking length measurements of fish in order to protect undersized fish and gather scientific data for the Marine Research Institute. The inspectors shall also enforce the captain´s satisfactory documentation of the catch and make independent observations of by-catch of seabirds and marine mammals into the vessel's logbook.

As reported last year, the system of electronic logbooks has now been installed in the vast majority of the commercial fleet. The logbook forms allow recording of all by-catch, including non-targeted fish species, mammals and seabirds. The Marine Research Institute has also announced its plan to quantify the effectiveness of the logbooks in this respect by comparing observations of fisheries inspectors and the records of logbooks with the aim to complete an assessment of by-catch levels by the end of 2014. Due to technical difficulties associated with the use of the electronic logbooks this date has been postponed by one year (see below).

Comparison of by-catch registered in the electronic logbooks with that from Marine Research Institute's surveys in comparable areas and season has indicated inadequate reporting of marine mammals and seabirds in the former and that further improvements are needed.

Similarly, preliminary results from comparisons of the electronic logbooks with data from the Directorate of Fisheries' observer scheme to evaluate the effectiveness of the new electronic logbook system for 2012 indicates underreporting of by-catch of seabirds and marine mammals in the electronic logbooks. This inefficiency of registration in the logbooks could partly be explained by technical difficulties in applying the new fields for this purpose including failure to update regularly to the latest version of electronic logbook. On the basis of this comparison, new instructions will be sent to the fleet to ensure improvements in these registrations. Fishery inspectors will continue to register all by-catch of marine mammals and birds independently from the electronic logbook system. This will enable the evaluation of the efficiency of the electronic logbooks from 2013 onwards. As outlined below, the evaluation process will continue on a yearly basis as a part of the Action Plan 2013-2015 aiming at a reliable estimate of by-catch levels by the end of 2015.

1.2 *Provisions of an Action Plan with a definite timeline for 2013, 2014 and 2015 that can be verified during the next surveillance assessment detailing the progressive actions to be taken towards resolution of the identified non-conformance.*

A steering group of the Ministry of Industries and Innovation (MII), The Directorate of Fisheries and the Marine Research Institute has laid out a detailed date-marked operation plan which has the aim of improving the shortcomings which have occurred with respect to the documentation of seabirds and marine mammal by-catch into logbooks in fishing operations. The plan entails increased enforcement of the documentation of by-catch into logbooks and independent documentation of the by-catch of birds and marine mammals by the fisheries inspectors themselves. The returns of data from electronic logbooks will also be improved and changes made in paper logbooks to enhance recording possibilities along with a revision of the regulation on logbooks. The plan furthermore entails an annual compiling and processing of by-catch data and an annual evaluation of the results obtained with the aim of improving the plan. The plan also provides for an overall appraisal of the operations undertaken and the results obtained as well as an evaluation of the magnitude of by-catch before the end of 2015, which will be issued by the steering group. The timetable of the action plan is as follows (the responsible agency indicated in paranthesis):

1. Fisheries surveillance (DoF)
In March of 2013, improvement of the Directorate of Fisheries neutral documentation of avian and mammalian by-catch independent of the vessel's logbook when fisheries inspectors operating on board a vessel along with technical improvements of transfer of by-catch data from the Directorate to the Marine Research Institute. This will facilitate a comparison between the logbook records and the documentation of by-catch by the inspectors.

The Directorate of Fisheries will during 2013 emphasize enforcement activity in inshore areas where bird and marine mammal by-catch is most likely to occur. Increased inshore surveillance will enable better monitoring and documentation of by-catch. The encouragement of captains to document by-catch into the vessels logbook will furthermore continue.

2. Logbooks (DoF)
Electronic logbooks now provide a specific window for registering the by-catch of seabirds and marine mammals. In April of 2013 changes will be made in a communications application which will enable direct automatic transfer of by-catch data into the data base of the MRI. A paper logbook will furthermore need to conform to a design where this by-catch can be registered in a specific window but this has previously been registered in a comment slot.

3. Laws and regulations on logbooks (MII, DoF, MRI)
Prior to May 15th 2013 the steering group will have finished a review of regulation no.557/2007 on logbooks which has the objective to evaluate, whether the obligation to register all seabirds and marine mammals in the logbooks of fishing vessels is clear enough and satisfactorily stipulated. If the review reveals that the provisions regarding the obligation to register such by-catch need to be strengthened, the steering group will recommend a change in the regulation.

4. Data and scientific processing (MRI)
During the autumn of the years 2013, 2014 and 2015 all data regarding by-catch will be compiled and processed with a deadline of December 15 of each year for final analysis of results.

5. Evaluation of enforcement success (MRI)
Based on data for each year an annual evaluation shall be carried out to estimate the benefits and success of the enforcement operations. Such an annual evaluation for the preceding year shall be completed prior to the end of January each year.

6. Overall evaluation (MII, DoF, MRI)
By the end of 2015 the steering group shall make an overall appraisal of the operations which have been carried out and present it in a report along with an estimate of the by-catch of seabirds and marine mammals in fisheries.

2. Discard ban in relation to Total Allowable Catch

"In 1996, a total ban of discards was introduced and any discards are subject to penalty. However, the discard ban has some flexibility, as any 5% of demersal catches from a fishing trip, irrespective of fish species or size, may be excluded from quota restriction, on the condition that catches are sold in public fish markets".

2.1 *The Committee has requested clarification as to how this 5% is accounted for in relation to avoiding overshooting of the TAC?*
Is 5% of the TAC taken off at the beginning of the year or what other mechanism is there available to make sure catches and discards are consistent with the overall TAC?

When the TAC is decided it does not include the so-called VS catch (the maximum 5% pr trip that may be excluded from quota deduction, referred to in question 2), which means that the such catch is additional to the TAC. In this context it is important to keep in mind that only 20% of the revenue of a VS catch goes to the fishing company and the crew and 80% goes to a designated research and development fund (the VS fund, under the auspices of the Ministry). This entails that the fishing companies have limited incentive and financial motivitation to land a such catch. Having the VS catch provisions within the fisheries management system, however, enables the fishing companies to land catches which are outside their specific quota thus preventing discards, improving the treatment of the fishery resource and promoting responsible fisheries. It also should be underlined that landing statistics show, that the permission to land a VS catch is not extensively practised by the fishing companies in the overall context bearing in mind that it can amount to the maximum of 5% of individual landings. The magnitude and proportion of cod landed as VS catch was 2.03% in the 2009/10 fishing year, 1.26% in 2010/11 and as low as 0.9% in the 2011/12 fishing year, respectively.

2.2 *How are gutted and ungutted catches in the TAC taken into account?*

The gutting factor (being 16% for cod) is a weighted average, where one has to take into account the catch for each period and for each gear type as well as the composition of the catch with respect to length.

Provide evidence on the weight conversion process from gutted to ungutted or vice versa and how this is in line with the overall TAC as set by the Minister (i.e. to avoid overshooting the TAC).

Article 9 of regulation no. 698/2012 on commercial fisheries for the 2012/2013 fishing season describes the method to be used for converting gutted fish to ungutted and vice versa. The gutting factor for cod is 16% which means that ungutted fish are converted to gutted by multiplying the total quantity with 0.84. Conversely a gutted cod is converted to an ungutted one by dividing the total quantity with 0.84. The allocated fishing quota is always based on gutted quantity and thus any subtraction from the allocated quota must be based on gutted fish. In the event that ungutted fish are landed they must always be converted to gutted quantity prior to subtraction from the allocated quota.

Since all species must be landed, even if they have no commercial value, what happens to landed species without commercial value/inedible that end up processed as fish meal?
Is that fishmeal with economic value? If so, it can be argued that even „noncommercial value" species actually have commercial value, this needs clarified.

It should be pointed out that fishers have a permission to throw species with no commercial value overboard but a species within the quota system can never be considered of non-commercial value. A fish species can only be considered of non-commercial value if the fishing company issues a statement declaring that a buyer could not be found despite considerable effort. There are very few cases of such declarations. Individual fishers on a fishing vessel can not decide whether a fish species is with or without a commercial value.

In the event that fish have been damaged during the fishing operation it is possible to land the catch to a fish meal factory in which case it is not subtracted from the quota allocation. The proper procedure in this case is to take the "damaged" catch to a fish market, weigh it and record it, and a market official decides whether the batch can be sold for a price. If the batch is saleable it is auctioned off and subtracted from the quota of the fishing vessel in question. If the fish market, on the other hand, deems the batch of fish as unsaleable or the catch can not be sold as a result of the damage it goes to a meal processing facility and is not subtracted from the vessel´s quota.

There is no incentive for landing damaged catches in order to avoid a subtraction from the vessel's quota . The value of fish meal is not high and the costs and effort associated with the registration of the catch for meal processing is such that it is not economical to follow that path. But it is important that the fisheries management system offers this possibility in the event that the catch is damaged so it can be landed, recorded and utilized instead of throwing it overboard, which is illegal. Then it is also important to note that there are very few incidences of damaged catch reported each year and the magnitude is negligible.

On behalf of the Directorate of Fisheries

Eyþór Björnsson
Fisheries Director

On behalf of the Marine Research Institute

Jóhann Sigurjónsson
Director General